Stock Market Volatility and Macroeconomic Performance in Nigeria

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Abstract

This study is on the effect of stock market volatility on some selected macroeconomic performance indicators in Nigeria. The first objective was the identification of the determinants of stock market volatility in Nigeria. The second objective was the investigation of the effects of stock market volatility on some selected macroeconomic performance indicators in Nigeria. The third objective was the examination of the causal relationship between stock market volatility and selected macro-economic performance indicators in Nigeria from 1981-2019. The study used secondary data sourced from central bank of Nigeria and World Bank databank.

The variables that turned out to be significant determinants of stock market volatility using the ECM are exchange rate, total savings, consumer price index, foreign direct investment and inflation.

The results from the findings reveal the presence of long run relationship between the variables. This was shown using the Johansen co-integration test which helped to check for long run relationship between the variables. The results further reveal that causality exists between the variables.

This study therefore recommends that the government of Nigeria should make consensus effort towards the revitalization and improvement in the overall efficiency of the significant determinants of stock market volatility in Nigeria, because if this improves the Nigerian stock market it can boost the growth of the overall economy.

1.0 Introduction

Stock market is viewed as a medium to encourage savings, help channel savings into productive investment, and improve the efficient and productivity of investment.

An efficient stock market contributes to attract more investment by financing productive projects and lead to economic growth, mobilize domestic savings, allocate capital efficiently, reduce risk by diversifying, and facilitate exchange of goods and services (Mishkin, 2012, Caporale et al, 2014).

Stock market is a critical log in the wheel that smoothens the transfer of funds for economic growth, stock exchange are expected to accelerate economic growth by increasing liquidity of financial assets, making global diversification easier for investors and promoting wiser investment decisions. In principle, a well-functioning stock market may help the economic growth and development process in an economy through growth of savings, efficient allocation of investment resources and all alluring of foreign portfolio investment.

The stock market also encourages savings by providing the household having investable funds, an additional financial instrument which meets their risk preference and liquidity needs better (Agrawalla, 2006)

Volatility is the statistical measure of the fluctuation of the price or returns of financial markets instruments like stocks and stocks markets indexes. Given two securities, the higher the level of volatility the riskier it becomes. An average investor is assumed to be risk -averse, such that excessive volatility often erodes investors' confidence.

1.2. Statement of the Problem

The Nigeria's financial market is relatively shallow and oligopolistic compared with its peers in emerging market economies (National Technical Working Group Report, Vision 20:2020, 2009). Although the financial market has witnessed some expansion in the review period, there are observed problems, which the market has to contend with. From inception the entire performance of the financial market has been mixed. Particularly, been a propeller of sustainable economic growth and development, the financial market in Nigeria has performed below its potential (Nwosu & Hamman, 2008).

Despite the fundamental functions performed by the Nigerian financial markets (money and capital markets), the key issues facing the Nigerian financial market includes the following: dearth of instruments and lack of market breadth and depth which increases stock market volatility: inadequate skilled manpower resulting in low market development: the oligopolistic structure of the markets: dependence on government resulting in narrow instruments range and slow growth of the secondary market: information gap and asymmetry leading to market inefficiency: inadequate risk management and corporate governance framework: and regulatory challenges. (National Technical Working Group Report; Vision 20:2020, 2009).

More also, one of the greatest challenges facing the Nigeria money market is the establishment of a highly encompassing liquid market in which investors can relatively buy and sell with ease, where larger transactions are carried out without significant changes in prices. This becomes necessary, given the backdrop that well-informed international investors generally consider the level of a market's liquidity before investing in such a market, investors will only look out for a market, which guarantee easy entry and exit. Weak domestic payment systems have also hindered efficient liquidity management and have obstructed the development of the Nigerian financial market. In addition, the absence of efficient and cost effective systems for transferring ownership of the securities traded in the secondary market, or the funds to pay for them has obstructed market development or repurchases transactions.

2.0 Literature Review

2.1 Stocks and Stock Exchanges.

Financial markets play an important role to allocate funds from surplus units to deficit units. Households, institutions and governments are the major participants in financial markets (Madura, 2001).

When financial market assists the flow of short term funds, funds with maturities of one year or less, then it is known as money market. Whereas financial markets with long term maturities are known as capital

markets. One of the most common types of capital market securities is stock or equity security (Madura 2001).

Equity securities or stocks represent the ownership of companies. Holding a stock of a company means that the stock holder has the partial ownership of that company and entitles to receive the profit from the company operation.

Stocks comprises of two kinds, the preferred and common stocks. Preferred stocks holders are entitle to a fixed dividend but don't have voting right. Wherefore, stocks or equity securities mostly refers to common stocks. The holder of common stocks has the right of voting and getting dividend. Companies issues stocks to collect long term funds and investors, individual and financial institutions, buy those stocks as a long term investment.

