Is the Indian Stock Market Affected by COVID-19? : Evidence from Cases or Fatalities

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Abstract

This paper examined the impact of the coronavirus pandemic on the Indian stock market returns as influenced by the number of confirmed cases or death cases. The study used Bombay Stock Exchange (BSE) Sensex daily adjusted closing price, volume of trade, price to book ratio, market capitalization, and coronavirus-related control variables, namely daily total confirmed cases and daily total confirmed death cases between January 30, 2020 and December 08, 2020. Pooled Ordinary Least Square regression was employed to investigate the influence of the unprecedented pandemic on stock market returns. The results revealed that the stock market returns were influenced by both daily total confirmed cases and death cases. Also, it was established that the total confirmed cases positively affected the stock market returns; whereas, the total confirmed death cases negatively affected the market returns. However, to check the robustness of the results, the study employed bivariate regression analysis, which confirmed the results. Thus, it can be inferred that the results were unbiased.

Keywords : **stock market, COVID-19, pandemic, confirmed cases, BSE**

JEL Classification Codes : E2, G15, G18, E2, E44, E49

Paper Submission Date : May 17, 2021 ; Paper sent back for Revision : June 20, 2021 ; Paper Acceptance Date : July 1, 2021

Today, the world is facing a deadly coronavirus (COVID - 19) categorized as a pandemic by the WHO. Originated from Hubei province, Wuhan city, China, in late December 2019, it transmitted from one infected person to another. Ultimately, it got transmitted to the rest of the world. Around 190 countries were affected across the globe. The US was the most affected country in terms of confirmed cases. As of February 2, 2021, there were 102,817,575 total confirmed cases and 2,227,420 total confirmed death cases around the world, as per the WHO report.

To prevent and stop the spread of COVID-19, many countries announced a countrywide lockdown, adopted strict quarantine policies, promoted social distancing, and restricted the mobility of people from one place to another. The pandemic has hampered not just the economic growth of the affected countries but also affected the stock market and the unemployment levels. The education sector, hotel & tourism industry, and the aviation industry certainly faced hardships (Leduc & Liu, 2020). International Monetary Fund [IMF] (2020) forecasted

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DOI : https://doi.org/10.17010/ijrcm/2021/v8i3/167957

that the global economy was expected to contract by –3.0% during 2020, which was worse than the global economic slowdown in 2008. Further, IMF estimations revealed that the gross domestic product (GDP) has been affected severely around the globe in 2020 due to unprecedented coronavirus.

Further, World Trade Organization (2020) estimated a double-digit fall in merchandise trade between 13% and 32%. On the brighter side, according to The Asian Development Bank (ADB) economic report (2020), developing Asia's economic growth was predicted to rebound at approximately 6.8% in 2021. However, Organisation for Economic Co-operation and Development [OECD]'s report (2020) revealed that stock markets around the world have seen a sharp decline of over 30 percent, which is worse than the global financial meltdown during 2008. The global financial markets started to fall in February 2020 due to a substantial increase in the number of confirmed cases reported outside China. The fall is considered as the highest single-day decline, since the recession in 2008-09, in the history of the global stock market.

The novel coronavirus affected the world economy, including India. India is ranked second in terms of population as per the World Bank. Thus, due to the high density of population in India, it was a challenging task to control the spread of COVID-19. To tackle the pandemic effectively, the Government of India (GoI) announced a nationwide lockdown on March 24, 2020. During the lockdown, GoI introduced various reforms to stop the spread of coronavirus. Yet, the Indian stock market, represented by two major stock indices, namely Bombay Stock Exchange (BSE) Sensex and Nifty 50, experienced a sharp decline. BSE Sensex fall by 13.2% on March 23, 2020. In the first phase of coronavirus, industries' production reduced considerably, which was also reflected in the stock market index. In India, there were 10,766,245 confirmed cases and 1,54,486 confirmed deaths as on February 2, 2020. Moreover, the impact of COVID-19 on global markets was also observable in the Indian markets (Alam et al., 2020). However, Ashraf (2020) established that the stock market mostly reacted to the confirmed cases and the death cases. Thus, it is important to examine the behavior of Indian stock markets during the pandemic, i.e., whether the stock market performance is influenced by the number of confirmed cases or by the number of death cases.

