Impact of COVID-19 on Stock Returns: A Comparative Study of Spot Market and Future Market

Sonia
Research Scholar
Deptt. of Business Mgt. & Com.
GNDU, Amritsar
RC Gurdaspur (Punjab)

Arwinder Singh
Assistant Professor
Deptt. Of Business Mgt. & Com.
GNDU, Amritsar
RC-Gurdaspur (Punjab)

Sapna
Assistant Professor
Deptt. Of Business Mgt. & Com.
GNDU, Amritsar
RC-Gurdaspur (Punjab)

ABSTRACT

The COVID-19 outbreak had an unprecedented and great impact on the world economy and the Indian economy. Not just India, but countries like Germany, Spain, the USA, and France have been severely impacted. The economy slowed down and investors in the stock market became fearful due to the nationwide lockdown, restrictions on the transportation network, and demand-supply imbalance. A swift decline in stock prices and heightened volatility has been observed during this timeframe. For the purpose of assessing the impact of the COVID-19 pandemic on these markets, the current study compares the volatility of stock price returns in the stock and future markets. The current study took into account the pre-COVID period, which spanned from January 1 to December 31, 2019, and the post-COVID period, which spanned from January 1, 2020, to December 31, 2020. In this study, we have selected the Nifty 50 spot index which is a diversified stock index accounting for 13 economic sectors, and the Nifty 50 futures index. The GARCH (1, 1) model is employed to assess and compare the volatility of stock price returns between the stock market and the future market. Additionally, it examines the impact of the Covid-19 pandemic on both markets. Result from the GARCH (1,1) indicated that volatility persistence has been the same for the Future Market and Spot Market in the pre-covid period. However, volatility is highest in the future market and lowest in the spot market during COVID-19.

Key Words: NSE, Nifty 50 Index, Nifty 50 Future Index, Covid-19, Garch Model.

1. Introduction

The swift transmission of the unprecedented COVID-19 pandemic has placed the world in great danger which has also changed the global outlook unpredictably. The COVID-19 pandemic was first caused by the SARS-CoV-2 virus, which first appeared in Wuhan, Hubei province, China, in December 2019. Over time, the virus spread to other parts of the world. In addition to becoming a major worldwide health issue, this pandemic is also causing a massive global economic downturn. Many nations impose stringent quarantine laws in an attempt to

contain the unknown virus, which abruptly stops their economic activity. Restricted and even prohibited international transportation has led to a deceleration of global economic activities. Perhaps most importantly, the unusual situation in the market has caused concern among consumers and businesses, preventing them from engaging in their typical purchasing patterns.

This epidemic has increased risk and uncertainty, which has had a substantial negative economic impact on both developed and developing nations, including Brazil, India, Spain, Italy, and the United States. The financial market has moved dramatically in response to this and has been negatively impacted. The COVID-19-related economic unrest has had a significant impact on the financial sector, which encompasses the stock and bond markets. The pandemic has led to a significant decline in oil prices and a substantial increase in the price of gold. Firzli (2020) characterizes this crisis as "the greater financial crisis". In numerous countries, Corporate debts are quite high, businesses are heavily laden, and weak corporations become even more unstable. Since the COVID-19 outbreak, the market value of the Standard & Poor (S&P) 500 indexes has decreased by 30%. Increased uncertainty, according to Azimili (2020), has an impact on the required rate of return and, consequently, current market value of the stocks.

