COVID-19 related uncertainty, investor sentiment and stock returns in India

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Abstract : *Akin to the global markets, the Indian stock market also nosedived in response to the COVID-19 pandemic. However, this drastic fall was not persistent; rather a sharp recovery was witnessed as a result of sweeping investor enthusiasm and wide-ranging speculation. In this paper, we explore the relationship between investor sentiment, stock returns and important macro variables during the COVID-19 period spanning from January, 2020 to May, 2021. We have also conducted event analysis to see the significance of major events during the period. While the Great Lockdown and first fiscal package impacted the stock returns significantly, the first case reported, second fiscal package, vaccination drive and the second wave failed to create a commendable impact. The event analysis also suggests that the Indian stock market responds negatively to an increase in interest rate uncertainty. Our empirical analysis shows evidence of significant effect of investor sentiment on stock returns during all periods, except the period of extreme volatility. Moreover, the stock return is positively related to oil price and negatively related to the exchange rate. We also find mixed evidence of COVID-19 related information on stock market.*

Keywords: COVID-19 pandemic, uncertainty, investor sentiment, stock returns, event analysis, India

1 Overview

The COVID-19 period stands out for an extremely high frequency of large daily stock market movements, making the financial market highly volatile and unpredictable. Albulescu (2021) and Zhang et. al (2020) contend that varying perceptions of the investors regarding the information available at one point of time and the resultant mixed reaction have escalated the global financial risk drastically since the onset of the pandemic. Eichenbaum et. al. (2020), Elgin et. al. (2020) finds that stringent public health measures adopted by the emerging countries which brought the economic activities to a standstill by restricting mobility, supply chains and commercial activities paved the way for the freefall of the markets. Stock markets across the globe rose like a proverbial phoenix soon after the freefall owing to the "whatever it takes" attitude of the major governments in cushioning the economy by way of unleashing monetary and fiscal packages of enormous magnitude.

India responded to the COVID-19 pandemic with a strict nationwide lockdown. The lockdown was devastating and GDP growth for the first quarter of 2021-22 was -23.9% (YoY)[1]. But, Ali et. al. (2020) finds the evidence of a positive average returns during the lockdown period and confirms that the lockdown had a positive impact on the Indian stock market performance. Healthcare, Technology and Cement were the top-performers throughout; while tourism, entertainment and hospitality stocks fell by 40%. A V-shaped recovery was largely anticipated as financial authorities boosted the investor sentiment by administering reduced taxes, providing production-linked incentives, supporting MSMEs and upholding labor and farm-sector reforms. Easy money propelled by high liquidity and low interest rates shot up the risk appetite thereby inducing the investors to invest in the stock market. The Indian companies also responded swiftly by cutting down costs thereby protecting profits, and strategically used the buoyancy in the market to raise capital for future growth. The stock market acted as a link between the current state and the future expectations of a strong economy in the post-crisis phase. And as soon as the second wave of COVID-19 took its shape around mid-March-2021, the market topped out and corrected itself around 8%-9%. Thereafter, the market continued the rally led by the positive investor sentiment based on a brighter long-term recovery boosted by the prospects of mass vaccination drive.

In the Indian context, studies on investor sentiment and stock returns are limited and inconclusive. In this paper, we employ event analysis to study the impact of major events on the stock returns. The event analysis helps us understand the speed with which Indian stock market reacts to the new set of information in a very short period of time. The paper also examines the relation between investor sentiment and stock returns during the COVID-19 phase. We capture investor sentiment via implied volatility. We also control for COVID related information such as growth in confirmed cases, recovery rate and death rate along with other important macro variables. We find evidence of significant effect of investor sentiment on stock returns during all the sub-periods except the first wave phase. However, investor sentiment had a negligible impact on the stock returns during the entire phase owing to a large influx of irrational traders during this phase. The stock return is positively related to oil prices, suggesting that higher oil prices capture the effect of strong global demand. Also, the negative relationship between exchange rate and stock return is confirmed, which is driven by strong dependence of Indian stock market on FIIs. While the stock market is always forward-looking, in the short-term it was largely driven by the daily news on COVID-

[1] https://www.indiatoday.in/diu/story/india-first-quarter-gdp-data-worst-1717384-2020-09-01

19 statistics. Given the prospects of a robust economy with 7-8% GDP growth rate in the next 3-4 years, one can only guess the levels at which the Sensex would trade in coming years.

2 Uncertainty, Investor Sentiment and the Indian Stock Market

Apart from the alarming number of confirmed COVID cases, factors like exchange rate volatility, oil price shocks, net FIIs and uncertainty influenced the investor sentiment and thereby stock returns. Since the lockdown, the stock market returns were highly volatile as the quantum of speculation was extremely large. After the announcement of the stimulus package on May 12th, the index dipped a bit owing to the meagre fiscal stimulus. In the beginning of June-2020, the stock market showed a considerable dip immediately after the Moody's downgrade. Consumer confidence remained very low in November 2020 when compared to the same a year ago, as reflected in the Current Situation Index (CSI); though it shows a marginal improvement over the all-time low recorded in the previous round. But the households remained optimistic about the one year ahead situation, with the future expectations index (FEI) remaining in growth terrain at 115.9 (RBI CCS, NOV 2020).

Economic policies create uncertainties and result in irrational judgment of investors, and have unpredictable effects on market stability (Chung et. al.,2013). According to Donadelli et al. (2017), the spread of infectious diseases creates a fear in the market which induces the investors to make cautious investments to deal with uncertainties. Risky times are also associated with increase in precautionary savings that decreases consumption and output (Bansal and Yaron, 2004). But the COVID-19 uncertainty had bolstered the output and innovation in the health and pharma sectors as not tapping the opportunity will be a costly decision. Uncertainty is also associated with increase in *risk premiums*, leading to higher borrowing cost for firms which further depresses investment and growth (Arellano et. al., 2010). COVID-19 induced uncertainty has led to an increase in lending rates over the risk-free rate thereby dampening the business investments. Bekaert et. al., (2013) suggest that uncertainty in the market can be captured by fluctuations in the VIX.

The Volatility Index (VIX) measures the expected future volatility of the underlying benchmark index in the next 30 days. Investors take into account the trajectory of this fear index before venturing into investments as the blacked-out volatility from option prices (VIX) should be informative about the uncertainty in the market. The investor sentiment is derived from the personal beliefs of investors regarding the discounted risk of their investments, which may not be justified by the existing facts (Baker and Wurgler, 2007). It

represents the total outlook that the rational, emotional and noise traders have regarding the future of the market. As the decision and action of the noise traders are highly unpredictable, a huge influx of them in the market can create chaos and unexpected turns unless the market is mature enough to absorb the shocks.