Literature Review

This section deals with the existing literature relating to the stock market performance and the impact of different crises, announcements, and pandemics on its performance. Islam (2009) analyzed the impact of the Indian capital market during the global financial crisis. The results of the study found that the crisis-hit countries' economy significantly. Mishra et al. (2010) examined the stock market volatility during the global financial meltdown. Sahu and Singh (2011) analyzed the exogeneity of financial markets in Asia and revealed that there is no cointegration among India, the Philippines, Taiwan, and South Korea. The results also suggested the existence of a unidirectional and bidirectional association between the Asian stock markets. Kumar (2012) studied the Diwali effect on the S&P CNX Nifty index. The study found that *muhrat* trading resulted in excess returns and higher volatility as compared to any other trading day. Gozgor et al. (2015) and Singh and Shrivastav (2018) investigated the relationship between BRIC countries' equity indices and oil prices during the economic slowdown. The finding suggested that there was a causal relationship between stock market indices and oil prices.

Mohania and Mainrai (2020) analyzed the impact of the COVID-19 pandemic on the Indian banking industry, specifically National Bank Ltd. Kanojia and Malhotra (2021) examined the various stock market crisis in the Indian capital market. The results showed that the securities withstood the crisis and had a high CAGR. Ali et al. (2020) studied the stock market reaction across the globe in terms of deterioration and volatility. The results provided evidence that Chinese stock markets exhibited calmness and lower volatility, even during the epidemic as well as the pandemic phase. They also showed that, during the pandemic period, a safer commodity like gold generated negative returns. The Chinese financial markets recovered during the first US phase because of preventive measures taken by the authorities. Phan and Narayan (2020) examined the daily time-series stock

return data of the 25 most-affected countries and found that the majority of the countries' stock market returns reacted negatively when the number of infected cases and deaths increased. He et al. (2020) investigated the Chinese stock market performance and industries' response during the pandemic. It highlighted that stock prices on the Shanghai Stock Market experienced a negative impact and the Shenzhen stock market experienced a positive impact of the pandemic. Also, the impact on the sector-wise result showed adverse effects on transportation, mining, electricity, and heating industries.

Further, manufacturing, information technology, education, and healthcare industries showed resilience against the pandemic. Zhang et al. (2020) studied the country-specific systemic risks in the global financial markets. The study revealed that the global financial market risk increased significantly due to the pandemic. Further, the study found that the pandemic affected the economy as well as the financial markets. Erdem (2020) evaluated the relationship between stock market movements and countries' freedom. The study considered 75 countries' broad stock market indices and COVID-19-related data such as infected cases per million and deaths per million. The results suggested that there is a significant negative relationship between the market movements and countries' freedom. Moreover, the coronavirus has adversely affected the stock markets in freer countries.

Alam et al. (2020) studied the impact of the lockdown effect on the Indian Stock Market. The results revealed that the Indian stock market reacted positively and significantly to the lockdown. Unlike investors' expectations, it generated a positive average abnormal return in the lockdown period. The study also recommended that investors may take some precautionary measures before investing in stock markets during the lockdown period. Topcu and Gulal (2020) examined the impact of COVID-19 on the emerging stock market between March 10, 2020 and April 30, 2020. The study found that the stock markets started falling gradually during the pandemic. The Asian emerging markets were highly impacted as compared to European stock markets and suggested that government needs to take immediate precautionary measures and provide stimulus package to boost their stock markets. Ashraf (2020) investigated the impact of the COVID-19 on 64 countries' major stock market indices by employing daily confirmed cases and deaths. The findings revealed that the market reacted negatively to the number of confirmed cases and reacted positively to the growth in confirmed cases when compared to the number of deaths.