The Indian government declared the Janata Curfew and a lockdown strategy to uphold social distancing practices in an effort to slow down outbreaks starting on March 24, 2020. When the government declared this lockdown, a number of economic operations were abruptly suspended. The disruption of the global market has resulted in high volatility in the Indian financial sector (Raja Ram, 2020). The global financial market's fallout has caused significant volatility in the Indian stock market as well. It has also been hardest hit by the COVID-19 outbreak. India's two main stock indices are the National Stock Exchange (NSE), Nifty, and the Bombay Stock Exchange (BSE), Sensex. Looking at the Bombay Stock Exchange, on March 23, 2020, the Sensex index fell to 13.2%. Following the announcement of the Harshad Mehta Scam on April 28, 1991, it was the highest single they fell (Mandal, 2020). In a similar vein, Nifty has dropped to about 29% over this time. The impact of COVID-19 on the Indian stock market has been referred to by some economists as a "black swan event," which is the occurrence of a very unexpected event that has a very negative consequence. The government's lockdown strategy caused the factories to cut back on both labor force size and output, which caused a disruption in the supply chain. Due to the prevailing uncertainty, individuals are scaling back their consumption habits, causing a demand-side shock.

The COVID-19 epidemic has had an impact on both the supply and demand chains. However, there isn't much research on COVID-19's effects on the stock market as a whole, particularly in emerging economies, despite the abundance of literature on the subject. This research aims to examine the effects of COVID-19 on the National Stock Exchange, a significant stock market in India, in order to shed light on this particular issue. The structure of this paper is as follows: Section 1 begins with an introduction, Section 2 provides a review of relevant literature, Section 3 outlines the data sources and methodology, Section 4 presents the results and discussion, and Section 5 concludes the study.

2. Literature Review

Bhatia & Gupta (2020). The study compared the volatility of sectoral indices within the Indian banking sectoral indices to the overall banking index in the aftermath of two major events: the subprime mortgage crisis and COVID-19. Using symmetric and asymmetric models, the comparison of both shocks that led to these indexes' volatility was undertaken. The outcomes of this analysis revealed that the volatile behaviour of these indices was robust enough to keep them in market despite the leverage effect that existed during the subprime crisis. During COVID-19, this effect vanished for Nifty Bank Indices and Private Sector Bank Indices when compared to Public Sector Undertaking Bank Indices (probably because the pandemic is not over yet). The study demonstrates that, in the long run, investors can use the diversification technique to protect their portfolio values from global shocks, using the GARCH and EGARCH models.

Chaudhary et al. (2020). The present study investigates the impact of COVID-19 on the Indian stock market performance using two composite indices (BSE Sensex and BSE 500) and eight sectoral indices from the Bombay Stock Exchange (Auto, Bank, Capital Goods, Consumer Durables, Fast Moving Consumer Goods, Information Technology and Health Care). The key findings across all indices indicate lower mean daily returns and negative returns during the crisis period compared to the pre-crisis period. Standard deviations for all indices have increased, skewness has become negative, and kurtosis values are notably high. Throughout the crisis, the correlation among indices has expanded. While the Indian stock market shares a standard deviation comparable to global markets, it exhibits a higher negative skewness and positive kurtosis in returns, creating a perception of increased volatility.

Meher et al. (2020). An attempt has been made in this research to assess the price volatility of crude oil and natural gas listed on India's multi-commodities exchange (MCX). We calculated

the leveraging effect of COVID-19 on crude oil and natural gas price volatility using daily crude oil and natural gas prices from May 1, 2017 to April 30, 2020. The study's findings show that COVID-19 has a leveraging effect on crude oil price volatility. The leverage impact, on the other hand, is absent in the natural gas price volatility. The study's findings will assist investors in developing investment strategies and regulators in formulating appropriate policies to mitigate or eliminate COVID-19's impact. Crude oil price predicting graphs suggest that price volatility may increase in the future. Nevertheless, due to the highly fluctuating nature of the price volatility chart, predicting the anticipated future volatility of natural gas proves to be challenging.

Tomar (2020). This study investigated the Indian financial markets' volatility spillover and connectedness as well as examined how monthly volatility is communicated to the three most important Bombay Stock Exchange indices. The three indexes are Sensex, Mid Cap, and the small-cap. The research also aims to assess the impact of the ongoing COVID-19 situation. The transmission of volatility and its interconnectedness have been brought to the attention of Diebold and Yilmaz's studies. David Gabauer improved the method by using the TVP-VAR methodology, which addresses the flaws of the Diebold and Yilmaz methods. According to this method, 58% of the volatility spillover comes from within the model. This suggests that the 58 percent volatility is due only to the size. The spillover is dispensed by the Mid Cap the most.