In uncertain times, due to risk aversion, the option prices increase leads to higher implied volatility[2]. This implies that VIX is likely to capture the movement in investor sentiment. The perception of the investors is then shaped by the news which may or may not lead to irrational behaviour (Suthar et. al. ,2020). The stock prices respond more to negative news than positive news which is termed as 'leverage effect' in the finance literature. The leverage hypothesis states that as the value of the firm decreases, the share of equity lessens in the total value and the small share of equity holders will have to bear the entire risk which raises the volatility. The 'volatility feedback effect' states that the positive shock to volatility increases the internal rate of return and necessitates the current market price decline to accommodate these future high returns (French et. al.,1987; Campbell and Hentschel,1992). Both the hypotheses confirm that there is a strong negative association between asset yields and market fluctuations. Figures 1 & 2 shows the negative relationship between VIX and stock prices during the Covid-19 period.

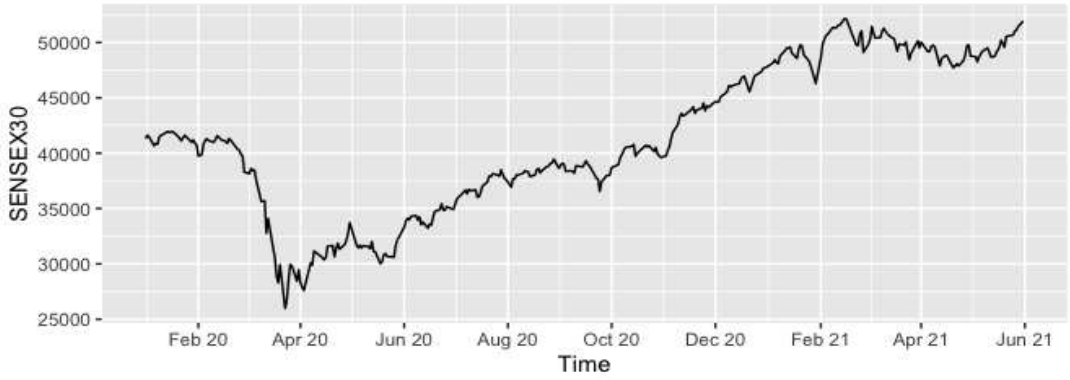

Figure 1: Stock Price – S&P BSE SENSEX30

[2] The widely used Black Scholes option pricing formula shows a positive relationship between option price and volatility.

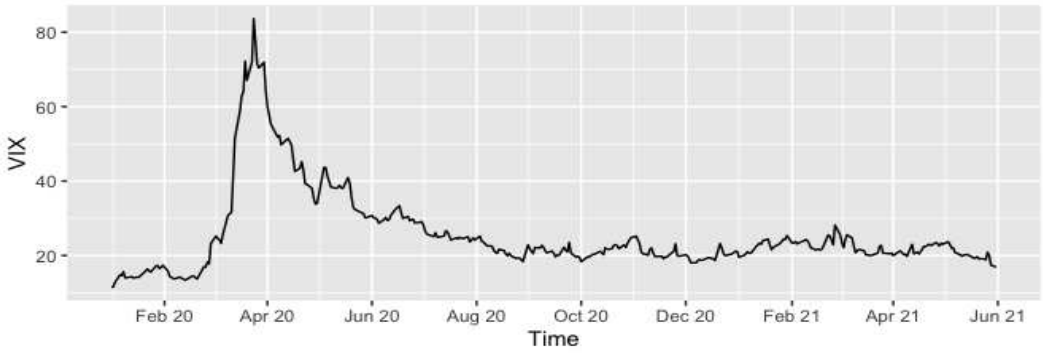

Figure 2: VOLATILITY INDEX (VIX)

Noise traders do not form their own sentiment rather make use of the investor sentiment generated from the stock prices (Yang and Wu, 2019). Kumari and Mahakud (2015) states that emerging markets like India is dominated by institutional investors and finds that negative investor sentiment influences the volatility, providing evidence to the proposition that pessimism leads to a volatile market. It is noteworthy that though the stock market as a whole suffered a severe setback in March-April 2020, there were few sectors that did exceptionally well during the trying times. Sensex being a composite index averages out the high-performing and low-performing sectors and shows the overall impact. A sneak-peek into the performance of some of the sectors during COVID-19 gives a hint in tackling the investment dilemma during crises.

