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COVID-19 PANDEMIC AND STOCK MARKET PERFORMANCE IN NIGERIA

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ABSTRACT

The objective of the study is to investigate the effects of the COVID-19 pandemic on stock market performance in Nigeria. The study relied on the data of the daily closing stock All Share Index (ASI), stock returns and the number of daily cases infected with COVID-19 and deaths cases, data were sourced from the Nigerian Stock Exchange and the Nigeria Centre for Disease Control websites covering a period of 6months (March 1, 2020, to August 31, 2020). The study employs the Vector Error Correction (VECM) model and Generalized Autoregressive Conditional Heteroscedasticity (GARCH) models.

The results of the VECM shows that stock market returns responded negatively to the growth in COVID-19 infected cases during the pandemic. The results of GARCH model confirmed the positive impact of COVID-19 pandemic on stock market volatility. The study concluded that Nigerian stock market responded quickly to the COVID-19 pandemic bad news; As practical policy implications for lowering COVID-19's negative impact on stock market performance, Nigeria needs to place a greater level of importance on the stock market as a channel for monetary policy transmission and also investors are encouraged to uphold their investment conscience during trying times for the cushion effect of government preventive measures to stabilize the performance of the financial market.

KEYWORDS: Covid-19, Garch, Pandemic, Stock Marketa.

1. INTRODUCTION

The outbreak of COVID-19 has dramatically exceeded our expectations and has a severe impact on the world economy (Baker, Bloom, Davis, Kost, Sammon and Viratyosin (2020), Fernandes (2020), McKibbin and Fernando (2020)). This shock is quickly reflected in the stock market, and the stock price dropped sharply in the early stage of the epidemic (Ramelli and Wagner (2020), Gormsen and Koijen (2020), and Liu et al.,(2020)). Not only in China, which was hit earlier by the epidemic but also in other countries like Nigeria, their stock markets have been negatively affected by the pandemic. There is existing literature about the different effects of COVID-19 on the stock market from various perspectives. In addition to the focuses on stock prices (or returns), much literature is also concerned about the impacts on stock volatility, asset portfolios, and financial contagion, and so on. It is natural to predict that, by and large, COVID-19 will hurt stocks' performance. However, the potential heterogeneity effects, the driving factors, and the underlying mechanisms are still worthy of further study.

The preventive policies taken by governments related to COVID-19 have affected the stock market, especially shutdown policies, where closing the workplace disrupts decision-making processes in many financial institutions, which does not allow for quick reactions and swift trading. Some financial institutions may be shutdown, therefore, in the event of a shortage of electronic infrastructure; traders may not be able to conduct transactions. Of course, the role of these would at least partially diminish if a large portion of trade was automated and the economy was digitally advanced; thus, the potential impact may be stronger in emerging markets than in developed countries. It is worth noting that even if business premises are not completely closed, soft regulations may also have an indirect effect on the financial markets (Zaremba et al., 2021). Moreover, policies related to COVID-19 can affect the stock market through policy responses to changes in the future economic environment, and deteriorating economic conditions may lead to changes in companies' cash flow expectations and an increase in the risk premium, so investors are less willing to do so, allocating their money to risky assets, such as stocks. Investors can also be influenced by behavioural and psychological factors. This means that investors are reluctant to monitor their portfolios when there is bad news about government restrictions.

2. LITERATURE REVIEW

2.1 Theoretical Literature

2.2 Mckinnon and Shaw Hypothesis

It states that financial liberalization and stock market development would promote economic growth through their effects on the growth rate of savings, investment, and thus economic growth. McKinnon and Shaw (1973) argued that the repressed financial markets (low and administered interest rates, domestic credit controls, high reserve requirements and concessional credit practices) discourages savings, retards the efficient allocation resources, increases the segmentation of financial markets, constrains investment and in term lowers the economic growth rate. The essential message of the McKinnon-Shaw thesis is that a low or negative real rate of interest discourages savings and hence reduces the availability of loan able funds, constrains investment, and in turn lowers the rate of economic growth. On the other hand, an increase in the real interest rate may induce the savers to save more, which will enable more investment to take place and which would exert a positive effect on the economic growth. Bouzid (2012) noted that this idea was adopted by great international institutions such as the International Monetary Fund (IMF) and the World Bank.
Thus, many developing countries have implemented financial liberalization policies with the aim to delete the repressed regime. The financial liberalization policies were aimed at liberalizing interest

rates by switching from an administered interest rate setting to a market-based interest rate determination; reducing controls on credit by gradually eliminating directed and subsidized credit schemes; developing primary and secondary securities markets; enhancing competition and efficiency in the financial system by privatizing nationalized commercial banks (Bouzid, 2012). In the McKinnon-Shaw hypothesis, the success of the financial liberalization process depends to the following hypothesis: the effective deepening of the financial sector, a positive correlation between the saving and the real interest rate, and a perfect complementarities between the money demand and investment (Bouzid, 2012).

2.3 Empirical Literature

There is a quickly growing literature about the impact of COVID-19 on the stock market. While the dynamic of stock markets during the pandemic might looks random, irrational, or even insane at first glance, on closer inspection it becomes clear that they did not react blindly (Capelle- Blancard & Desroziers, 2020). Stock market movements during COVID-19 were more reflective of sentiment than substance (Cox et al., 2020).

