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Impact of Covid-19 on the Financial Sector Indices

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ABSTRACT

This study is an attempt to assess the impact of Covid-19 and the lockdown pronounced thereof on the Nifty sectoral indices with specific reference to the financial sector indices owing to their significance in the economy. The OLS regression, Granger Causality and Impulse Response Function were estimated to measure the changes in the future responses of Nifty 50 to the changes in the select sectoral indices, namely, Nifty Bank, Nifty Financial Services and Nifty Private Banks and Nifty PSU Banks for the period consisting two sub-periods, i.e., the first sub-period from April 2019 to March 2020 are assumed as the pre-Covid-19 period and the second sub-period from April 2020 to March 2021 is assumed as the period during Covid-19. The results indicated that the shock of the Covid-19 had an impact on the financial sector indices in India during the Covid-19 period.

SARI PATI

Studi ini merupakan upaya untuk menilai dampak Covid-19 dan penutupan wilayah yang dilakukan pemerintah pada indeks sektoral Nifty dengan referensi khusus pada indeks sektor keuangan karena signifikansinya dalam perekonomian. Regresi OLS, Granger Causality dan Impulse Response Function diperkirakan mengukur perubahan respons Nifty 50 di masa mendatang terhadap perubahan dalam indeks sektoral tertentu, yaitu, Nifty Bank, Nifty Financial Services dan Nifty Private Banks serta Nifty PSU Banks untuk periode yang terdiri dari dua sub periode, yaitu sub periode pertama April 2019 hingga Maret 2020 diasumsikan sebagai periode pra-Covid-19 dan sub periode kedua April 2020 hingga Maret 2021 diasumsikan sebagai periode Covid-19. Hasil penelitian menunjukkan bahwa guncangan Covid-19 berdampak pada indeks sektor keuangan di India selama periode Covid-19.

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INTRODUCTION

The financial sector of India that includes the banking, non-banking financial companies, and the insurance industry is highly influential in the real economy since they create credit and mobilize savings. This forms the basis for investments, provides payment and fund transfer services to boost businesses and consumers; thereby creating avenues of growth in the economy. The performance of the financial sector is crucial to the sustained functioning of the markets and risk mitigation.

The Covid-19 pandemic that hit the world has altered the way the sectors of the economy functioned. The global financial markets including India have witnessed significant impact due to the announcement of the pandemic Covid-19 and the lockdown pronounced thereafter across the world. The fear of many businesses turning to bankruptcy, increased NPA, liquidity depletion in the financial services sector, and termination of capital flows have alarmed the policymakers to estimate the extent of the impact of Covid-19 shutdowns on the various sectors of the economy.

The financial sector that operates through the equity markets has increased access to capital flows, but the pandemic has had its impact on the indices of this sector as well globally and India in specific. According to Business Standard, Apr 2020, expected a 16-22 percent fall in Nifty, the leading benchmark index of the National Stock Exchange (NSE) of India. This study is therefore an attempt to assess the impact of Covid-19 and the lockdown pronounced thereof on the Nifty sectoral indices with specific reference to the financial sector indices owing to their significance in the economy.

The studies conducted earlier on estimating the impact of Covid-19 on stock markets have pointed out the volatility using various models like GARCH, impulse response function, and the causality analysis using various sectoral indices and comparatively for markets. Some of the significant studies in line with the present study carried out during the pandemic for the Indian context are presented in this section.

Agarwalla, Varma and Virmani (2021) investigated the impact of Covid-19 in Indian stock markets using liquid Nifty index options traded at the NSE for the period January 1 to May 31, 2020. The study measured the impact of Covid-19 on market-wide uncertainty and tail risk implied by the options market. It was found that there were notable shifts in the first four moments of the risk-neutral distribution of the future stock market index. Chuan, Mahdi and Kenneth (2021) estimated the volatility of two Asian stock markets, Bursa Malaysia and Singapore exchange by breaking the data into pre-Covid-19 and during the-Covid-19 using the GARCH, GARCH-M, TGARCH, EGARCH and PGARCH models for each of the subsamples. The results showed that both stock market returns were quite persistent, and the persistence decreased for both stock market returns during the pandemic. Furthermore, the normal distribution performed well for Malaysian and Singaporean stock markets before the pandemic and switched to a Student's (skewed normal) during the pandemic. The standard GARCH(1,1), GARCH-M(1,1), and EGARCH(1,1) performed well for both stock market returns, and the EGARCH indicated the presence of the leverage effect when stock market returns were negatively correlated with its volatility.