Verma & Sinha (2020). The objective of this study is to investigate how COVID-19 cases have influenced the Indian stock market, considering variations in expectations of volatility and a specific time frame, notably the entire lockdown period from April to May 2020. Utilizing a GARCH (1,1) model and data spanning from May 16, 2019, to May 13, 2020, the results suggest that fluctuations in the total number of cases in India do not have a significant impact on the average Nifty return. However, there is evidence indicating a positive effect on the conditional variance of Nifty returns.

Yousef & Shehadeh (2020). The study examines the covid-19 influence on gold return volatility using GARCH and GJR-GARCH models based on daily gold returns from 2012 to 2020. The rising number of global coronavirus cases and rising gold prices have a positive association, according to our findings. We find a noteworthy positive impact of COVID-19 on the conditional variance equation through the application of GARCH and GJR-GARCH models. This suggests that the coronavirus has the potential to elevate the volatility of gold returns. The heightened uncertainty surrounding the virus's transmission contributes to

increased demand for gold, leading to upward pressure on prices. This pattern is anticipated to persist until the development of a vaccine or other treatments, which can stabilize the global economic landscape.

Aslam et al. (2021). The volatility spillover among twelve European stock markets, spanning all four regions of Europe, is estimated in this empirical research. From 2 December 2019 to 29 May 2020, the data comprises 10,990 intraday observations. According to the study, spillovers contribute to 77.80% of the forecast error variance in intraday volatility across twelve European markets. Furthermore, the Sweden and the Netherlands stock markets have the highest gross directional volatility spillovers, whilst Poland and Ireland stock markets have the lowest. However, the most substantial directional volatility spillovers originate from German and Dutch markets. When we divide the entire sample into pre- and post-pandemic declarations (11 March 2020), we find that the latter has more stable spillovers. During COVID-19, the findings provide vital information about European stock market interdependence, which will be useful to policymakers and practitioners equally.

Apostolakis et al. (2021) investigate intra-market volatility transmission in the Athens stock market using volatility impulse response functions and analyzing volatility spillovers in this article. We use a large sample period of daily data spanning December 1999 to December 2020 to capture major events of the last 20 years, including the announcement of two referendums during the Greek government-debt crisis in 2010 and the economic and political turmoil that increased country instability, the BREXIT referendum, and the COVID-19 pandemic in 2020. Our findings show that negative shocks during the referendum announcement induce bigger impulse reactions than negative shocks during the country lockdown announcement. We also discovered the presence of a dynamic link between volatility spillovers. During the COVID-19 epidemic, volatility spillovers surged. Mid-cap enterprises transmit higher volatility to large-cap firms during the COVID-19 epidemic, according to dynamic spillover plots.

Bora & Basistha (2021). This research empirically explores COVID-19's impact on stock market volatility in India using a generalized autoregressive conditional heteroscedasticity model. The investigation used daily closing prices of stock indices, Nifty and Sensex, from 3 September 2019 to 10 July 2020. Furthermore, the research aimed to compare stock price returns in pre-COVID-19 and post-COVID-19 scenarios. The stock market in India suffered volatility amid the pandemic, according to the findings. Upon comparing the outcomes between

the COVID period and the pre-COVID period, it was observed that the indices exhibited higher returns in the pre-COVID-19 era compared to the period affected by COVID-19.

Guru & Das (2021). This study delved into the impact of COVID-19 on volatility spillovers among ten key sector indices listed on the BSE India. Throughout the COVID-19 period, we observed that total volatility spillovers accounted for 69 percent. The energy sector emerged as the primary net transmitter of volatility, closely followed by oil and gas. The pandemic significantly heightened volatility spillovers in the stock market. The influence of the energy sector on other industries was substantial, with FMCG standing out as the most significant net recipient of volatility spillovers from various sectors.