Lee et al. (2020) examined the Malaysian stock market post coronavirus-outbreak. The study used Kuala Lumpur Composite Index (KLCI) as the dependent variable and sectoral indices, confirmed cases, deaths cases, volatility index, and Brent crude oil price as the independent variables. The study found that KLCI and all sectoral indices, except the Real Estate Investment Fund (REIT) index, were adversely affected by an increase in the number of confirmed cases. Further, the Malaysian stock market performance depends on the Brent crude oil price and volatility index. Bahrini and Filfilan (2020) examined the impact of confirmed cases and deaths cases on Gulf Cooperation Council (GCC) countries' daily stock market returns. The results revealed that there was a negative impact of confirmed cases and death cases on the GCC stock market returns, but findings were not significant in respect of confirmed cases. GCC countries' stock index declined mainly due to an increase in the total number of confirmed deaths cases. Al-Awadhi et al. (2020) investigated the effect of COVID-19 on the Chinese stock market. It revealed that the pandemic negatively impacted the stock market returns. Particularly, daily confirmed cases and death cases were found to be negatively and significantly associated with the stock market returns. Baig et al. (2021) studied the microstructure of the US equity market during the pandemic. The finding showed that market liquidity and volatility declined due to an increase in the number of confirmed and death cases, which led to the market decline.

After conducting a rigorous literature review, it was identified that most of the studies were based on international borders. In the Indian context, only limited studies were carried out to study the impact of the COVID-19 outbreak, and that, too, considered various sectoral indices, not a specific benchmark index. Hence, the present study attempted to fill this research gap in the Indian context.

Data and Methodology

The study collected data for the period starting from January 30, 2020 to December 8, 2020 and used BSE Sensex daily adjusted closing price, volume of trade, market capitalization, price to book ratio, turnover, illiquidity, volatility, and other coronavirus-related variables, namely daily total confirmed cases and daily total confirmed death cases. All the stock market-related variables were collected from Bloomberg financial database. The coronavirus-related data were collected from the ourworldindata.org database. The present study employed pooled OLS regression analysis. It is more appropriate to study the individual index to derive unbiased reliable estimates of parameters even when the time constant attributes are present. The estimated results of pooled OLS analysis are more reliable. The study also employed bivariate regression analysis by using a dummy variable. For analysis purposes, natural log values for all the variables were considered.

Firstly, the stock market return was calculated by using equation (1) :

$$SMR_{it} = \frac{P_t - P_{t-1}}{P_{t-1}} \quad (1)$$

where,

SMR_{it} represents daily BSE SENSEX return on day t,

P_t represents the closing price of the day t, and

P_{t-1} represents the closing price of the previous trading day.

Further, the returns were regressed by the predictor variables as modeled in equation (2):

$$SMR_{i,t} = \alpha_0 + \alpha_1 \text{COVID-19}_{i,t-1} + \beta Z_{i,t-1} + e_{it} \quad (2)$$

where,

$SMR_{i,t}$ represents the dependent variable, i.e., BSE SENSEX returns on day t,

$\text{COVID-19}_{i,t-1}$ represents the independent variable, i.e., total confirmed cases and total death cases,

$Z_{i,t-1}$ represents the control variables such as the volume of trade, market capitalization, price to book ratio, turnover, illiquidity, volatility, and

e_{it} is the error term.

Empirical Analysis and Results

Table 1 shows descriptive statistics of the variables considered for the study. It can be observed that stock market returns gave a positive mean return of 0.0007 during the sampled period. Whereas at the maximum of 0.0897 and minimum of -0.1315. The stock market returns give minimum negative returns during the pandemic.

Table 2 presents the results of the correlation matrix of the study variables. The result shows that all the variables are positively correlated with stock market returns (SMR_{it}) except volatility ($r = -0.170$). Except for volume, the remaining variables are statistically significant at 0.05 level. Further, total confirmed cases, total death cases, market capitalization, price to book ratio, and illiquidity are negatively correlated with volatility.

Tables 3 and 4 represent the results of pooled OLS regressions of total confirmed cases and death cases. The study uses stock market returns (SMR_{it}) as the dependent variable and total confirmed cases and total death cases as the independent variables. Further, the study uses the volume of trade, market capitalization, price to book ratio, turnover, volatility, and illiquidity as the control variables. The results of seven pooled OLS regression

models reveal that coefficients in models (1), (2), (6), and (7) are statistically significant at various levels, which indicates that the total confirmed cases affect the stock returns positively. The results are in line with the previous study (Alam et al., 2020). Models (1) and (2) also show a positive impact of total death cases on the stock market returns. However, the total number of death cases negatively and significantly affects the stock market returns in models (6) and (7). Further, the control variables such as volume of trade, market capitalization, price to book ratio, turnover, volatility, and illiquidity are statistically significant at 0.10, 0.05, and 0.01 levels in different models.