Several studies have confirmed that the COVID-19 pandemic has caused an unprecedented economic and financial crisis. Global financial market risks have increased dramatically in response to the COVID-19 pandemic (Zhang et al., 2020).

Most empirical studies confirmed the negative response of the stock market indices to the spread of the COVID-19 pandemic (Cao et al., 2020; Ashraf, 2020; Alber, 2020; Rahman et al., 2021; Ahmar & del Val, 2020; Anh & Gan, 2020; Eleftheriou & Patsoulis, 2020; Shujan et al., 2020; Camba & Camba Jr, 2020). Moreover, Khan et al. (2020) showed that the growth rate of weekly new cases of COVID-19 negatively predicts the returns in stock markets of sixteen countries. He et al. (2020a) analyzed the daily returns data from stock markets in China, Italy, South Korea, France, Spain, Germany, Japan and the USA. The study showed that COVID-19 has a negative, but short-term impact on stock markets of affected countries. In addition, the study concluded that there is no evidence that COVID-19 has negatively affected stock markets in these countries more than it has affected the global average. On the other hand, Waheed et al. (2020) concluded that the Pakistani stock market index, achieved a positive increase in stock returns, the reason to the timely intervention of the Pakistani government that protected investors from an absolute disaster for the stock market.

Ashraf (2020a, b) find that stock markets negatively react to COVID-19 and this reaction varies over time depending on the stage of the outbreak. When extending data to 77 countries' main indices, Liu et al. (2020b) reinforce that the pandemic incurs considerable negative shocks on global stock markets. Topcu and Gulal (2020) draw a similar conclusion when only focusing on or permanent depends on the nature of the markets (Gil-Alana and Claudio-Quiroga 2020). Although recent literature reports that global stock markets react to the COVID-19 pandemic with negative returns, Ashraf (2020a, b) find uniform reaction across countries: the response is stronger for countries with higher national level uncertainty aversion. With respect to volatility, Baker et al. (2020) point out that "COVID-19 has resulted in the highest stock market volatility among all recent infectious diseases including the Spanish Flu of 1918". This is also supported by Baig et al. (2020). Sharma (2020) further shows that COVID-19 has a statistically significant effect on stock volatility, but the impact actually varies with countries involved, with the markets in higher income countries overreacting in the beginning and bouncing back more rapidly than lower-income countries. Engelhardt et al. (2020), on the other hand, argue that the magnitude of market volatility

in reaction to COVID-19 depends on trust: volatility is significantly lower in high-trust (including societal trust and trust in the government) countries.

Ibikunle and Rzayev (2020) investigate the effect of stock price volatility on unlit market share and traders' venue choice by examining the impact of external shock of the coronavirus pandemic on financial markets as well as the imposed restrictions on non-transparent trading. 110 European stocks were used as samples consisting 55 control and 55 treated stocks. Findings based on univariate and multivariate analyses performed show succinctly that market volatility driven by COVID-19 resulted in reduction in informational efficiency of the stock prices compared with stocks under dark trading restrictions.

3. METHODOLOGY

3.1 Sources of Data

The study used employ *ex-post facto* survey research design since the event under investigation has just occurred and is still ongoing. Since the first confirmed case of the pandemic was recorded on February 27, 2020, daily secondary data covering 2020 March to 31 September 2020were used for this study. The data used were collected from the Nigerian stock exchange website, the Nigeria Centre for Disease Control (NCDC) and World Health Organisation (WHO) websites

3.2 Model Specification

To achieve the objectives of the study, daily data was used from the index of the Nigerian stock market; the other variable is the change in the number of daily cases infected with COVID-19 and the number of recorded death. The implicit function can be expressed thus;

(1) $S_{RT} = B_0 + B_1X_I + B_2X_2 + B_3X_3 + B_4X_4 + \cup$ ..... (1)

$S_{RT} = B_0 + B_1CCC + B_2CCD + B_3INTR + B_4EXCR + \cup$

Where S_{RT}= stock returns
CCC= COVID-19 confirmed cases
CCD= COVID-19 Confirmed deaths

Control variables

INTR= Interest Rate
EXCR= Parallel Market Exchange Rate
B_0- B_4= Parameters of Estimate
∪= Error term

(2) $SMV = B_0 + B_1CCC + B_2CCD + B_3INTR + B_4EXCR + \cup$ ..... (2)

COVD = COVID-19 Confirmed cases, COVID-19 confirmed deaths
SMV= Stock market volatility (Proxy by ASI)

Control variables

INTR= Interest Rate
EXCR= Parallel Market Exchange Rate
B_0- B_4= Parameters of Estimate
∪= Error term

(3) $\Delta Y_{1t} = \beta_{io} + e_{it};\ e_{it}\ N(0, \sigma^2_{it}),\ t=1,2,3.....214,\ i=1,2,3,4,5$ ..... **(3)**

$\sigma^2_{it} = \alpha_{i0} + \alpha_{i1}e^2_{it-1} + \beta_1\sigma^2_{it-1}$

Where:
Δ= symbol for first differencing
Y_{it} =Stock Market Volatility
Y_{2t}= COVID-Confirm Cases
Y_{3t}= COVID-Confirm Deaths
Y_{4t}= Exchange Rate
Y_{5t}= Interest Rate
β_{io} = The Long-run average (trend) in the mean equation for each of the i^{th} series
σ^2_{it} = The conditional variance for each of the i^{th} series
α_{i0}= The Long-run trend in the variance equation for each of the i^{th} series
α_{i1}= The ARCH Effect for each of the i^{th} series
β_1= The GARCH Effect for each of the i^{th} series
$\mathbf{e_{it}}$ = The random error associated with each $Y_1$and which is thought to be normally distributed with zero mean and heteroscedastic variance.