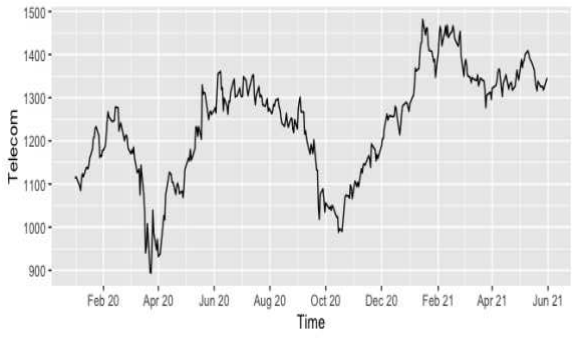

Figure 3(a): Telecom

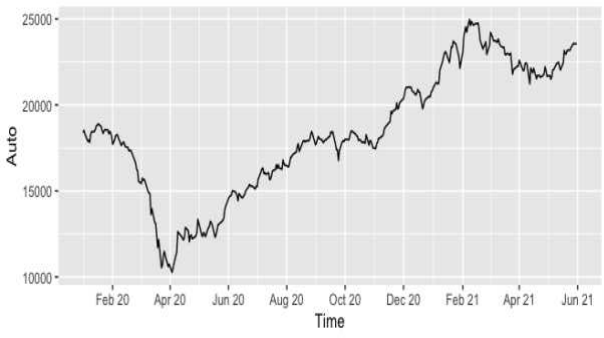

Figure 3(b): Automobile

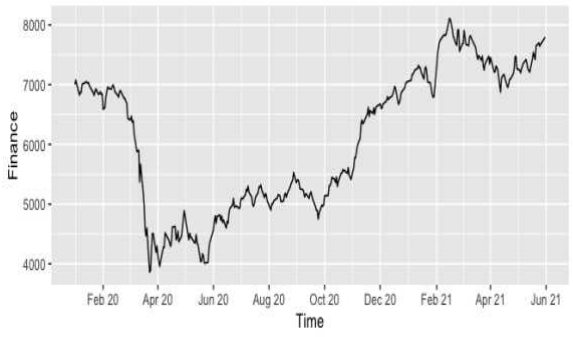

Figure 3(c): Financial Services

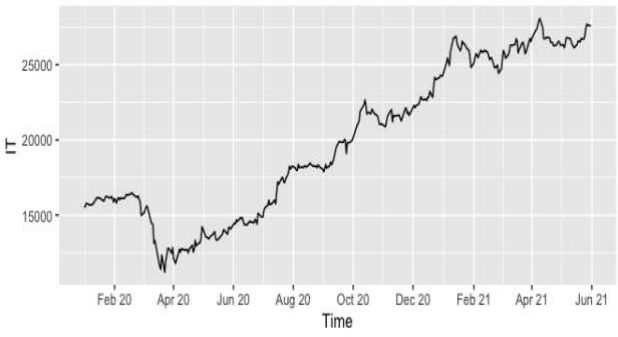

Figure 3(d): IT

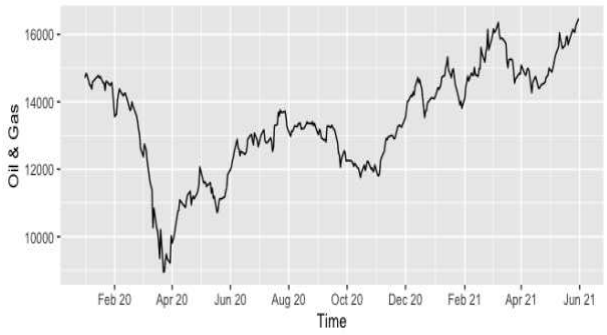

Figure 3(e): Oil & Gas

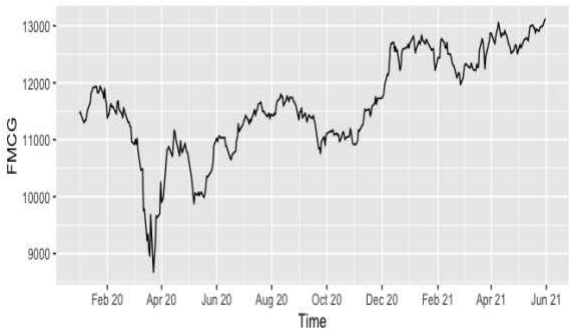

Figure 3(f): Fast Moving Consumer Durables

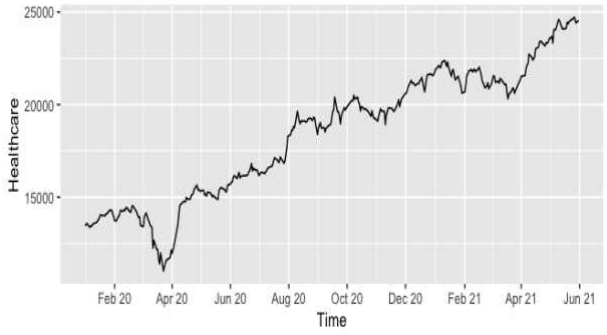

Figure 3(g): Health Care

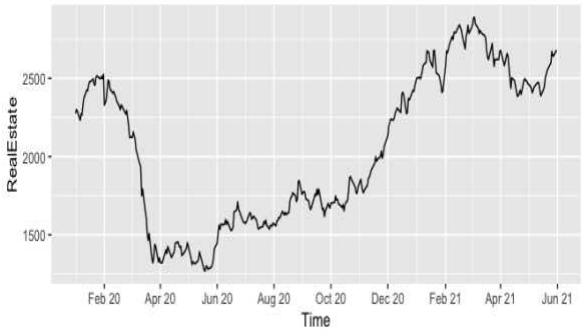

Figure 3(h): Real Estate

The sector-wise graphs (figures 3(a)-3(h)) show that the sectors such as Real Estate and Financial Services faced a severe backlash while the Telecom sector returns exhibited an undulating pattern. The sectors like Oil & Gas, FMCG, IT and Auto have either not suffered a serious setback or has managed to revert soon after the jolt. Healthcare, Pharma and IT sector stocks were the only ones that managed to grow amidst the economic tension. Following an epidemic led crisis, when all the investments avenues stand risky, it is beneficial to invest in the medical industry as latter shall experience a sudden growth via R&D. Uncertainty can also potentially increase growth through *Oi-Hartman-Abel* effect emphasized in the early works by Oi (1961), Hartman (1972) and Abel (1983). This effect is more prominent when firms can expand and contract capacity quickly and the adjustment cost is small. A lot of firms pitched in timely for exercising the growth option effects during COVID-19 by investing in booming industries. Thus, Curatola et. al., (2016) upholds the importance of investment in medial sector in case of an infectious disease outbreak in order to diversify the risk.

Stock markets are forward-looking and act as a link between the present and the future. Gormsen and Koijen (2020) assert that the stimulus-oriented policies might lead to an inconsistency between investors' short- and long-term expectations. It is this bright long-term

expectations regarding the future economy that sustained the positive vibe in the Indian stock market in the post-COVID phase. The Efficient Market Hypothesis rarely holds in the real world and flawed information flow or information asymmetry distorts the logic of the stock market reactions. In this regard we proceed to analyse the interesting dynamics between the investor sentiment and stock movements during the COVID-19 phase in India.

3 Event Study Analysis

An event study measures the valuation effects of a set of firms by examining their stock return movements in response to an unexpected event. The underlying assumption is that information regarding the event is priced into the market in an unbiased manner. Pioneer works in this arena include Fama et. al. (1969). Other prominent works include Brown and Warner (1985), Barber and Lyon (1997), Mitchell and Stafford (2000) and Kothari and Warner (2006). Since the very first case of COVID-19 was reported in India on 30th January 2020, investors were sceptical about the pulse of the stock market. By the time the cases sky-rocketed, forcing the government to impose a complete lockdown on 24th March, 2020 the speculation in the Indian stock market was raging high. The investors being clueless about the direction and magnitude of the stock movements, began indulging in heavy transactions in the market. This sudden surge in the trading volume in the stock market resulted in a spike in stock market volatility during the initial phase of the lockdown. We perform a set of event studies in order to identify the events that had a commendable impact on the stock returns on the days immediately preceding and succeeding the event date. We have identified six events based on the significance of those events in influencing investor sentiment (Table 1).