Table 1. ***Descriptive Statistics***

Variables	Mean	Std. Dev.	Maximum	Minimum
Stock market returns (SMR_{it})	0.0007	0.0215	0.0897	–0.1315
Total Cases	11.7154	4.8584	16.0913	0.0000
Total Deaths	8.1780	4.1187	11.8591	0.0000
Volume	16.6999	0.4395	19.0534	15.0096
Market Capitalization	0.0007	0.0207	0.0868	–0.1331
Price to Book Ratio (P/B Ratio)	–0.0002	0.0225	0.0859	–0.1410
Turnover	16.2073	0.4585	18.6548	14.4401
Illiquidity	0.0000	0.0013	0.0053	–0.0078
Volatility	–4.1338	0.6198	–1.7831	–5.4316

Table 2. ***Correlation Matrix***

Variables	SMR_{it}	Total Cases	Total Deaths	Volume	Market Cap.	P/B Ratio	Turnover	Illiquidity	Volatility
SMR_{it}	1								
Total Cases	0.151*	1							
Total Deaths	0.168*	0.992**	1						
Volume	0.118	0.150*	0.094	1					
Market Cap.	0.993**	0.147*	0.166*	0.097	1				
P/B Ratio	0.955**	0.142*	0.163*	0.095	0.949**	1			
Turnover	0.156*	0.140*	0.102	0.915**	0.135*	0.126	1		
Illiquidity	1.000**	0.156*	0.174*	0.110	0.992**	0.955**	0.148*	1	
Volatility	–0.170*	–0.29**	–0.37**	0.457**	–0.18**	–0.18**	0.306**	–0.178**	1

Note. *, ** represents significant at 0.05%, and 0.01%.

Table 3. ***Results of Pooled OLS Regression Analysis***

Panel A - Daily Total Confirmed Cases							
Models	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Constant	–0.0070*	–0.0847	–0.0157**	–0.0153**	–0.0156**	–0.008***	–0.005***
	(–1.86)	(–1.55)	(–2.32)	(–2.40)	(–2.46)	(–5.47)	(–2.90)
Total Cases	0.00065**	0.0006**	0.0000	0.0000	0.0000	–0.000***	–0.0000**
	(2.23)	(1.99)	(0.06)	(0.02)	(0.02)	(–3.32)	(–2.26)

Volume	0.0047	0.0009**	0.0009**	–0.0000	0.0002	–0.0000
	(1.42)	(2.30)	(2.41)	(–0.01)	(0.90)	(–0.18)
Market Cap.		1.0299***	0.9000***	0.8981***	0.0442***	0.0441***
		(118.71)	(35.20)	(35.05)	(3.10)	(3.11)
P/B Ratio			0.1259***	0.1268***	0.0045	0.0050
			(5.36)	(5.40)	(0.83)	(0.93)
Turnover				0.0009	0.0003	0.0004**
				(1.09)	(1.55)	(2.08)
Illiquidity					16.14***	16.143***
					(64.98)	(65.38)
Volatility						0.0001*
						(1.87)

Note. *, **, *** represents significance at 0.10, 0.05, and 0.01; *t*-statistic value is written in parenthesis.