Assumptions
1. $\alpha_{i0,}\ \alpha_{i1,}\ \beta_1 \geq 0$
2. $\alpha_{i0+}\alpha_{i1+}\beta_1 \geq 0$

3.3 Aprori Expectation
1. The relationship between COVID-19 Confirmed cases (CCC) and COVID-19 Confirmed death (CCD) are expected to affect stock market returns negatively
2. The relationship between COVID-19 confirmed cases (CCC) and COVID-19 confirmed deaths (CCD) are expected to affect stock market volatility positively.

4. RESULTS AND DISCUSSION
4.1. Stationary Test
This test is conducted at 0.05 level of statistical significance. Therefore, data is stationary when p-value of the Augmented Dickey Fuller test statistics are less than 0.05 (i.e. p-value < 0.05) and also when the test statistics are above the corresponding critical values. The lag length is automatically chosen with the Schwarz Information Criterion (SIC) and the maximum lag length was set at 14 for the ADF.

Table 4.1: Augmented Dickey Fuller Test Result

Variables	Augmented Dickey Fuller Test Statistic	Critical Values at 5%	Probability Values	Order of Integration	Maximum Lag Length
ASI	-14.61114	-2.874997	0.0000	I(1)	14
STK-RTNS	-6.064690	-2.874997	0.0000	I(1)	14
EXRT	-14.53517	-2.874997	0.0000	I(1)	14
INTR	-14.53846	-2.874997	0.0000	I(1)	14
CC-19-CASES	-16.33375	-2.875062	0.0000	I(1)	14
CC-19-DEATH	-4.018126	-2.875062	0.0000	I(1)	14

Source: Author's Computation from EViews 9, 2022.

The tables above confirms that the ADF test results reveal stationary at first difference of All share Index (ASI), Stock Market Returns (STK-RTNS), Exchange Rate (EXCR), Interest Rate (INTR),

COVID-19 Confirm Cases (CC-19-CASES) and COVID-19 Confirm Deaths(CC-Deaths) are all stationary at first Difference and therefore, this can be also be stated as all the variables used are integrated of order 1, that is I(1).

4.2 Johansen Co-integration Test

The results from the co-integration test in the table 4.2 below shows that the variables are co-integrated at 5% significance level using trace test. This is evident as there exist two (2) co-integrating equations from the trace test on one hand and also two co-integrating equations from the max-eigenvalue test on the other hand. However, the two equations are in agreement with each other and also in conformity. Hence, it can be concluded that there exists long run relationship between the variables under consideration.

Table 4.3: Johansen Co-integration Test Result

Sample (adjusted): 6 214			
Included observations: 173 after adjustments			
Trend assumption: Linear deterministic trend			
Series: RETURNS COVID_DEATHS COVID_CASES EXCR INTR			
Lags interval (in first differences): 1 to 4			
Unrestricted Cointegration Rank Test (Trace)			
Hypothesized		Trace	0.05
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None *	0.229749	97.13640	69.81889
At most 1 *	0.170779	51.97665	47.85613
At most 2	0.068293	19.57923	29.79707
At most 3	0.027508	7.341682	15.49471
At most 4	0.014439	2.516198	3.841466
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level			
* denotes rejection of the hypothesis at the 0.05 level			
**MacKinnon-Haug-Michelis (1999) p-values			
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)			
Hypothesized		Max-Eigen	0.05
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None *	0.229749	45.15974	33.87687
At most 1 *	0.170779	32.39742	27.58434
At most 2	0.068293	12.23755	21.13162
At most 3	0.027508	4.825484	14.26460
At most 4	0.014439	2.516198	3.841466
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level			
* denotes rejection of the hypothesis at the 0.05 level			

**MacKinnon-Haug-Michelis (1999) p-values			

Source: Author's Computation from EViews 9, 2022

4.3 Vector Error Correction Model (VECM)

The VECM result on the effect of COVID-19 pandemic on the Nigerian stock Market returns is presented in the table 4.3 below. The value of the R- squared is given as 0.409273which implies that the model is a good fit and that change in the Nigerian stock market returns can be attributed to changes in the independent variables by about 41 per cent during the study period. The probability value of the F-statistics is significant which implies that all the independent variables employed for this study significantly determines Nigerian stock market returns.

Results from the table 4.4 above reveals that COVID-19 confirmed cases (CC- CASES) is significant and has a negative relationship with stock returns in Nigeria that is a unit increase in number of infectious cases in Nigeria will lead to -0.002954 decrease in stock return in the first lag. COVID-19 confirmed Death Cases (CC-DEATHS) has a positive relationship with (CC-DEATHS) does not significantly affect stock returns in Nigeria. That is COVID-Death does not have any significant impact on stock returns in Nigeria during the sample period.