Li (2021). This research investigates the dynamic nature of volatility spillovers and their asymmetry across stock markets in the United States, Japan, Germany, the United Kingdom, France, Italy, Canada, India, China, and Brazil. Utilizing high-frequency data spanning from 1 June 2009 to 28 August 2020, and employing the Diebold-Yilmaz spillover index, network analysis, and a developed asymmetric spillover index, the study reveals that global markets exhibit a close integration with time-varying, crisis-sensitive, and asymmetric volatility spillovers. The primary conveyors of risk are developed markets while emerging markets serve as the main recipients of risk. The impact of financial contagion is predominantly characterized by downside risk, with a substantial amount of downside risk transferring from risk-transmitting stock markets to global markets. Moreover, the overall extent of volatility spillover remains exceptionally high during the coronavirus recession, with emerging markets emerging as the primary recipients of risk during the 2020 stock market crash.

Mensi et al. (2021). This study explores the spillovers in price-switching between the US and Chinese futures markets for stocks, gold and crude oil, both before and during the COVID-19 epidemic. We show that stock markets are primarily influenced by their shocks, with effects that are sensitive to regime shifts, using a Markov-switching vector autoregressive model. In the period of low volatility, gold and stock markets were net contributors to spillovers, while in the high-volatility regime, they acted as net receivers. Conversely, during the low-volatility phase, oil experienced significant spillovers as a net receiver, whereas in the high-volatility regime, it functioned as a substantial net contributor, as indicated by connectedness network analysis. From January 2019 to February 2020, low-volatility regimes dominated, whereas high-volatility regimes dominated from March to May 2020. The COVID-19 epidemic, we conclude, increased commodity market spillovers to the US and Chinese stock markets.

Sikdar (2021). This research aims to assess the influence of the COVID-19 pandemic on the overall economy by examining the stock price return volatility, transaction volume, and delivery percentage of different listed companies on the BSE during both pre and post-COVID-19 periods. We looked at the pre-COVID period extended from 1 September 2019 to 15 March 2020, and the post-covid era from March 2020 to August 2020 in this article. We chose 50 BSE-listed companies from five industries for our study: pharmaceuticals, automobiles, banking and finance, industrial products, and consumer goods. For the majority of the sectors, we found that the mean daily stock price, average daily return, daily number of transactions, and volatility varied significantly between the before and post-COVID periods.

Verma et al. (2021). The result of the Indian government's shutdown announcement on various core sectors of the economy, such as pharmaceuticals, financial services, FMCG, banking, and energy, is examined in this study. Our research centers on the day of the lockdown announcement, with a selected 40-day event window comprising 20 days before and 20 days after the announcement date. The majority of the sectors did well and gained anomalous returns in the 21 days following the announcement, according to our findings. It is evident that various sectors recovered their standing even in the face of a decline in the market index. This suggests that investors held confidence that the market's downturn was a result of exceptional conditions rather than inherent issues within the sectors. The findings indicate that investors might choose to retain their investments in stocks that demonstrated recovery during the specified period. Beyond the influence of COVID-19, investors have the opportunity to enhance portfolio diversification by investing in industries exhibiting positive abnormal returns. This study marks the initial exploration into the repercussions of the COVID-19 lockdown announcement on stock market performance.

Al-Nassar & Makram (2022). For the periods before and during the COVID-19 epidemic, this study examines return and asymmetric volatility spillovers, and dynamic correlations, among the major and small and medium-sized company (SME) stock markets in between the major and small and medium-sized company (SME) stock markets in Egypt and Saudi Arabia. A VAR-asymmetric BEKK–GARCH (1,1) model is used to depict spillovers in returns and volatility. and a VAR-asymmetric DCC–GARCH (1,1) model is used to simulate dynamic conditional correlations between these markets, which are then utilised to evaluate and investigate portfolio construction and hedging implications. While bidirectional return spillovers between the main and SME stock markets are limited to Saudi Arabia, shock and volatility spillovers in both main–SME market pairs have distinct characteristics and dynamics.