Bhatia and Gupta (2020) investigated the volatility of the Indian banking sectoral indices with the general banking index considering the shocking events via; the Sub-prime crisis and the Covid-19 using asymmetric and symmetric models. The findings of the study indicated that the volatile behavior of these indices was strong enough to persist in the market with the leverage effect present during the Sub-prime crisis. This effect disappeared for Nifty Bank Indices and Private Sector Bank Indices as compared to Public Sector Undertaking Bank Indices during Covid-19. With GARCH and EGARCH models, the study suggested that the investors may

use the diversification approach, in the long run, to safeguard their portfolio values to survive global shocks. Patil, Parab and Reddy (2018) analyzed the impact of demonetization on NIFTY's sectoral indices, that is, Nifty Auto Index, Nifty Financial Services Index, Nifty FMCG Index, Nifty IT Index, Nifty Media Index, Nifty Private Bank Index and Nifty Realty Index. They applied the GARCH Model to capture its effect on them. They concluded that the NIFTY Auto index was the most affected due to India's demonetization announcement in November 2016. Sahoo (2021) empirically investigated the existence of the day-of-the-week effect by using closing daily data for Nifty 50, Nifty 50 Midcap, Nifty 100, Nifty 100 Midcap, Nifty 100 Smallcap, and Nifty 200 for before and during the Covid-19. Secondary data for all indices over the period 1 April 2005–14 May 2020 was used and the dummy variable regression and the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model were applied to estimate the results. The study found a negative return for Mondays during-Covid-19 and in contrast, positive returns were seen before the Covid-19 period. Tuesday's effect on index return was found to be statistically significant and positive for all indices during the Covid-19 crisis.

Chaudhary, Bakhshi and Gupta (2020) in their study analyzed the impact of Covid-19 on the performance of the Indian stock market from the two composite indices (BSE 500 and BSE Sensex) and eight sectoral indices of the Bombay Stock Exchange (BSE) (Auto, Bankex, Consumer Durables, Capital Goods, Fast Moving Consumer Goods, Health Care, Information Technology, and Realty) of India, and compared the composite indices of India with three global indexes S&P 500, Nikkei 225, and FTSE 100, using daily data from January 2019 to May 2020. Using the GLS regression to assess the impact of Covid-19 on the multiple measures of volatility, namely standard deviation, skewness, and kurtosis of all indices, the key findings of the study indicated lower mean daily return than specific, negative returns in the crisis period compared to the pre-crisis period. The standard deviation of all the indices increased, the skewness was found to be negative, and the kurtosis values were exceptionally large. The Indian stock market depicted roughly the same standard deviation as the global markets but had higher negative skewness and higher positive kurtosis of returns, making the market seem more volatile. Guru and Das (2020) examined the impact of Covid-19 on the volatility spillovers of ten major sector indices listed in BSE India. The study found that the total volatility spillovers reached 69 percent during Covid-19. The energy sector followed by oil and gas was the major net volatility transmitters. Covid-19 has magnified the volatility spillovers in the stock market. FMCG remains the largest net recipient of volatility spillovers from other sectors.

Kulal and Kumar (2020) focused on studying the impact of Covid-19 on the Indian stock market specifically, NSE and five sectoral indices. The findings reveal that Covid-19 had a negative impact on the different indexes of NSE initially for one month, later the market recovered and performed normally due to the liquidity-driven market. Abhinanadan, Sanath Kumar K, Dr. Yatish Kumar (2020) examines the impact of Coronavirus on the Indian Stock market using Event Study. This study analyzed the stock market reaction by taking one of the major indexes of NSE i.e. Nifty 50. It was found that there is a significant impact of Covid-19 on the stock market in India and a short period downfall in the stock prices happened due to some other factors also.

The study will add to the literature and enables further understanding of the impact of Covid-19 on the various sectoral indices of Indian stock markets. It also paves way for further research on other sectoral indices and comparatively analyzes the impact of ongoing Covid-19 on the various sectors of the stock market in India. This would enable to understand the changes in the characteristic of the indices that form due to the Covid-19 impact. Hence this novel attempt is structured as Section I with the Introduction, Review of literature and Need for the study, Section II which describes the objectives of

the study, variables, data, and methodology, Section III presents the empirical results and discussions of the findings of the study discuss the results, and Section IV provides the Conclusion and implications of the study.