Date	Event
30-01-2020	First COVID-19 case reported in India
24-03-2020	Imposition of the Great Lockdown
12-05-2020	First fiscal package announced
12-11-2020	Second fiscal package announced
05-01-2021	Vaccination schedule declared India
22-04-2021	PM cancels election rally in Bengal: Second wave

Table 1 : Events

Our analysis makes an attempt to examine if cross-sectional returns on and after the event day is abnormal or not in order to see how the information is incorporated into the prices. In the first stage, we create an event window of 11 days; which includes five days prior to the event, the event day and five days after the event. For the purpose of the study, we take all the 30 companies which constitute the BSE SENSEX index and calculate their daily stock returns from closing stock prices. BSE500 index is taken as the benchmark market index to which the individual company stock returns are compared to. The return on the stocks is calculated as given by equation (1).

$$r_{it} = \ln(p_{it}) - \ln(p_{it-1}) \quad (1)$$

Where r_{it} is the return of the company i at time t, p_{it} and p_{it-1} is the price of the stock on the current day (t) and the previous trading day($t-1$). Following Sefcik and Thompson (1986) that studies the effects of cross-sectionally correlated abnormal returns, we examine the statistical properties via cross-sectional regressions. We control for company fixed effects by taking the firm level heterogeneity into account and estimates each of the six events considered in this paper. The model specification is given by equation (2).

$$r_{it} = \beta_0 + \sum_{t-k}^{t+k} \beta_k + \sum_{j=2}^{j=30} \theta_j + \epsilon_{it} \;\; k = 1,2,3,4,5^{3} \quad (2)$$

Where $t = 0$ is the event date and θ_j controls for firm-level fixed effects. We estimate the above model and obtain the coefficients $\beta_{-5}\, to\, \beta_5$. In the AR plots, x-axis represents the event window that ranges from -5 to 5 and the y-axis shows the Average Return (AR). We also estimate 29 company dummies, and one base company dummy included in the intercept term. A narrow window is chosen to identify the precise causal factors as larger event windows bring confounding factors and increases the omitted variable bias problem[3]. The graphs (figures 4-9) show the coefficients and their standard error. Ideally, if a statistic is significantly different from 0 at the 0.05 level, then the 95% confidence interval will not contain 0, as all the values that fall within the confidence interval are the plausible values that

[3] Event study windows are usually short on the basis of the Efficient Market Hypothesis and due to cost of expanding them. According to Efficient Market hypothesis, the stock market reacts almost immediately to any new information available. Expanding event window leads to reduced power of analysis (Brown and Warner, 1985). Longer event windows are more likely to be affected by other confounding events.

the variable may take. Thus, to say that an event is significant, all values in the confidence interval should be on the same side of zero (either all positive or all negative) and not include zero.

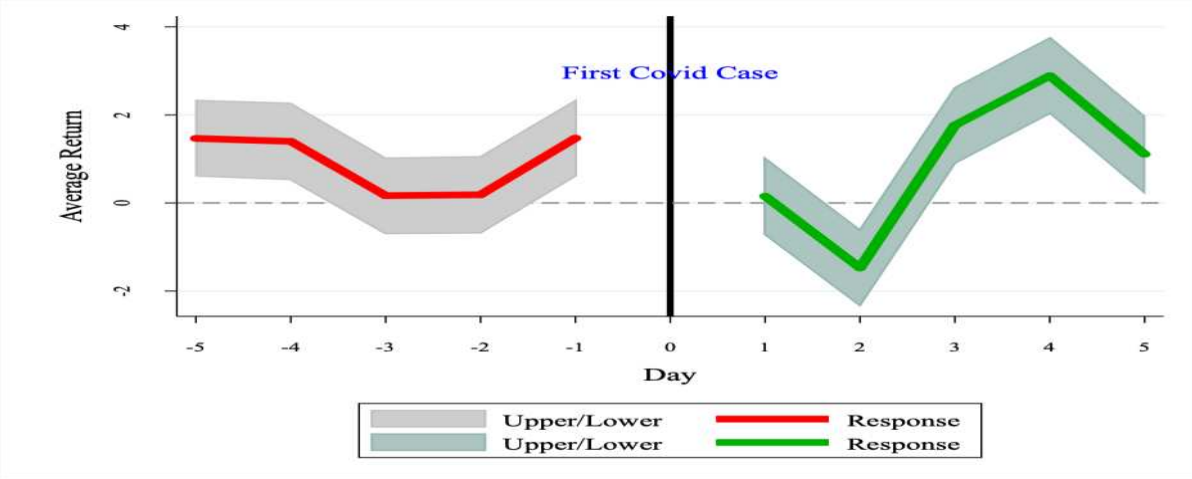

Figure 4: First COVID-19 case reported in India

Figure 4 presents the average returns pertaining to the first covid case in India. The return was in the positive range before the event, but became significantly negative on the second day after the detection of first covid case on 30th Jan 2020. But soon after the second day ($k = 2$), the returns moved to the positive range indicating that the first covid case did not lead to a persistent decline in stock returns. This could be due to the falling oil prices which boosted the market value of the listed companies that rely heavily on crude oil for production and transportation processes. The Union Budget announced on Feb 1st,2020 also contributed to the positive effect by advocating bold steps.

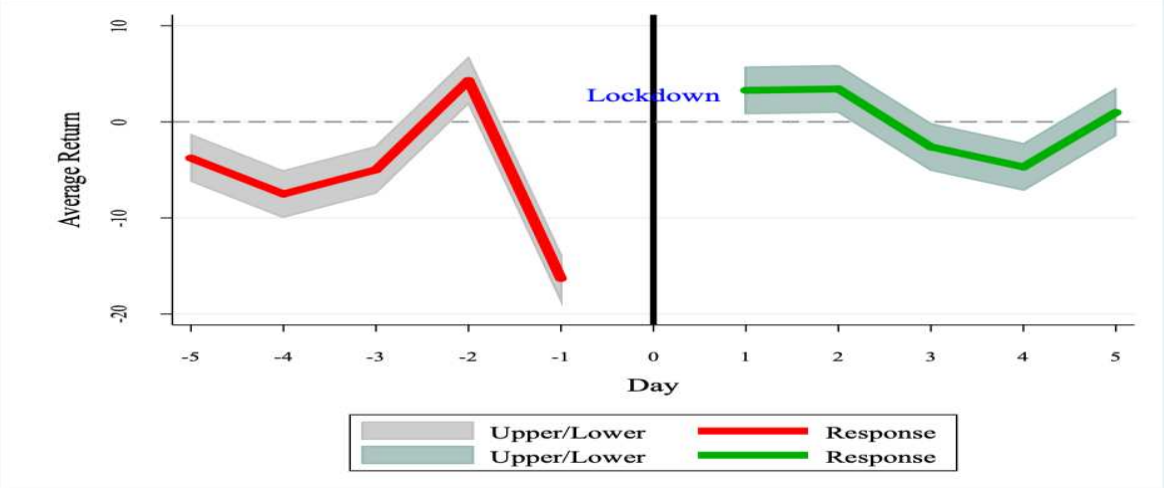

*Figure 5:*Great Lockdown

Figure 5 presents the results from the Great Lockdown. We could see a significant fall in average return of almost all companies just before the day of announcement of the lockdown, due to the extreme uncertainty that prevailed. Raging panic that resulted in FII outflows and heavy withdrawals from the stock market led to negative returns. After the announcement of the lockdown, the return was positive and significant but with higher dispersion. On the third and the fourth trading day, the average return reverted to being negative and significant. The positive and significant return after the announcement of lockdown could be due to the following reasons:

Firstly, it was anticipated that the lockdown shall contain the spread of the virus in the country, supporting the country's stock market in long run. Secondly, RBI reduced the interest rate by 75 basis points which brought the repo rate down to 4.4 percent from 5.15 percent. The reverse repo rate was also cut by 90 basis points to 4 percent. Thirdly, despite infusing volatility in the Indian stock market, the lockdown has not been able to detract investors. After the lockdown announcement, many millennials ventured in to the stock market due to a ripple effect of lockdown which has caused unemployment, pay cuts and work from home culture. Fourthly, progressive regulation made the stock market access easier. SEBI has been working actively towards regulations to ease market participation which acted as a catalyst for millennials to invest in the market.

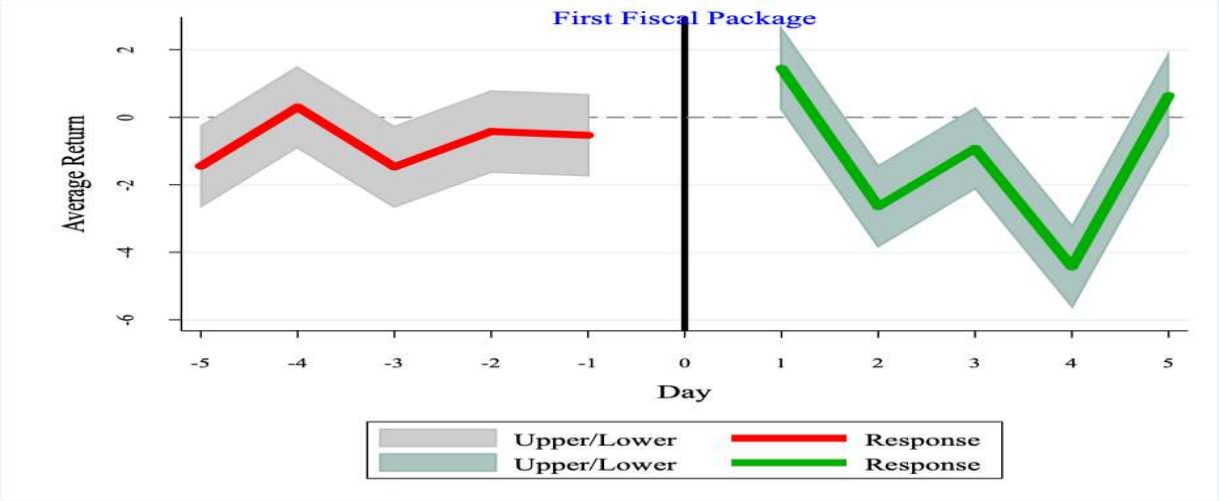

Figure 6: First Fiscal Package

Given the magnitude of the aid demanded, the first fiscal package announced on May 12th seemed too late and too little. Figure 6 presents the results from first fiscal package.

Market was in the negative return range before the announcement of the fiscal package, but the negative return became more pronounced after the announcement of the fiscal package. The reasons for the negative returns could be:

Firstly, the increase in government borrowings to fund the increased public expenditure might lead to an increase in interest rate. The stock prices are discounted present value of cash flow given by $p_{it} = \frac{\sum_{s=0}^{s=\infty} cf_{it+s}}{(1+r)^s}$,where cf_{it+s} is the cashflow for the company and r is the risk-free rate. An increase in interest rate will thus lead to a fall in stock prices. Secondly, if government consumes more, the increase in interest rate will reduce private investment leading to the Crowding Out effect. Following the change in investment schedule by these companies, market might revise all the future cashflows in downward direction which shall put further pressure on prices. Third, the retail investors who borrow and invest in the stock market shall reduce their investment, as borrowings become costlier. Figure 6 clearly shows that before the announcement of the fiscal package, the market was in negative zone but after the announcement of the first fiscal package the effect is more pronounced. Also, the fiscal package could have led to positive effect on prices had it stimulated a spike in the cash flow of these firms to counter the negative effect of increase in expected interest rate; which did not happen as shown in figure 6.

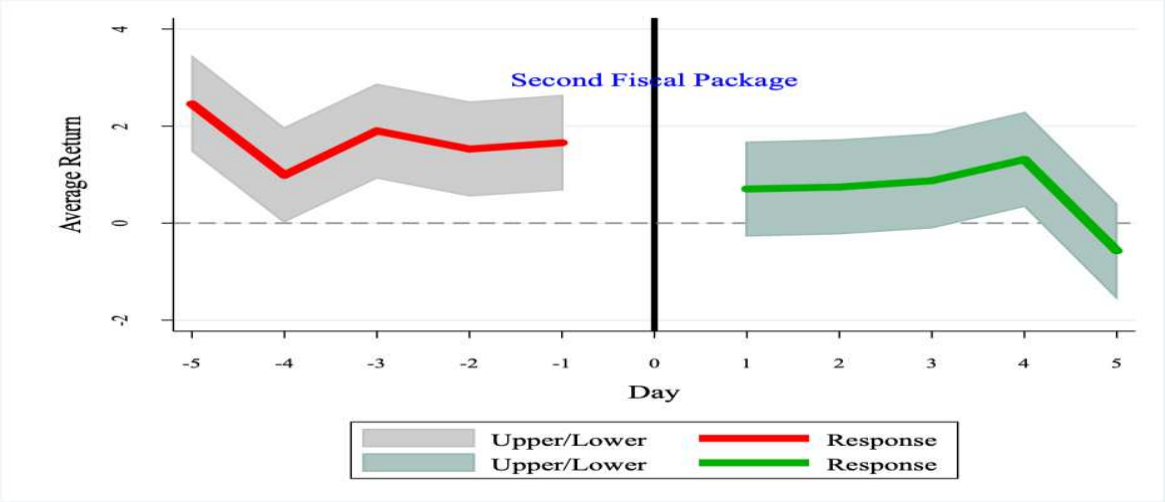

Figure 7: Second Fiscal Package

Following the wide unrest over the first fiscal package, the second fiscal package was announced on Nov 12th, 2020. Figure 7 shows that the average return was positive and significant before the announcement of fiscal package but was largely insignificant after the announcement of second fiscal package. During this time the market might have expected that India will be having current account surplus in FY21 due to lower oil imports, lower gold imports and reduction in imports from China. Most importantly, the market is believed to

have priced the resumption of normal economic activities, with vaccination against COVID-19 around the corner. The positive news swayed the investors towards the equity markets and this resulted in positive returns. A fall in the active COVID-19 cases also resulted in the investors investing heavily in the equity markets which in turn ramped up the market. Thus we can say that second fiscal package affected the returns negatively, but not to the extent that of first fiscal package.