Investors can buy new stocks from primary market existing securities from secondary market. Brokerage firms help investors as a financial intermediary to buy and sell existing stocks in secondary market. These secondary market transactions can be performed in the over-the-counter (OTC) market if the stocks are not listed on an exchange. Organized exchange is an

established platform for secondary market trading of listed stocks. Transactions in stock exchanges are strictly monitored and regulated by the Securities and Exchange Commission (SEC) and considered safer than OTC transactions (Madura, 2001).

2.2 EMPEIRICAL LITERATURE

Ogboi and Oladipo (2012) in a study titled "Stock market and economic growth: The Nigerian experience", employed the Error Correction Model on an annual time series data from 1981–2008, as well as the Granger Causality Pair-wise Test in order to determine the causal relationship among the variables. Their result indicated that market capitalization (proxy for stock market activities) affects economic growth causally. Thus, an increase in market capitalization will result to availability of more investment funds to the entrepreneurs, thereby leading to economic growth.

Chizea (2012) examined the long-run causal relationship between the stock market and economic growth in Nigeria. The study used one bank and three measures of stock market development: the loans to deposit ratio of banks, market capitalization ratio, value traded to market capitalization ratio as well as value traded to GDP ratio. Employing the Multivariate Vector Autoregressive Models (VAR) and Vector Error Correction Model (VECM) on a time series data (1980–2007), the study revealed that there exist a co-integration between stock market development and economic growth in both short and long-run. Thus, the stock market development has impacted positively on economic growth in Nigeria.

In a more recent study, Onakoya (2013) examined the relative contributions of stock market volatility on economic growth in Nigeria for the periods 1980–2010. Employing Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH), the study revealed that the volatility shock is quite persistent in Nigeria, which might distort economic growth. Thus, the result of the empirical analysis

suggests that there exist a bi-causal relationship between stock market volatility and economic growth in Nigeria. The result further revealed that small investors are more interested in short-term gains and as such, ignore long-term investment opportunities. Hence, the stock market performance of listed companies in Nigeria can hardly reflect their real economic competence.

Jayasuriya (2002) examines the effect of stock market liberalization on stock return volatility using Nigeria and fourteen other emerging market data, from December 1984 to March 2000 to estimate asymmetric GARCH model. The Nigerian session of the result reveals that returns series exhibited business cycle behaviour than volatility clustering

3.0. Theoretical Framework And Methodology

3.1 Theoretical Framework

Theoretically, the McKinnon and Shaw hypothesis is the foundation in which the model was specified. The theory 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 turn lowers the economic growth rate. The important message of the McKinnon-Shaw hypothesis 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.

3.2. Model Specification

Macroeconomic variables are interconnected. Change in one variable also affects others and these overall affect the economy of a country. These have effect on the working of equity market. Their linkage is mostly short in nature and get volatile early.

1. For Objective one: To examine the determinants of stock market volatility in Nigeria.

In this study, the conditional variances or volatility over time in stock prices is hypothesised to be determined by the macroeconomic variables such as exchange rate, inflation rate, money supply, foreign direct investment, total savings and credit to private sector. Thus, the conditional variance equation is specified as follows in implicit form:

$$SMV = f(INFL, FDI, EXRT, MS, TSAV, CPS)$$

Where;

SMV = stock market volatility as proxied by All share index volatility

INFL = inflation rate

FDI = foreign direct investment

EXRT = exchange rate

MS = money supply

TSAV = total savings

CPS = credit to private sector

2. Objective Two: To examine the effects of stock market volatility on selected macro-economic variables performance in Nigeria.

Part A:

In order to ascertain the effect of stock market volatility on economic growth in Nigeria, the model for this study is specified for the selected macroeconomic variable, GDP:

$$GDP = f(SMV)$$

The main independent variable (SMV) was replaced by its proxy (that is, all share index volatility). Other variables are introduced into the model to serve as control variables in the model below. These variables include total savings, money supply, foreign direct investment and exchange rate and the expanded model when logged becomes;

$$LNGDP = \beta_0 + \beta_1 LNASI + \beta_2 LNTSAV + \beta_3 LNMS + \beta_4 LNFDI + \beta_5 LNEXRT + \mu$$

Part B:

The second part of this analysis will involve domestic investment as the dependent variable. This is the second macroeconomic variable that was chosen. Hence, the effects of stock market volatility on domestic investment will be tested as follows:

$$DI = f(SMV)$$

Other variables are introduced into the model to serve as control variables in the model. These variables include total savings, money supply, foreign direct investment and exchange rate and the expanded model when logged becomes

$$LNDI = \beta_0 + \beta_1 LNASI + \beta_2 LNTSAV + \beta_3 LNMS + \beta_4 LNFDI + \beta_5 LNEXRT + \mu$$

Where:

DI = Domestic Investment (Proxy for Gross Capital Formation)

ASI = NSE all-share index (proxy for stock market volatility);

FDI = foreign direct investment

EXRT = exchange rate

MS = money supply

TSAV = total savings;

μ = Error or stochastic term; and

$\beta_1 - \beta_3$ = Coefficients.