METHODS

The objectives of this study are

1. To determine the causal relationship between Nifty 50 and select sectoral indices.
2. To measure the changes in the future responses of Nifty 50 to the changes in the select sectoral indices.

Variables, Data, Measurement

The financial sector forms the fulcrum of any economy and India is no exception. The Covid-19 pandemic and the lockdown announced in India since March 2020 have caused both short-term and long-term effects on the financial sector. The sector includes the banking, NBFC, and the insurance sector which are connected to the lives of the people regularly. Considering this significant role, it is essential to measure the impact of Covid-19 on this sector and the indices operated in the BSE and NSE, which will facilitate policymakers, investors, and governments to forecast and make strategic decisions to meet the impact. Hence the present study has considered the sectors Banks, Financial Services, Private Banks and PSU Banks of India and the variables were the indices of Nifty Bank, Nifty Financial Services and Nifty Private Banks and Nifty PSU Banks.

The daily closing prices of Nifty Bank, Nifty Financial Services, Nifty Private Banks and PSU Banks were drawn from the NSE website for two years, consisting of two sub-periods. The first sub-period from April 2019 to March 2020 is assumed as the pre-Covid-19 period and the second sub-period from April 2020 to March 2021 is assumed as the period during Covid-19.

The study has carried out the empirical analysis by first testing for stationarity using the Augmented Dickey-Fuller (ADF) and the Phillips and Perron (PP) tests to check for the presence of unit root. Secondly, the Normal Least Square Regression was estimated to derive the coefficients, which was further used to forecast the future response of the stock indices following the Covid-19. To assess the causal nexus, the Granger Causality test was performed and the Impulse Response Function (IRF) graphs were plotted to trace the one-time shock of one variable on the current and future values of the endogenous variable in the system.

RESULTS AND DISCUSSION

Descriptive Statistics

The descriptive statistics of the selected stock indices for the study period are presented in Table 1. There was a large difference between the minimum and maximum values of the indices, indicating high volatility. The fluctuations in the price movements presented in Figure 1 also indicated that the prices of the stock indices have fallen steeply with the start of the Covid-19 lockdown in Mar 2020 and there off. The prices have shown an increase during the Covid-19 period but have not risen to the levels of the pre-Covid-19 period, signifying the shock created on this sector due to the lockdown. The mean of the Nifty Bank index was found to be highest indicating high volatility.

The skewness is positive (right-skewed) for study variables, namely Nifty 50 and Nifty PSU Banks, which means that the mean is higher than the mode. The skewness is negative (left-skewed) for study variables, namely Nifty Bank, Nifty Financial Services and Nifty Private Banks, which means that the mean is less than the mode. This suggested that the movements of the study variables are related to one another and are found to be systematic. The kurtosis coefficient values for Nifty 50 are positive and are higher than three, which indicates that the distribution is leptokurtic. The kurtosis coefficient values for Nifty Bank, Nifty Financial Services, Nifty Private Banks, and Nifty PSU Banks are positive and are less than three, which indicates that the distribution is platykurtic with fewer, less extreme

Table 1. Demographic Data

Particulars	Nifty50	Nifty Bank	Nifty Financial Services	Nifty Private Banks	Nifty PSU Banks
Mean	11753.66	27697.05	12856.05	15252.16	2079.28
Median	11669.15	29395.95	12995.50	16321.60	2155.90
Maximum	15314.70	37306.25	17504.90	19866.55	3425.10
Minimum	7610.25	16917.65	8298.50	8974.30	1087.20
Std Deviation	1531.12	4846.69	1999.60	2668.23	653.81
Skewness	0.27	-0.43	-0.06	-0.60	0.26
Kurtosis	3.33	2.10	2.38	2.06	1.86
Jarque-Bera	8.22	31.85	8.22	47.79	32.63
Probability	0.02**	0.00**	0.02**	0.00**	0.00**
Observations	495	495	495	495	495