Table 4. ***Results of Pooled OLS Regression Analysis***

Panel B - Daily Total Confirmed Deaths							
Models	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Constant	–0.0064**	–0.8887*	–0.0157**	–0.0153**	–0.0156**	–0.007***	–0.005***
	(–2.00)	(–1.63)	(–2.32)	(–2.41)	(–2.46)	(–5.34)	(–2.90)
Total Deaths	0.0009**	0.0008**	0.0000	–0.0000	–0.0000	–0.000***	–0.0000**
	(2.49)	(2.35)	(0.06)	(–0.03)	(–0.06)	(–3.40)	(–2.26)
Volume		0.00050	0.0009**	0.0009**	–0.0000	0.0001	–0.0000
		(1.52)	(2.32)	(2.43)	(–0.00)	(0.74)	(–0.23)
Market			1.0299***	0.9001***	0.8982***	0.0443***	0.0442***
Cap.			(118.28)	(35.21)	(35.06)	(3.11)	(3.12)
P/B Ratio				0.1259***	0.1268***	0.0047	0.0052
				(5.36)	(5.40)	(0.87)	(0.96)
Turnover					0.0010	0.0003*	0.0004**
					(1.09)	(1.65)	(2.12)
Illiquidity						16.138***	16.140***
						(65.07)	(65.38)
Volatility							0.0001*
							(1.72)

Note. *, **, *** represents significant at 0.10, 0.05, and 0.01; *t*-statistic value is written in parenthesis.

Table 5 results show the robustness of the pooled OLS regression results by employing bivariate regression analysis. The results confirm that total confirmed cases affect the stock market returns positively and negatively in Models (1) and (2), respectively. The total death cases, again, exhibit mixed results. Interestingly, in the presence of control variables in Model (4), the sign of association changes from positive to negative as compared to Model (3), while the coefficient remains the same. All the coefficients are statistically significant at different levels. The results obtained are in line with that of international studies such as Al-Awadhi et al. (2020), Ashraf (2020), Bahrini and Filfilan (2020), and Baig et al. (2021).

Table 5. ***Bivariate Regression Analysis***

Variables	(1)	(2)	(3)	(4)
Constant	–0.007*	0.025***	–0.006**	0.017**
	(–1.86)	(3.00)	(–2.00)	(2.39)
Total Cases	0.001**	–0.002***		
	(2.23)	(–2.65)		
Total Deaths			0.001**	–0.001**
			(2.49)	(–1.97)
Dummy Variable		–0.033***		–0.028***
		(–4.29)		(–3.71)

Note. *, **, *** represents significant at 0.10, 0.05, and 0.01; *t*-statistic value is written in parenthesis.

Conclusion

The research paper investigated the impact of coronavirus on Indian Stock market returns as influenced by COVID-19 confirmed cases and death cases. The analysis of BSE SENSEX index data, collected for the period between January 30, 2020 and December 08, 2020, revealed a positive impact of total confirmed cases and a negative impact of total death cases on the BSE Sensex returns. All the results were also significant. Moreover, the Indian stock market reacted quickly to the coronavirus-related news or announcement. From time to time, the GoI has adopted appropriate precautionary measures to control the spread of the virus. Further, the government has also taken measures to boost various sectors and stock markets of the economy in the form of stimulus packages to recover from the pandemic. Therefore, it can be concluded that the Indian stock market is affected by both total confirmed cases and death cases.

Research Implications

The present study may be helpful to the investors, government, policymakers, corporates, and investment companies in several ways. First of all, it is suggested to the investors to know the present condition of the economy and the reaction of the stock market to such conditions before investing their hard-earned money. The policymakers are also suggested to make necessary regulations concerning the impact of COVID -19 on the stock market and provide flexibility to the participants to boost the investors' confidence during these unprecedented situations.

Limitations of the Study and Scope for Further Research

The present study considered only the Indian stock market, particularly BSE, and is limited to the BSE Sensex index. The study period covered a short-term period of approximately one year only. Also, the study employed pooled ordinary least square regression analysis, which may have its limitation.

This study gives the scope for upcoming researchers in several ways. For better understanding, a study can be conducted to include other indices. Further, comparative analysis can be undertaken by incorporating other stock exchanges of India as well as of foreign countries. Moreover, the sampled study period can be extended to over one year for better results.

Authors' Contribution

Veeravel V. framed the conceptualization, data, and methodology and conducted the formal analysis of the study. Dr. K. Karthikeyan facilitated writing the original draft, review of literature, and monitoring the research work. P. R. Remiya helped write the original draft, proofread, and edited the final manuscript.

Conflict of Interest

The authors certify that they have no affiliation with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Funding Acknowledgement

The authors received no financial support for the research, authorship, and/or for the publication of this article.

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