Exchange rate (EXCR) is negative and significantly affects Stock-returns in Nigeria with a t-value of -2.84946, which implies that a unit increase in the exchange of Nigerian naira against the foreign currencies will lead to -0.021294 decrease in the stock returns. This conforms to the aprori expectation that exchange rate can assume either positive and negative value in the long run, the sign depends on the co-variance between stock returns, currency and stock market risk premia.

Interest Rate (INTR) is negative and statistically significant, that is its has a decreasing effect on stock market returns in Nigeria, the t-statistics is -2.68088 which is significant at 5% significant level in the first lag , a unit increase in the interest rate will lead to -0.402617 decrease in the stock returns in Nigeria.

4.4. Summary of Descriptive statistics for All Share Index (ASI)

Table 4.4 describes the summary statistics of the stationary All Share Index. The table reveals positive mean daily index of 24298.45 and the standard deviation which measures the riskiness of the underlying assets was 1415.923 which is far higher than 100%. The higher the standard deviation, the higher the volatility of the market and the riskier the equity traded. The 6168.04 difference between the minimum and maximum of all share returns shows the level of price variability in equity trading in the NSE over the sample period.

Again, considering the Jarque-Bera value (16) and the very small corresponding p-value, the null of normality was rejected for the data. To support the Jarque-Bera inference, the skewness (-0.807798) is less than 0 (skewness of a normal distribution is 0) and the kurtosis (2.820813) is lower than 3 (kurtosis of a normal distribution is 3). The negative skewness is an indication that the lower tail of the distribution is thicker than the upper tail meaning that the returns drops more often than it rises, reflecting the loss of confidence in the market. Information emanating from the descriptive statistics supports the subjection of the return series to volatility models.

Table 4.4.0: Descriptive Statistics of the All Share Index

MEAN	MEDIAN	MAX	MIN	Std. Dev	SKEWNESS	KURTOSIS	J-BERA	PROBOB
24298.45	24751.32	26837.42	20669.38	1415.923	-0.807779	2.820813	15.9629	0.000145

Source: Author's Computation from EViews 9, 2022

4.4.1 Volatility Clustering of Daily Return Series over the Sample Period

The plot of the graph of all share indexes is shown is figure 4.1 and visual inspection of the plot shows that return series was stable around the mean value up to the maximum value and oscillates around the mean and maximum value slowly. Volatility of stock returns is high for consecutive period and low for another consecutive period. This feature of sustained periods of calmness and sustained periods of high volatility, as indicated in graph, signifies volatility clustering, a stylized fact financial time series exhibit, and a condition necessary for the application of ARCH model.

Figure 4.1: Volatility Clustering of Daily Return Series

4.4.2 Autoregressive Heteroskedasticity (ARCH) Test

Table 4.5.4 shows the result of the test for ARCH effect given the high values of the F- statistics of 236.4938 and probability value of 0.0000 which is less than 5% significance level and Chi-Squared statistics of 89.97533 and its corresponding small p-values of 0.000 at lag 1 shows that there is presence of ARCH in the series.

Table 4.4.2: Heteroskedasticity Test: ARCH Test

F-statistic	236.4938	Prob. F(1,142)	0.0000
Obs*R-squared	89.97533	Prob. Chi-Square(1)	0.0000

Source: Author's Computation from EViews 9, 2022.

4.4.3 Serial Correlation Test Results (Correlogram of Residuals) of the Volatility of the model Models

The null hypothesis that there is no remaining ARCH effect in the models is accepted at 5% significance level, as shown in table 4.4.3 below. The conformity of the residuals to homoscedasticity is an evidence of good volatility models because ARCH effect has been adequately accounted for. Again, serial correlation test results, using Q-Statistics (Correlogram of Residuals) is presented in table 4.4.3 below. The probability values of the Q-statistics for first lags are higher than 0.05, confirming that there is no serial correlation in the residuals of the estimated models at 5% significance level. Also, judging from the diagnostic checks, variance equations qualified for forecasting.

Table 4.4.3 Serial Correlation Test Results (Correlogram Standard Residuals)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.|. |	.|. |	1	-0.008	-0.008	0.0139	0.906
.|. |	.|. |	2	-0.004	-0.004	0.0166	0.992
.|. |	.|. |	3	-0.010	-0.010	0.0391	0.998
.|. |	.|. |	4	-0.018	-0.018	0.1065	0.999
.|. |	.|. |	5	-0.012	-0.012	0.1357	1.000
.|. |	.|. |	6	-0.010	-0.010	0.1564	1.000
.|. |	.|. |	7	-0.006	-0.007	0.1646	1.000
.|. |	.|. |	8	-0.004	-0.005	0.1685	1.000
.|. |	.|. |	9	-0.004	-0.005	0.1730	1.000
.|. |	.|. |	10	-0.003	-0.003	0.1745	1.000
.|. |	.|. |	11	-0.001	-0.002	0.1748	1.000
.|. |	.|. |	12	-0.002	-0.003	0.1761	1.000
.|. |	.|. |	13	-0.003	-0.004	0.1783	1.000
.|. |	.|. |	14	-0.005	-0.006	0.1843	1.000
.|. |	.|. |	15	-0.007	-0.007	0.1954	1.000
.|. |	.|. |	16	-0.000	-0.001	0.1954	1.000
.|. |	.|. |	17	-0.001	-0.002	0.1957	1.000
.|. |	.|. |	18	-0.003	-0.004	0.1981	1.000
.|. |	.|. |	19	-0.009	-0.010	0.2170	1.000
.|. |	.|. |	20	-0.007	-0.008	0.2289	1.000
.|. |	.|. |	21	-0.007	-0.007	0.2394	1.000
.|. |	.|. |	22	-0.009	-0.010	0.2604	1.000
.|. |	.|. |	23	-0.006	-0.007	0.2701	1.000
.|. |	.|. |	24	-0.007	-0.008	0.2811	1.000
.|. |	.|. |	25	-0.004	-0.005	0.2842	1.000
.|. |	.|. |	26	-0.005	-0.006	0.2903	1.000
.|. |	.|. |	27	-0.006	-0.007	0.2989	1.000
.|. |	.|. |	28	-0.004	-0.005	0.3024	1.000
.|. |	.|. |	29	-0.005	-0.006	0.3083	1.000
.|. |	.|. |	30	-0.007	-0.008	0.3193	1.000
.|. |	.|. |	31	-0.005	-0.007	0.3269	1.000
.|. |	.|. |	32	-0.005	-0.006	0.3335	1.000