** Significant at the 5% level

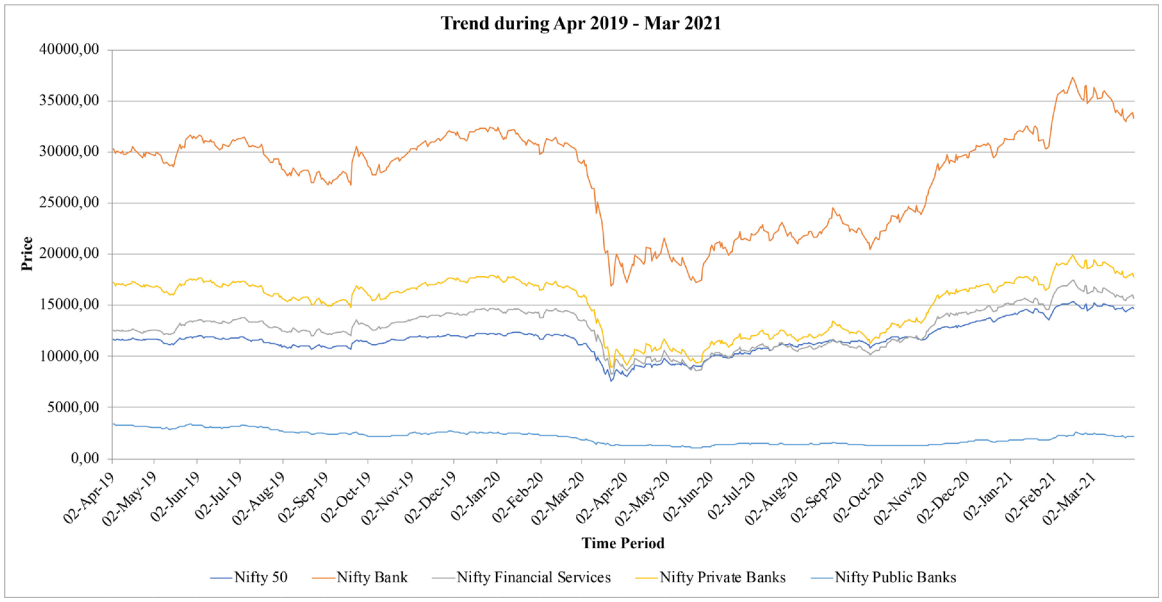

Figure 1. Graphical Representation on the Prices of the Select Sectoral Indices

outliers. Subsequently, the Jarque-Bera test statistics and its probability suggest that all the study variables are not normally distributed.

Testing the Data for Stationarity

The results of unit root tests for checking the stationarity of the data are presented in Table 2.

From the Augmented Dickey-Fuller and Phillips-Perron unit root test results, it is identified that all the study variables are found to be stationary at first difference I(1) series. Hence, all the time series data are statistically significant and integrated in order I(1). Therefore, it is understood that the data of this study are stationary.

Table 2. Results of Unit Root Tests

Time Series Data	ADF Unit Root Test		PP Unit Root Test	
	Level	First Difference	Level	First Difference
Nifty50	-1.14	-23.03**	-1.26	-23.07**
Nifty Bank	-0.93	-21.24**	-1.14	-21.35**
Nifty Financial Services	-1.12	-21.61**	-1.28	-21.69**
Nifty Private Banks	-1.03	-20.99**	-1.20	-21.06**
Nifty PSU Banks	-0.80	-21.67**	-0.89	-21.68**

** Significant at the 5% level

Table 3. Estimation of Regression Model

Independent Variables	Coefficient	Std. Error	t-Statistics	R Square	Adjusted R Square	F-Statistics
Constant	3.77	2.72	1.39**	0.87	0.87	806.10
Nifty Bank	-0.16	0.06	-2.76**			
Nifty Financial Services	0.62	0.05	11.60**			
Nifty Private Banks	0.25	0.08	3.15**			
Nifty PSU Banks	0.42	0.09	4.66			

** Significant at the 5% level

Time Series Regression

Time series regression is a statistical method used in this study to forecast the future response of Nifty 50 index prices based on past data of the select sectoral indices. The result of the time series regression is presented in Table 3.

The regression output consists of four important pieces of information. First, the R^2 value is based on the sample and represents the proportion of variance in Nifty 20 index prices that could be explained by the select sectoral indices considered in this study, and it indicates the fitness of the regression model. For a model to be fit, the R^2 value needs to be 0.60 or above. In the above regression model, the model is fit because the R^2 value is 0.87, which is above 0.60. This means that the select sectoral indices could explain 87 percent of the variability of Nifty 50 index price movements. Second, the adjusted R^2 value corrects the positive bias to provide a value that could be expected in the population. The adjusted R^2 value of the model is 0.87, which is as same as the R^2 value. Third, the F value of the model is 806.10, which indicates that the model is statistically significant at the 0.05 level. Finally, the coefficients for the constant and independent variables (i.e., select sectoral indices) are the information used to construct a model and forecast the dependent variable (i.e., Nifty 50 index prices).