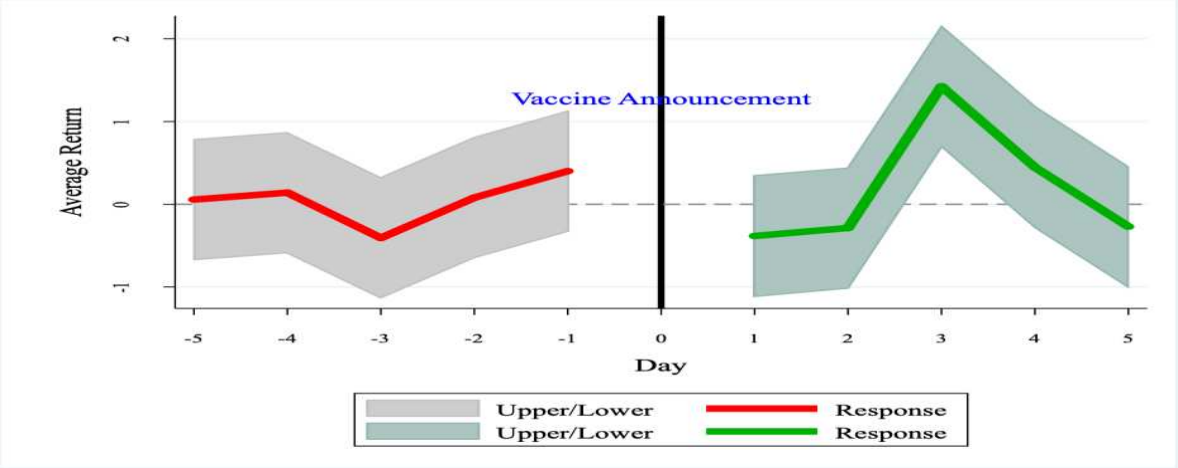

Figure 8: Announcement of Vaccine Schedule

Figure 8 presents the variation in average returns due to vaccine announcement. The vaccination announcement on 5th January, 2021 was an expected event. Before the announcement of vaccination dates, market was hovering around zero return and after the announcement, the market attained a significant positive return. This was an expected outcome as vaccination was the only solution out of the pandemic. Nevertheless, we do not see a big effect as COVID-19 cases had declined significantly by this time, and the masses were not worried about the health risk.

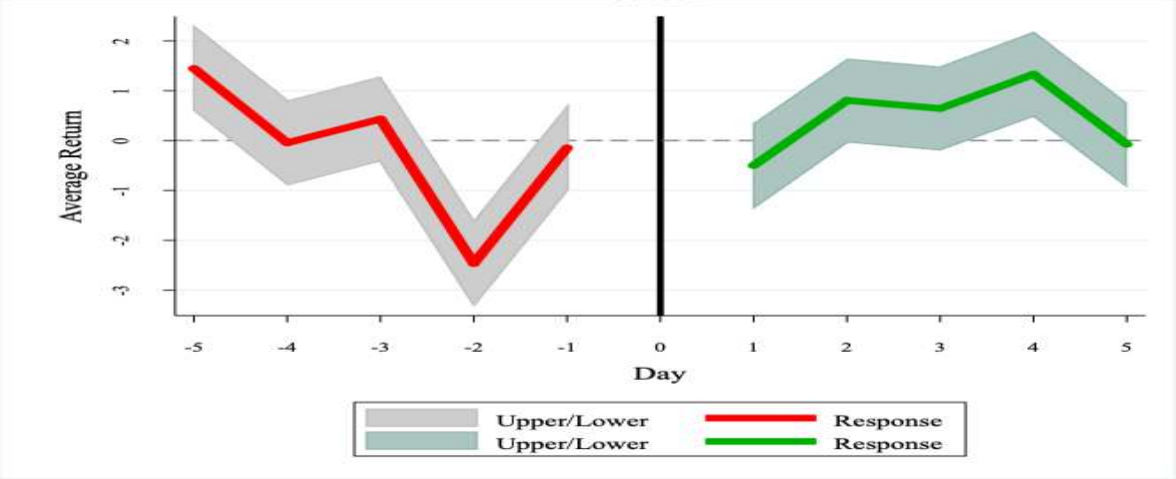

Figure 9 : PM Cancels Election Rally

Figure 9 presents the results from the second COVID-19 wave. There is no definite point for the start of second wave as it happened in a staggered manner. We choose the day on which the Prime Minister cancelled his election rally in Bengal. The market was in negative range before the day and moved in positive range within two days of the announcement. Though the death rate was extremely high, people perceived the rally cancellation as a positive move of the government towards tackling COVID-19 thereby reducing the uncertainty arising out of the second wave. Of all the events, the announcement of first lockdown and first fiscal had the most significant impact on the Indian stock returns. Though, ignoring the anticipation effects and presence of confounding factors has made the event identification biased, we have tried to control for some of the confounding factors by controlling for firm fixed effects.

4 Regression Analysis

In this section, we empirically examine the Indian stock market's response to the daily COVID-19 news and investor sentiment. The data spans from January 30th, 2020 when the first case was reported in India to May 31st,2021. The closing stock prices of BSE30 index has been taken from the BSE website and the stock returns were calculated by taking logarithmic differences of daily closing stock prices. Daily data for confirmed COVID-19 cases, deaths & recoveries are obtained from the website of John Hopkins University, Research Resources Centre. Other variables used in the study are CBOE oil volatility index (OVX), Indian equity volatility index (VIX), exchange rate (ER) and the commodity indices (MCX iCOMDEX Crude Oil and MCX iCOMDEX Gold). Data for OVX, INDIAVIX,

exchange rate and the commodity indices is obtained from investing.com. The growth rate of confirmed cases is used along with the death rate and recovery rate. Death rate and recovery rate is formulated by calculating the respective shares of deaths and recoveries in the total number of confirmed cases; expressed as a percentage. The death rate and recovery rate, in a way proxy for the bad news and good news respectively.

$$Death\ Rate\ (DRATE) = \frac{No: of\ Deaths}{No: of\ Confirmed\ Cases} * 100$$

$$Recovery\ Rate\ (RECRATE) = \frac{No: of\ Recoveries}{No: of\ Confirmed\ Cases} * 100$$