.|.	|	.|.	|	33	-0.003	-0.004	0.3355 1.000
.|.	|	.|.	|	34	-0.004	-0.005	0.3399 1.000
.|.	|	.|.	|	35	-0.010	-0.011	0.3643 1.000
.|.	|	.|.	|	36	-0.016	-0.017	0.4265 1.000

Source: Author's Computation from EViews 9, 2022

4.4.4 Histogram Normality Test

For the Normality test is shown in figure 4.4.4 below, Jarque-Bera was used to check whether the residuals are normally distributed. The Jarque-Bera value is 41.57953 and a probability value is 0.0000 which statistically significant, hence we accept the null hypothesis and conclude that the errors are not normally distributed with 0 mean and constant variance.

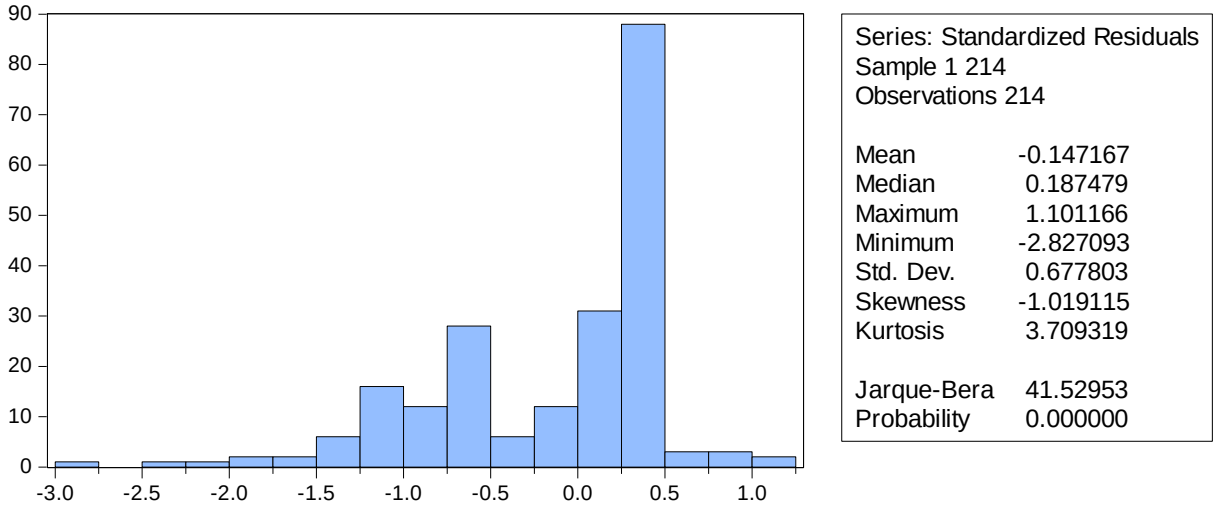


Figure 4.4.4: Histogram Normality Test

4.4.5 Generalized Autoregressive Heteroskedasticity (GARCH) Regression

Note R^2 is not of important in GARCH models. This is because 'the model is no longer of the usual linear form so OLS cannot be used for GARCH model estimation. There are several reasons for this, but the simplest and most fundamental one is that OLS minimizes the residual sum of squares (RSS). The (RSS) depends only on the parameters in the conditional mean equation, and not the conditional variance, and hence RSS minimization is no longer an appropriate objective.

Table 4.5.5 GARCH Regression Result

Dependent Variable: ASI
Method: ML - ARCH (Marquardt) - Normal distribution

GARCH = C(6) + C(7)*RESID(-1)^2 + C(8)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
CC-19 CASES	1.372818	0.623318	2.202435	0.0276
CC_DEATHS	5.174494	17.03240	0.303803	0.7613
EXCR	11.12497	4.062840	2.738225	0.0062
INTR	-72.89165	108.4515	-0.672113	0.5015
C	21112.51	2368.884	8.912430	0.0000

Variance Equation

C	635473.5	237441.1	2.676341	0.0074
RESID(-1)^2	1.033162	0.490279	2.107295	0.0351
GARCH(-1)	-0.648362	0.249967	-2.593791	0.0095

R-squared	0.262014	Mean dependent var	24298.45
Adjusted R-squared	0.240929	S.D. dependent var	1415.923
S.E. of regression	1233.618	Akaike info criterion	16.15459
Sum squared resid	2.13E+08	Schwarz criterion	16.31882
Log likelihood	-1163.208	Hannan-Quinn criter.	16.22132
Durbin-Watson stat	0.054262		

Source: Author's Computation from EViews 9, 2022.