The following is the regression model framed from the above regression results:

$$\text{Nifty } 50_t = +3.77 - 0.16\ (\text{Nifty Bank}) + 0.62\ (\text{Nifty Financial Services}) + 0.25\ (\text{Nifty Private Banks}) + 0.42\ (\text{Nifty PSU Banks}) + \varepsilon_t$$

Testing the Data for Causality

Hypothesis H_{01}, there is no significant causal relationship existing between Nifty 50 and select sectoral indices.

Granger causality test was used to determine the causality between the Nifty 50 and the select sectoral indices, i.e., to check whether Nifty 50 is useful in forecasting the select sectoral indices and vice versa and also helps in determining the

Table 4. Results of Granger Causality Tests

Null Hypotheses	F-Statistic	Probability	Result
Nifty Bank does not Granger Cause Nifty 50	2.25	0.11	Accept
Nifty 50 does not Granger Cause Nifty Bank	3.11	0.04**	Reject
Nifty Financial Services does not Granger Cause Nifty 50	3.18	0.04**	Reject
Nifty 50 does not Granger Cause Nifty Financial Services	4.05	0.02**	Reject
Nifty Private Banks does not Granger Cause Nifty 50	2.17	0.12	Accept
Nifty 50 does not Granger Cause Nifty Private Banks	3.33	0.04**	Reject
Nifty PSU Banks does not Granger Cause Nifty 50	0.18	0.83	Accept
Nifty 50 does not Granger Cause Nifty PSU Banks	1.61	0.20	Accept

Note: Appropriate lag length was determined by the Akaike information criterion.
** Significant at the 5% level