Furthermore, dynamic correlations between the main and SME markets are mostly positive and have notably increased during the COVID-19 pandemic, particularly in Saudi Arabia, implying that including SME stocks in a main stock portfolio improves risk-adjusted return, particularly during calm market periods.

3. Objectives of the Study:

3.1 Objectives of the Study

To examine the price volatility index of the Nifty 50 Spot Market and Futures Market.

To assess the influence of COVID-19 on the Nifty 50 Spot Market and Futures Market.

3.2 Hypothesis:

H01: The Index price return of Nifty 50 Spot Market is not volatile.

H02: The COVID-19 does not influence the index price returns of Nifty 50 Spot Market.

H03: The Index price return of Nifty 50 Future Market is not volatile.

H04: The COVID-19 does not influence the index price returns of Nifty 50 Future Market.

4. Methodology

This research is analytical in nature and examines the volatility index price of Nifty 50 Spot Market and Future Market and to check the influence of COVID–19 on Nifty 50 Spot Market and Future Market. Secondary data i.e. daily-closing-prices data for market indexes are taken in this study. In this research, we have taken into account the period before COVID-19, spanning from January 1, 2019, to December 31, 2019, and the period after COVID-19, ranging from January 1, 2020, to December 31, 2020. The value of dummy variable is taken as “1” for the COVID-19 period, i.e., from January 2020 to December 2020, and “0” for the pre-COVID-19 period (January 2019 – December 2019). To enhance the significance of the study regarding volatility in stock index prices resulting from the pandemic outbreak and the lockdown measures implemented by the Indian Government, a Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model is employed. EViews software was used to obtain GARCH models results

5. Result and Analysis

5.1 Test for Stationarity

Before establishing any relationship, it is necessary to examine the stationarity of each series. As in case of non-stationary time series, element of permanent component is always there. Consequently, mean and variance of such time series will depend upon time. So, there are chances of spurious results. It is found from table **1** that all time- series are stationary at level at 1 percent level of significance. Therefore, the empirical analysis indicates that the underlying time series exhibit stationarity.

Table 1. Findings from the Unit Root Test.

Augmented Dickey-Fuller test statistic	t-Statistic	Prob.*
Spot Price	-6.994962	0.0000
Future Price	-7.040246	0.0000

5.2 Test for Hetroskedasticity

Although the graphic representation of returns claims the application of ARCH/GARCH model as shown in the graphs of both the series (Figure 1 and Figure 2). Times of high volatility are followed by high volatility and periods of low volatility are followed by low volatility, means that graphs exhibit considerable swings in the return series for both the samples, despite this, it is sensible to confirm the existence of ARCH effects by employing ARCH-LM to ensure their presence.