From table 4.5.5 above the results shows the GARCH regression output for the effects of COVID-19 Pandemic on Stock Market Volatility in Nigeria.

The results presented in the table below indicate that GARCH model is significant to explain volatility of NSE daily stock returns. This can be explained by the fact that the p-value is very small and far less than the 5% significant level. The GARCH coefficient of -0.648362 is less than zero (0) i.e. Negative, so the argument can be made that negative or bad news have a greater impact on stock returns volatility as opposed to positive or good news.

The model has a coefficient of -0.648362 which is less than zero (0) i.e. negative which indicates the fact that shocks in stock returns caused by bad or negative news exceeds those shocks caused by positive news. This is an indication of leverage effect on companies' capital structure which can increase risks caused by increasing proportion of debts.

The R^2which is 20% is not of importance in GARCH Models. This is because 'The RSS depends only on the parameters in the conditional mean equation, and not the conditional variance, and hence RSS minimization is no longer an appropriate objective'.

In the variance equation, all the parameters were significant. In order words there are both ARCH and GARCH effects in stock market, although GARCH effect is significant but negative returns volatility. Moreover, $(\alpha+\beta) = (1.033162) + (-0.648362) = 0.3848$ This implies that the model is stationary and the volatility caused by the pandemic bad news will only persist for a short time.

CC-CASES (COVID-19 CASES) have a significant and positive relationship with stock market volatility in Nigeria. The coefficient of the Z-statistics and its p-values shows a direct relationship with stock market volatility that is, a unit increase in COVID-19 confirm Cases will lead to 1.372818 increase in stock market volatility, this is expected as its follows the aprori expectation. This is because the bad news of the pandemic creates panic and unrest where people are fighting for their lives to survive the pandemic and not thinking about investment at all.

The result also reveal that CC_DEATHS (COVID-19 Deaths) has a positive but insignificant relationship with stock market volatility in Nigeria, considering the z-statistics of 0.303803 which is less than 2 and its corresponding p-value of 0.7613 shows that COVID-19 deaths, that is CC-DEATHS do not significantly impacts stock market volatility in Nigeria at 5% significant level during the sample period. This may be due to the fact that African countries, Nigeria especially has

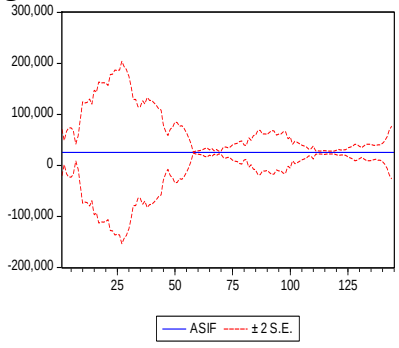
lower COVID-19 death index cases compared to china and Europe and rest of the world where the death index cases and the bad news are more higher and volatility responds more to bad news or negative shocks more than the good news as reveal by GARCH coefficient is -0.648362 which is less than 0 (zero)

The results also reveal that EXCR (Exchange Rate) parallel market exchange rate and stock market volatility has a positive or direct significant relationship with each other. The Z-statistics and its corresponding small P-value of 2.738225 and 0.0062 establish how exchange rate impacted positively on stock market volatility in Nigeria. A unit increase in foreign currency exchange to Nigeria Naira in the parallel market will lead to 11.12497 increases in stock returns volatility. These findings are in tandem with the work of Zhang (2020) this can be attributed Nigeria been an import-based economy with majority of her citizens relying on imported goods. However, global restrictions as a result of the pandemic, has led to an increase in foreign exchange rate in the country.

The results also reveal that INTR (Interest rate) has a negative and insignificant relationship with stock market volatility in Nigeria. The results shows that interest rate does not impact volatility in Nigeria during the pandemic period, has its shows no significant impact, the interest rate during the sample period reduces stock volatility at -72.89165. A unit increase in interest rate will lead to decrease in volatility of stock returns; this can be attributed to the fact that lending government intervention in giving debt waver to the Nigerian government as at the period makes the increase in interest rate to shows a positive but insignificant relationship.

4.5.6 Forecast Performance

The need for modelling and forecasting volatility is because investors are not just only interested in the average returns of the stock but also its risk. Market investors and speculators need information to analyse the gains or losses from the erratic behaviour of financial assets; are there gains to be made or losses to be incurred. Analysing volatility is helpful as it's informs investors or measure risk involved in holding an asset.