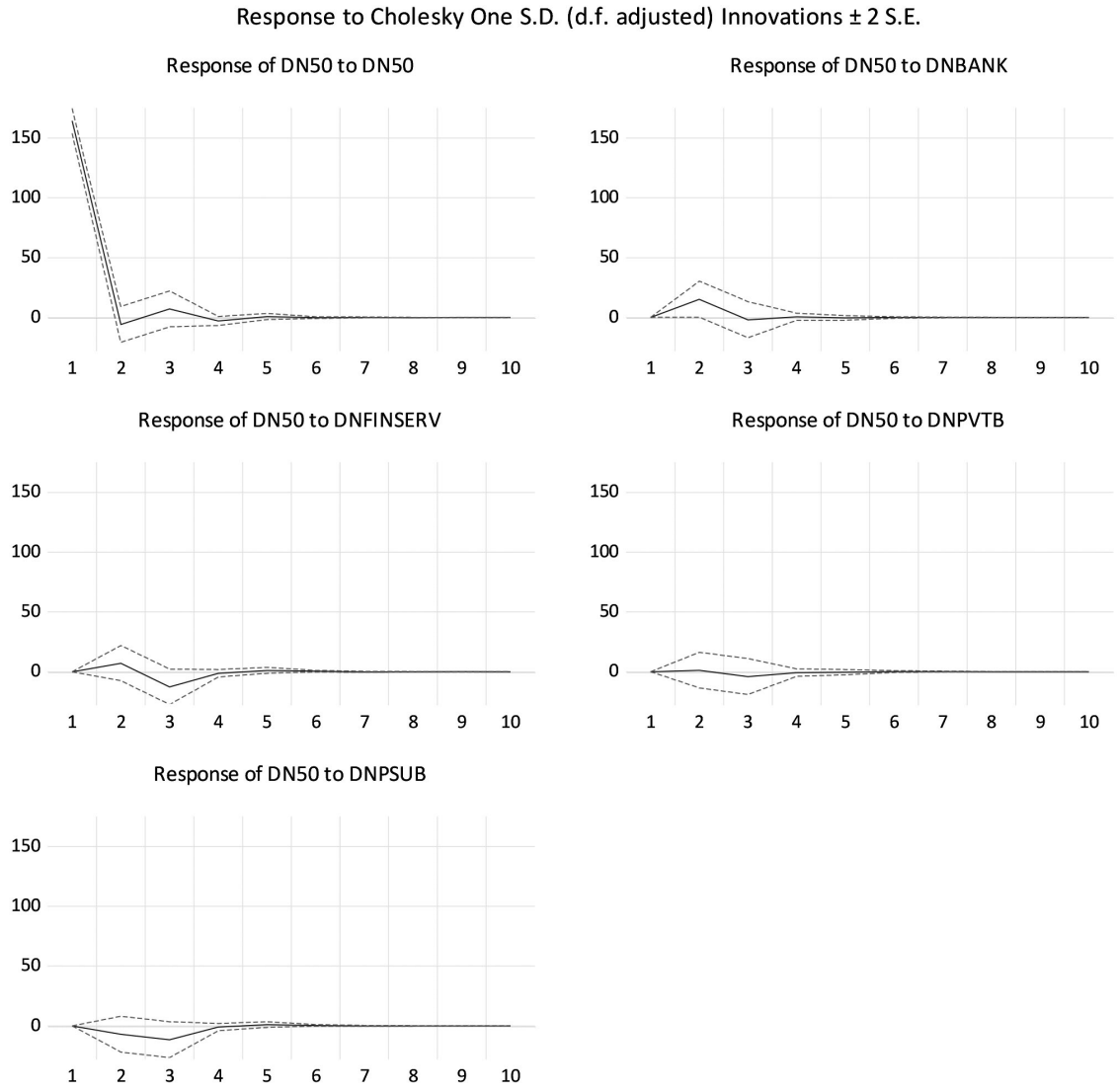

Figure 2. Impulse Responses of Nifty 50 to Select Sectoral Indices

short-run equilibrium relationship. The results of the Granger causality test for Nifty 50 and the select sectoral indices are given in Table 4.

The results of the Granger causality revealed that there was a significant causal relationship between Nifty 50 and the select sectoral indices in the short-run. A unidirectional causality existed from Nifty 50 to Nifty Bank and Nifty Private Banks, implying a change in the Nifty 50 index during both pre-Covid-19 and during the Covid-19 period had a significant impact on the Nifty Bank and Nifty Private Banks index prices. It was further found that there existed bidirectional causality between Nifty 50 and Nifty Financial Services during both pre-Covid-19 and Covid-19 periods.

Impulse Response Function (IRF)

IRF was derived to test the null hypothesis H_{02}: There is no significant change in the future responses of Nifty 50 to the changes in the select sectoral indices. IRF graphs were plotted to trace the one-time shock of one variable on the current and future values of the endogenous variable in the system. The responses of the Nifty 50 due to Covid-19 shock on the select sectoral indices are presented in Figure 2.

IRF plots showing the response of Nifty 50 to the changes in Nifty Bank, Nifty Financial Services, Nifty Private Banks, Nifty PSU Banks indicated that there were significant responses due to the Covid-19 shock, leading to the rejection of the null hypothesis. The empirical analysis carried out using the regression, Granger causality, and IRF provides evidence to suggest that the shock of the Covid-19 had its impact on the financial sector indices in India during the Covid-19 period.

MANAGERIAL IMPLICATIONS

The stock markets across the globe move on the spectrum of volatility caused by information asymmetry shock experienced at various timeframes and government policy decisions. The assessment of the volatility in the performance of the stock market parameters is considered vital by investors and policymakers to enable forecasting and decision making. In this background, the recent Covid-19 pandemic that shook the globe has had its impact on all sectors of the economy, and the stock market was not spared though.

CONCLUSION

This study was carried out to examine empirically the impact of Covid-19 on the financial sector indices of the NSE in India, using robust econometric techniques. The results indicated that the financial sector indices via; Nifty Bank, Nifty Financial Services, Nifty Private Banks and Nifty PSU Banks experienced impact due to the Covid-19 and the lockdown in India, with the volatility being highest for the NSE Banks. A unidirectional causality existed from Nifty 50 to Nifty Bank and Nifty Private Banks, implying a change in the Nifty 50 index during both pre-Covid-19 and during the Covid-19 period had a significant impact on the Nifty Bank and Nifty Private Banks index prices. It was further found that there existed bidirectional causality between Nifty 50 and Nifty Financial Services during both pre-Covid-19 and Covid-19 periods. IRF plots indicated the absorption of the Covid-19 shock on all the indices of the study during the Covid-19 period. This implies that Covid-19 caused volatility in the Indian stock market. ■

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