The logarithmic transformation of the stock market index (BSE Sensex) and exchange rate (ER) is taken as follows:

$$LNBSE = \ln\left(\frac{BSE_t}{BSE_{t-1}}\right) * 100$$

$$LNER = \ln\left(\frac{ER_t}{ER_{t-1}}\right) * 100$$

The stock returns (LNBSE) is then regressed on other variables like growth in cases (GCASES), death rate (DRATE), recovery rate (RECRATE), oil volatility index (OVX), equity market volatility index (VIX) and exchange rate returns (LNER) as depicted by equation (3).

$$LNBSE_t = \beta_0 + \beta_1 GCASES_t + \beta_2 DRATE_t + \beta_3 RECRATE_t + \beta_4 VIX_t + \beta_5 OVX_t + \beta_6 LNER_t \quad (3)$$

For the purpose of examining the change in interrelation between the variables, the whole span of January 30th, 2020 – May 31st, 2021 is bifurcated to four distinct phases. The first phase runs from January 30th to March 24th which is the incubation period when the pandemic was in its primary stage. The second phase runs from the day when the lockdown was announced, March 24th till the announcement of the announcement of the Unlock 1.0, June 1st, 2020. This period shows the highest volatility in the stock markets owing to the burgeoning crisis. The third phase is basically the immediate post-crisis phase that runs from June 1st, 2020 to March 10th, when the flattened graph started picking up marking the beginning of the deadly second wave in India as per the JHU CSSE COVID-19 database. Even amidst the uncertainty related pertaining to a severe secondary wave, stock markets kept on moving in a bullish mode in this intermediate phase. This period also saw extremely

positive realms led by the hopes of a mass vaccination drive. Also, on February 16th, 2021 the stock markets witnessed its all-time high since the March of 2020, after which it started retreating. In the second wave phase which ran from March 10th,2021 to May 31st,2021, the market corrected itself up to almost 8%-9%. In this section, we analyze the interrelation between the variables throughout the study period; in particular the investor sentiment – stock return nexus. Firstly, ADF and PP tests were carried out to check the stationarity of the variables.

Variable	ADF	PP
LNBSE	-20.095***	-19.990***
GCASES	-15.472***	-15.668***
DRATE	-2.115**	-2.119
RECRATE	-3.258*	-2.740*
VIX	-1.583*	-2.715
OVX	-3.010**	-2.711*
LNER	-20.226***	-20.309***
LNCRUDE	-17.358***	-17.364***
LNGOLD	-18.348***	-18.347***
Note: *** denotes p<0.01, ** denotes p<0.05, and * denotes p<0.1		

Table 2: Unit Root Tests

Table 2 presents the unit root test results of the variables. All the variables used in the study are stationary at levels and hence we proceed with simple OLS estimation. Table 3 shows the regression results of the entire sample along with the four sub samples; wherein stock returns is regressed on growth in cases (GCASES), death rate (DRATE), recovery rate (RECRATE), oil volatility index (OVX), equity market volatility index (VIX) and exchange rate returns (LNER).

Variables	Full Sample	Incubation Phase	First Wave	Intermediate Phase	Second Wave
GCASES	-0.000209	-0.00341	-0.000638	-0.0824*	0.00409
	(-0.0036)	(-0.00591)	(-0.0294)	(-0.0471)	(-0.144)
DRATE	0.308**	-3.691***	-2.978	1.446***	5.125
	(-0.143)	(-1.265)	(-2.303)	(-0.502)	(-5.919)
RECRATE	-0.000394	-0.00504	-0.142	0.0219	-0.172
	(-0.00447)	(-0.0122)	(-0.0885)	(-0.0158)	(-0.137)
VIX	-0.017	0.191**	-0.126	-0.157***	-0.416**

	(-0.0162)	(-0.0918)	(-0.0951)	(-0.042)	(-0.182)
OVX	-0.00276	-0.0327	-0.0125	0.0161	-0.00555
	(-0.00451)	(-0.0373)	(-0.00966)	(-0.0107)	(-0.0373)
LNER	-1.751***	-4.927***	-1.951**	-1.052***	-0.0084
	(-0.25)	(-1.238)	(-0.747)	(-0.225)	(-0.453)
CONSTANT	0.173	-1.406	20.51	-1.172	17.94**
	(-0.555)	(-1.231)	(-12.96)	(-1.876)	(-8.533)
Note : Standard Errors in parenthesis ; *** denotes p<0.01, ** denotes p<0.05, and * denotes p<0.1					

Table 3 : Regression Results (Without Commodity Indices)

First column of the Table 3 shows the results of the full sample estimation. Along the entire time span we see that exchange rate returns and death rate are the factors that significantly impact the stock returns. Exchange rate (ER) is significant in all the sub periods but one. During this period, the INR depreciated by 7.2% against the USD and was more volatile (Flaxman et. al., 2020). It has a negative coefficient which implies that a higher exchange rate (depreciation) leads to lower stock returns by way of reduced foreign investments (FIIs). Narayan et. al. (2021) conclude that during the COVID-19 pandemic, the role of the exchange rate has become even stronger. Apart from the exchange rate, death rate (DRATE) also had significant impact on the stock returns except during the second wave phase. At the same time, we observe that the recovery rate (RECRATE) has negligible or no impact on the stock returns during this period which indicates that the stock returns are affected more by the negative news (deaths) than the positive news (recoveries) which is very much in line with the behavioural finance theories. In the incubation phase, the death rate had a negative and significant impact as the increasing deaths during the period tarnished the lustre of the stocks. But in the intermediate phase, the coefficient was positive and significant indicating that stock markets overlooked the rising deaths in hope of trend reversal sometime soon. Also, in the intermediate phase, when the situation was nearly normal, the rising cases affected the stock returns in a negative and significant manner. Thus the growth in confirmed cases (GCASES) had a significant impact on the stock market only during the normal phase where in other variables were stable.

Oil is a crucial input in most firms' production and therefore their expected cash flows can be affected by oil price leading to changes in costs, earnings and dividends and hence stock prices (Basher et. al ,2012; Rafailidis and Katrakilidis, 2014; Salisu and Isah

,2017; Narayan and Smyth, 2018). The COVID-19 crisis period witnessed drastic changes in global oil prices; wherein the price of brent oil dropped from $68.90/barrel in the very beginning of 2020 to $26.60 in May, 2020. The oil price volatility was also high during this period, but since the prices were extremely low, it provided a support for the plunging the stock market. Nevertheless, the oil volatility index (OVX) is also not a significant influence on the stock returns during this period.