Forecast: ASIF	
Actual: ASI	
Forecast sample: 1 145	
Included observations: 145	
Root Mean Squared Error	1674.884
Mean Absolute Error	1171.628
Mean Abs. Percent Error	5.117512
Theil Inequality Coefficient	0.033809
Bias Proportion	0.290252
Variance Proportion	NA
Covariance Proportion	NA

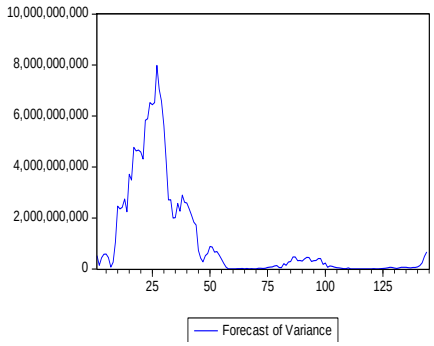


Figure 4.5.6: forecast variance

From figure4.5.6 above the returns on assets are stable, and intense volatility slows down towards the end of the year, that is there was a downwards spiral toward the end of the year. Who knows there may be a spiral hike in the remaining part of the year?

5. CONCLUSION

This study investigated the consequential effects of the COVID-19 pandemic on stock returns and stock volatility in Nigerian economy.

One of the key issues that concerns market participants is that of volatility of stock returns. Highly volatile markets lower investors' confidence hence affecting the total market capitalization due to fear of losses due to the unpredictability of the markets. Stock markets that are less volatile are considered to be stable and create investors' confidence which increases their propensity to invest their funds. So the crucial aspect among experts is to understand the behaviour or volatility of stock returns by forecasting or modeling them so that proper decisions can be made based on strong grounds. For instance options can be correctly priced if volatility is well forecasted which can help dealers and investors improve their profits. It is therefore pertinent to note that many determinants a parts from COVID-19 and the selected control variables (EXCR and INTR) that influence the development of stock market in the Nigerian economy, but it would be difficult to capture all these determinants in our model so only few of them were used.

5.1 Recommendations

The implications of the findings raise various areas of recommendations for policy:

- Investors can weigh the behaviour of stock prices by observing the level of inflationary trend in the country. In particular, investors will maximize returns if they buy during a downturn in the economy and sell during a boom. This kind of behaviour also helps to strengthen the stabilization of the stock market in the economy.
- The conduct of monetary policy should effectively incorporate the role of the stock market. Being an emerging economy, Nigeria needs to place a greater level of importance on the stock market as a channel for monetary policy transmission.
- The implementation of precautionary policies to curb the spread of diseases is essential at the early stage of the outbreak to control the disease. Relating the scenario to investors, they should uphold their investment conscience during trying times for the cushion effect of government preventive measures to stabilize the performance of the financial market. This way, investors would be able gain from the accrued profit in the market.
- Lastly, the outcomes of the analysis showed a significant and direct relationship between COVID-19 and the Nigerian foreign exchange market. This implies that as the numbers of cases of COVID-19 increases, the Parallel Exchange Rate in the country also increase. Nigeria is still an import-based economy with majority of her citizens relying on imported goods. However, global restrictions as a result of the pandemic, has led to an increase in foreign exchange rate in the country, government should encourage consumption of local goods so that to keep exchange rate low.

REFERENCES

Alam, M. N., Alam, M. S., & Chavali, K. (2020). Stock market response during COVID-19 lockdown period in India: An event study. *Journal of Asian Finance, Economics and Business*, *7*(7), 131–137. https://doi.org/10.13106/jafeb.2020. vol7.no7.131

Ashraf, B. N. (2020). Stock markets' reaction to COVID-19: Cases or fatalities? *Research in InternationalBusinessand Finance, 54,* 101249.https://doi.org/10.1016/j.ribaf.2020.101249

Aslam, F., Mohmand, Y. T., Ferreira, P., Memon, B. A., Khan, M., & Khan, M. (2020).
Network analysis of global stock markets at the beginning of the coronavirus disease (Covid 19) outbreak. *Borsa Istanbul Review*. 20(S1), S49–S61. https://doi. org/10.1016/j.bir.2020.09.003
Baker, S. R., Bloom, N., Davis, S. J., Kost, K., Sammon, M., & Viratyosin, T. (2020). The
unprecedented stock market reaction to COVID-19. *The Review of Asset Pricing Studies, 10*(4), 742–758. https://doi.org/10.1093/rapstu/raaa008

Baker, Scott, Nicholas Bloom, Steven Davis, Kyle Kost, Marco Sammon, and Tasaneeya

Viratyosin. 2020. The Unprecedented Stock Market Impact of COVID-19. No. w26945. Cambridge: National Bureau of Economic Research.

Donthu, N., and A. Gustafsson. 2020. Effects of COVID-19 on business and research.
Journal of Business Research. https:// doi. org/ 10. 1016/j. jbusr es. 2020. 06. 008.

Elavarasan, R., R. Pugazhendhi, T. Jamal, J. Dyduch, M. Arif, N. Kumar, G.M. Shafiullah,S.

H. Chopra, and M. Nadarajah. 2021. Envisioning the UN Sustainable Development Goals (SDGs) through the lens of energy sustainability (SDG 7) in the post-COVID-19 world. *Applied Energy*. https:// doi. org/10. 1016/j. apene rgy. 2021. 116665.

Engle, R. (1982). Autoregressive Conditional Heteroskedasticity with Estimates of United
Kingdom Inflation, *Econometrica*, *50*(4), 987–1008.
Fagbemi, F. 2021. COVID-19 and sustainable development goals (SDGs): An appraisal of
the emanating effects in Nigeria. *Research in Globalization*. https:// doi. org/ 10. 1016/j. resglo. 2021. 100047.