Figure 1 Volatility Clustering of Daily NIFTY 50 Spot Market Returns

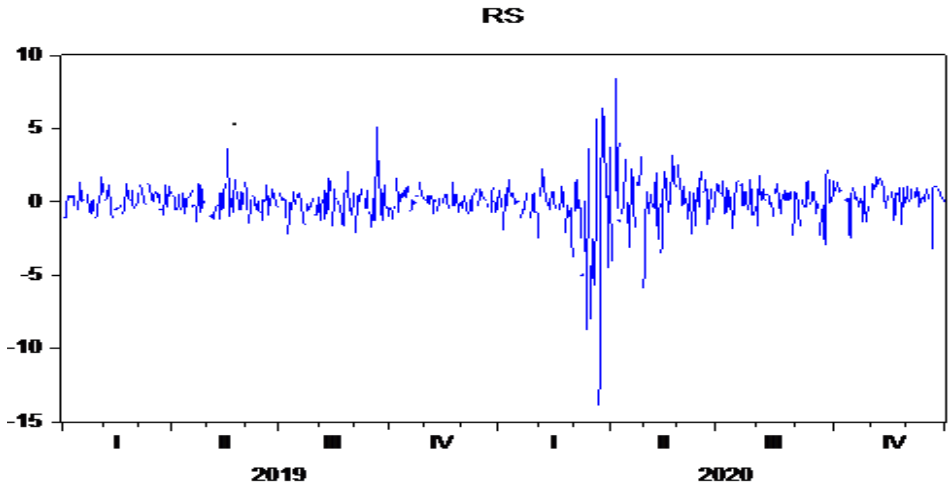
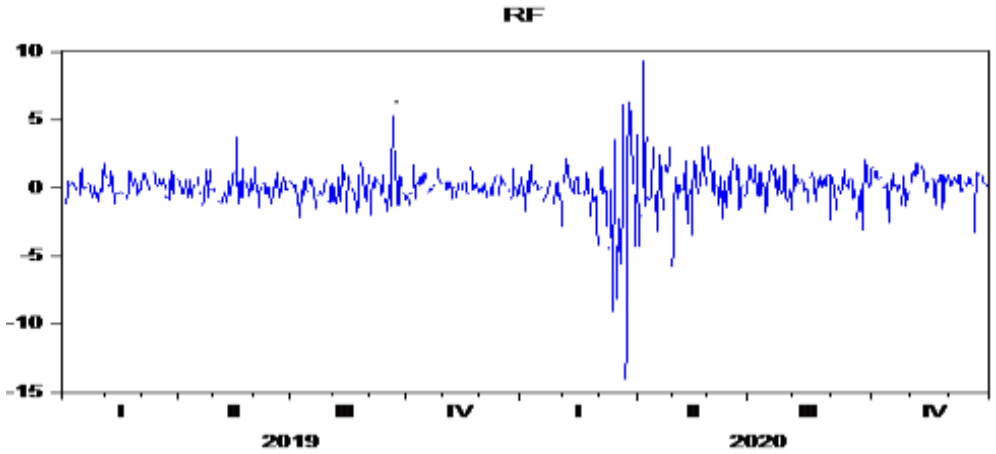


Figure 2. Volatility Clustering of Daily NIFTY 50 Future Market Returns



The test statistics in Table 2 for the ARCH-LM test are notably significant, confirming the existence of ARCH effects. Obs*R-squared is 7.046570 and 11.21905 with probability value of 0.0294 and 0.0036, suggesting clear denial of the null hypothesis of 'no ARCH effects' homoscedasticity in both markets.

Table 2. ARCH- LM Test of Residuals

	Null hypothesis	F-statistic	Probability
F-Statistics (Spot Market)	No Heteroskedasticity	3.552444	0.0294
Obs* R-squared		7.046570	0.0295
F-Statistics (Future Market)	No Heteroskedasticity	5.704630	0.0036
Obs* R-squared		11.21905	0.0037

5.3 Results of GARCH Model

After confirming to pre requisite of ARCH/GARCH family of techniques that whether the two series show the signs of ARCH effect we go ahead to apply this test. The present study employed garch (1,1). The results are given as follows:

The results of GARCH (1,1) for NIFTY Spot Market is shown in table 3 which depicts the parameters of GARCH are statistically significant. To elaborate, the coefficients i.e C (Constant), ARCH term, GARCH and Covid term are highly significant at 1 percent level of significance. In the conditional variance equation, the estimated coefficient of GARCH term is considerably higher than coefficient of ARCH term which is a sign that market has a longer memory than one period and further volatility is more sensitive to its lagged values. It evidenced the persistence of volatility. Parameters α and β and their sizes determine the volatility in the above time series. β coefficient values are found to be very high equal to 77% which implies persistence volatility clustering. The statistical significance of α and β illustrates