Many studies confirm the inverse relation between investor sentiment and stock returns. In the Indian context, Shaikh and Padhi (2015) confirms the negative association between VIX and stock returns. This relationship is established in the literature mainly via two channels of operation. Firstly, when the investor sentiment is high, it pushes down the value of the stocks due to the abnormal trading volume in the market. Secondly, when the sentiment is bearish, lot of investor attention goes in there, which reduces the level of uncertainty and hence the risk involved. This in turn reduces the premium reward for risk taken thereby pulling down the stock returns. The stock market consists of all sorts of investors; strategic, naive and opinionated whose behaviour is difficult to predict with certainty especially during periods of extreme uncertainty. The impact of VIX on the stock returns is insignificant during the whole COVID-19 phase and especially during the first wave phase when the pandemic intensified. Chandra and Thenmozhi (2015) support the fact that stock prices move independently with respect to the sentiment (VIX) during periods of sharp downturns. And hence the investor sentiment turns out to be insignificant during the first wave. In other phases, the VIX is negative and significant and the impact is more prominent during the second phase, where we find that the stock markets were buttressed by the strong positive sentiment alone. We see the same results for the second wave phase even after the inclusion of the commodity indices of gold and crude oil. Equation (4) shows the modified equation after the inclusion of the commodity indices; MCX iCOMDEX Crude Oil (LNCRUDE) and MCX iCOMDEX Gold (LNGOLD).Both the commodity returns are calculated for the purpose of the analysis.

$$LNBSE_t = \beta_0 + \beta_1 GCASES_t + \beta_2 DRATE_t + \beta_3 RECRATE_t + \beta_4 VIX_t + \beta_5 OVX_t + \beta_6 LNER_t + \beta_7 LNCRUDE_t + \beta_8 LNGOLD_t \quad (4)$$

Table 4 shows that, along with the investor sentiment, the commodity index for crude oil (CRUDE) returns also impact stock returns in a positive manner.

Variables	Full Sample	Incubation Phase	First Wave	Intermediate Phase	Second Wave
GCASES	-0.000759	-0.00206	-0.00637	-0.0893*	0.00179
	(-0.0036)	(-0.00545)	(-0.031)	(-0.046)	(-0.145)
DRATE	0.247*	-4.241***	-3.137	1.311***	5.447
	(-0.142)	(-1.258)	(-2.359)	(-0.491)	(-5.904)
RECRATE	0.000121	-0.00256	-0.154	0.0161	-0.179
	(-0.00441)	(-0.0108)	(-0.0917)	(-0.0155)	(-0.137)
VIX	-0.025	0.0654	-0.14	-0.163***	-0.432**
	(-0.0162)	(-0.0943)	(-0.0986)	(-0.041)	(-0.185)
OVX	0.00206	0.032	-0.0145	0.0195*	-0.000185
	(-0.00469)	(-0.0388)	(-0.0108)	(-0.0105)	(-0.0373)
LNER	-1.694***	-4.092***	-1.978**	-1.028***	-0.0163
	(-0.247)	(-1.149)	(-0.766)	(-0.219)	(-0.449)
LNCRUDE	0.0615***	0.247***	-0.0216	0.116***	0.116*
	(-0.0196)	(-0.0757)	(-0.0388)	(-0.0338)	(-0.0683)
LNGOLD	0.0912	-0.203	0.182	-0.0104	-0.0609
	(-0.0841)	(-0.318)	(-0.35)	(-0.0648)	(-0.246)
CONSTANT	0.18	-1.919*	22.18	-0.491	18.33**
	(-0.547)	(-1.126)	(-13.42)	(-1.838)	(-8.561)

Note : Standard Errors in parenthesis ; *** denotes p<0.01, ** denotes p<0.05, and * denotes p<0.1

Table 4 : Regression Results (With Commodity Indices)

The debate on the causality associated with oil price-stock market nexus anchored on the financialization of the commodity markets preceding the emergence of COVID-19 (Wang et. al ,2013; Salisu et. al. 2019). Delatte and Lopez (2013) finds that the introduction of commodity indices has not only increased the financialization of commodities, but also the volatility in respective markets which finally gets transmitted to financial markets. India's stock market is influenced by gold and crude oil prices (Jain and Biswal, 2016), currency risk (Garg and Dua, 2014), exchange rates, and foreign equity flows (Dhingra et. al., 2016; Mishra, 2004). In the overall span of the COVID-19 crisis, the crude oil returns seem highly significant and positive. This could be due to the fact that crude oil price captures the global demand conditions and Indian stock market responds to the same. The global uncertainty tied to COVID-19 outbreak has significantly perturbed the price dynamics of crude oil and gold and created a risk-averse environment that has driven investors towards safe-haven assets

such as gold (Mensi et. al. 2020; Gharib et al, 2021). But in the Indian context, we see negligible impact of gold returns on the stock returns. There exists a strong negative association between stock market and exchange as the Indian stock market is highly dependent on FIIs. In the incubation phase, VIX becomes insignificant as the crude oil returns is added, indicating the preference for safe assets in times of a crisis.

5 Conclusion

The bullish market that emerged in the latter half of 2020 can be attributed to sheer pessimism that existed in the months of March-April (2020), when the investors decided to take advantage of the opportunity of the extremely undervalued stocks. Large influx of retail traders into the stock market was guided by falling real return on deposit; both demand and term; and improved digitization coupled with progressive regulations by SEBI to ease market participation.

The event analysis shows that only the first lockdown and the first fiscal package could garner an immediate significant impact on the stock returns. The analysis also suggests that the market has been most averse to interest rate uncertainty in comparison to other types of COVID-19 induced uncertainty. The empirical estimation provides interesting results as we see that during periods of extreme volatility, the investor sentiment becomes insignificant while it's a pivotal influence during the normal time periods. But the stock return is positively related to oil prices, suggesting that higher oil prices capture the effect of strong global demand. Also, the negative relationship between exchange rate and stock return is confirmed which is driven by strong dependence of Indian stock market on FIIs. The results are of importance to both investors and policy makers as it exposes the complicated sentiment-stock returns dynamics especially during times of crisis. It is not only the investor sentiment, but the detailed analysis of the market fundamentals and portfolio diversification, that constitutes a healthy investment plan during a crisis.

Indian stock market has outperformed its world counterparts even amidst grappling economic pressures. A thriving stock market led by strong positive investor sentiment has drawn in retail investors coveting exorbitant profits. But, with the economy's vitals in danger, sustaining the current performance is difficult as corporates cannot surpass the threats of an imminent demand crunch. Lack of sufficient demand may run down the corporate profits and erode the market value endangering the prevailing market stability. The current stock market

bubble guided by irrational exuberance may soon give way to an acute market crash unless the economy is injected with adequate growth activators.

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