Fenner, R., and T. Cernev. 2021. The implications of the Covid-19 pandemic for delivering
the Sustainable Development Goals. *Futures*. https:// doi. org/ 10. 1016/j. futur es.
2021. 102726.

Gormsen, N. J., & Koijen, R. S. (2020). Coronavirus: Impact on stock prices and growth
expectations. *The Review of Asset Pricing Studies, 10*(4), 574–597.
https://doi.org/10.1093/ rapstu/raaa013
Goodell, John W. 2020. COVID-19 and finance: Agendas for future research. Finance
Research Letters 35: 101512. [CrossRef]
Ibikunle, G., & Rzayev, K. (2020). Volatility, dark trading and market quality: Evidence from
the 2020 COVID-19 pandemic-driven market volatility. *Available at SSRN 3586410*.
Khan, K., Zhao, H., Zhang, H., Yang, H., Shah, M. H., & Jahanger, A. (2020). The impact of
COVID-19 pandemic on stock markets: An empirical analysis of world major stock indices. *Journal of Asian Finance, Economics and Business, 7*(7), 463–474. https://doi.org/10.13106/jafeb.2020.vol7.no7.463
Liu, H., Manzoor, A., Wang, C., Zhang, L., & Manzoor, Z. (2020). The COVID-19 outbreak
and affected countries stock markets response. *International Journal of Environmental Research and Public Health, 17*(8), 2800. https://doi.org/10.3390/ijerph17082800
Louhichi, W., Z. Ftiti, and H.B. Ameur. 2021. Measuring the global economic impact of the

coronavirus outbreak: Evidence from the main cluster countries. *Technological Forecasting and SocialChange*. https:// doi. org/ 10. 1016/j. techf ore. 2021. 120732.

Mayhew, R. A. and Vorst, T. (1994). "Analysis of the Term Structure of ImpliedVolatilities". *Journal of Finance and Quantitative Analysis* 29 Vol. 1 31-56

Mazur, M., Dang, M., & Vega, M. (2020). COVID-19 and the March 2020 stock market crash. Evidence from S&P1500. *Finance Research Letters*, p.101690. https://doi.org/10.1016 /j.frl.(2020).101690

Mckibbin, W., and R. Fernando. 2020. The global macroeconomic impacts of COVID-19: Seven scenarios. *CAMA Working Paper Series*, 19/2020. https:// cama. crawf ord. anu. edu. au/ publi cation/ cama- worki ng- paper- series/ 16221/ global- macro econo mic- impac ts- covid-19- seven- scena rios.

Mulugeta, T., E. Tadesse, T. Shegute, and T. Desta. 2021. COVID-19: socio-economic impacts and challenges in the working group. *Heliyon*. https:// doi. org/ 10. 1016/j. heliy on. 2021. e07307.

OECD. 2020. *Coronavirus: The world economy at risk*. https:// www. oecd. org/ berlin/ publi katio nen/ Inter im- Econo mic- Asses sment-2- March- 2020. pdf [accessed on 14.04.2020]

Pan, M. and Hsueh, L. P. (1998): Transmission of Stock Returns and Volatility between the U.S. and Japan: Evidence from the Stock Index Futures Markets. *Asia- Pacific Financial Markets*, 5, 211–225.

Padhan, R., and K.P. Prabheesh. 2021. The economics of COVID-19 pandemic: A survey.

Economic Analysis and Policy 70: 220–237.

Pan, S., and S. Zhang. 2020. From fighting COVID-19 pandemic to tackling sustainable development goals: An opportunity for responsible information systems research. *International Journal of InformationManagement*. https:// doi. org/ 10. 1016/j. ijinf omgt. 2020. 102196.

Ramelli, Stefano, and Alexander F. Wagne. 2020. Feverish stock price reactions to COVID-19. The Review of Corporate Finance Studies 9: 622–55. [CrossRef]

UNCTAD. 2020. The Covid-19 shock to developing countries. UNCTAD Report, INF/2020/2. https:// unctad. org/ en/ Publi catio nsLib rary/ gds_ tdr20 19_ covid2_en. pdf [accessed on 13.04.2020]. Vera-Valdes, J. 2021. The persistence of financial volatility after COVID-19. *Finance Research Letters* (in press) https:// doi. org/ 10. 1016/j. frl. 2021. 102056.

Wagner, A. F. (2020). What the stock market tells us about the post- COVID-19 world. *Nature Human Behaviour*, *4*(5), 440–440. https://doi.org/10.1038/s41562-020-0869-y

World Bank (2012): World Bank Development Indicators. www.data.worldbank.org

Wunder, S., D. Kaimowitz, S. Jensen, and S. Feder. 2021. Coronavirus, macroeconomy, and

forests: What likely impacts? *Forest Policy and Economics*. https:// doi. org/ 10. 1016/j. forpol. 2021. 102536.

Zaremba, A., Aharon, D. Y., Demir, E., Kizys, R., & Zawadka, D. (2021). COVID- 19, government policy responses, and stock market liquidity around the world: A note. *Research in International Business and Finance*, *56*, 101359. https://doi. org/10.1016/j.ribaf.2020.101359