that any news on volatility from past period would have impact on the current volatility. The sum of two estimated coefficients $\alpha+\beta$ are 0.94 which is close to unity signalling that shock will continue to persist over many future periods but less than $\alpha+\beta<1$ implying that GARCH process is mean reverting. Covid coefficient value is found to be very low equal to 9% which implies Covid has vey less impact on stock market volatility. Also, this demonstrates the long periods of volatility clustering for both series as seen in figures (1 and 2). ARCH-LM test explains that there is no statistically significant trace of ARCH effect in the residuals which is a positive sign for our results and secondly squared standardized residuals do not reveals any significant autocorrelation till lag 36.

Table 3. Results of GARCH (1,1) Model for NIFTY Spot Returns

Variable	**Coefficient**	**Std.Error**	**z-Statistics**	**Prob.**
μ C	0.084588	0.042216	2.003718	0.0451
		Variance	**Equation**	
ω C	0.058598	0.022953	2.552924	0.0107
α RESID(-1)^2	0.168881	0.034272	4.927632	0.0000
β GARCH(-1)	0.771198	0.051518	14.96948	0.0000
$\alpha + \beta$	0.94			
Covid	0.090370	0.034972	2.584090	0.0098
Durbin Watson Stat	2.207531			
Q^2 (1)	0.1706			0.680
Q^2 (36)	36.275			0.456
Obs*R-squared (ARCH) LM	0.169312			0.6807

Table 4 shows the GARCH (1,1) results for the NIFTY Future Market, indicating that the GARCH parameters are statistically significant. To elaborate, at a 1% level of significance, the coefficients C (Constant), ARCH term, GARCH term, and Covid term are very significant. The estimated coefficient of the GARCH term in the conditional variance equation is significantly greater than the coefficient of the ARCH term, indicating that the market has a longer memory than one period and that further volatility is more sensitive to its delayed values. It was proof

of the volatility's durability. The volatility in the above time series is determined by the parameters and their sizes. The coefficient values are found to be quite high, at 78%, implying persistence volatility clustering. The statistical significance of α and β shows that any news on volatility from past period would have impact on the current volatility. The sum of two estimated coefficients α + β is 0.94, which is close to unity, indicating that the shock would endure for a long time. The value of the Covid coefficient is found to be very low, at 3%, implying that Covid has a very small impact on future market volatility. The ARCH-LM test explains that there is no statistically significant trace of ARCH effect in the residuals, which is a positive indicator for our results, and second, squared standardised residuals do not reveal any significant autocorrelation until lag 36, which is a favourable sign for our results.

Table 4. Results of GARCH (1,1) Model for NIFTY Spot Returns

Variable	**Coefficient**	**Std. Error**	**z-Statistics**	**Prob.**
μ C	0.091522	0.042909	2.132938	0.0329
		Variance	**Equation**	
ω C	0.061405	0.022788	2.694672	0.0070
α RESID(-1)^2	0.163954	0.032045	5.116348	0.0000
β GARCH(-1)	0.776548	0.048143	16.13006	0.0000
α + β	0.940502			
Covid	0.038878	0.031624	1.229409	0.2189
Durbin Watson Stat	2.272241			
Q^2 (1)	0.0793			0.778
Q^2 (36)	37.787			0.388
Obs*R-squared (ARCH) LM	0.078692			0.7791

Conclusion

The main aim and purpose of the study is to examine the volatility of stock price returns and analyse the influence of the COVID-19 pandemic on the Spot Market and the future market of the National Stock Exchange. Results from the GARCH (1,1) concluded that the persistence of volatility has been same for Future Market and Spot Market in pre-covid period. However,

volatility has been high for future market and low for spot market during the COVID-19. Stock returns and volatility in both spot and future markets are almost the same in the pre-covid period which states that it may not be a good source for investors to hedge their portfolio in the long run. But the same had not been valid for COVID-19; future market may be a good source for investors to hedge the portfolio in the short run as compared to spot market

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