3. Objective 3: Testing For The Causal Relationships

In order to measure the direction of casual relationship among stock market volatility and selected macro-economic performance indicators, the granger causality test will be used to forecast the direction of causation among the variables, to ascertain the variable that granger causes one another.

The implicit function is stated thus;

$$SMV = f(DI, GDP)$$

Where SMV = stock Market Volatility

DI = Domestic investment (proxy by gross capital formation)

GDP = Gross Domestic product

3.3 Sources of Data

This study used time series data from 1981–2019 of Nigeria stock index and macroeconomic variables. Stock indices were chosen from Nigeria stock market and data of macroeconomic variables was taken World Bank databank as well as the Central Bank of Nigeria statistical bulletin.

In this study a comprehensive set of macroeconomic variables was used which have a deterministic role for returns in equity market. These variables are real inflation rate, money supply M_2 , foreign direct investment, gross domestic product e.t.c.

3.4 A priori Expectation

An a priori expectation is one where certain basic principles are assumed to be true. It is then not necessary to use empirical evidence but rely on the axioms being true. Based on the study done on the impact of stock market volatility on macroeconomic performance in Nigeria:

ASI > 0, TSAV > 0, DI > 0, FDI > 0, MS > 0, EXRT > 0, GDP > 0, CPS > 0, INFL > 0.

All variables are meant to exhibit a positive relationship. The foreign direct investment can yield either a negative or positive relationship depending on the amount of foreign direct investment at the time period.

3.5 Estimation Techniques

Unit Root Test, Johansen Co-integration test, Error Correction Mechanism (ECM) and Granger Causality Test were all employed in the analysis of the data.

4.0 Discussion Of Result

The tables below confirms that the ADF test results reveal stationary at first difference – All share index volatility (ASIV), Exchange Rate (EXRT), Money Supply (MS), Credit to Private Sector (CPS), Gross Domestic Product (GDP), Domestic Investment (DI), Inflation (INFL), Foreign Direct Investment (FDI) and Total Savings (TSAV). Therefore, this can be also be stated as all the variables used are integrated of order 1, that is I(1).

Table 4.1
Stationarity Test Result

Variables	Augmented Dickey Fuller Test Statistic	Probability Values	Order of Integration	Maximum Lag Length
LNASIV	-8.026875	0.0000	I(1)	9
LNEXRT	-5.205054	0.0001	I(1)	9
LNMS	-3.357209	0.0192	I(1)	9
LNCPS	-4.188023	0.0022	I(1)	9
LNGDP	-4.227259	0.0020	I(1)	9
LNDI	-3.575208	0.0112	I(1)	9
LNINFL	-6.889738	0.0000	I(1)	9
LNFDI	-10.22771	0.0000	I(1)	9
LNTSAV	-4.490256	0.0010	I(1)	9

Source: Author's Computation from EViews 9, 2021.

4.2. Johansen Co-integration Test: For Objective one: To examine the determinants of stock market volatility in Nigeria

The results from the co-integration test shows that the variables are co-integrated at 5% significance level using trace test. This is evident as there exist only one co-integrating equation from the trace test on one hand and no co-integrating equation from the max-eigen value test on the other hand. However, where

there exists conflicting results, the trace test takes precedence over the max-eigen value test. Hence, it can be concluded that there exists long run relationship between the variables under consideration in the study.

Table 4.2
(A): Johansen Co-integration Test Result

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.589781	105.8116	103.8473	0.0368
At most 1	0.518654	72.84227	76.97277	0.0990
At most 2	0.408642	45.78900	54.07904	0.2219
At most 3	0.303399	26.35168	35.19275	0.3226
At most 4	0.240973	12.97462	20.26184	0.3659
At most 5	0.072208	2.773085	9.164546	0.6239
Trace test indicates 1 cointegrating eqn(s) at 5% significant level				
* denotes rejection of the hypothesis at 5% significant 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	Prob.**
None	0.589781	32.96937	40.95680	0.2972
At most 1	0.518654	27.05327	34.80587	0.3114
At most 2	0.408642	19.43732	28.58808	0.4564
At most 3	0.303399	13.37705	22.29962	0.5203
At most 4	0.240973	10.20154	15.89210	0.3163
At most 5	0.072208	2.773085	9.164546	0.6239
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at 5% significant level				
**MacKinnon-Haug-Michelis (1999) p-values				
<i>Source: Author's Computation from EViews 9, 2021</i>				
4.2(B) Error Correction Model (ECM)				

Hypothesized	Trace	0.05
<p>From the table below, the result shows that the R^2 is 76%. This can infer that the independent parameters explain changes in all share indexes. The Adjusted R^2 is seen to be 61%. This confirms the R^2. The Probability of the F-statistic is 0.000420. Since it is less than 0.05, it can be concluded that the model is significant. The Durbin-Watson stat which explains the co-efficient of serial correlation of the error term shows that the null hypothesis of serial or autocorrelation of the error term should be rejected. The Durbin Watson is seen to be 1.891604 which shows the absence of serial correlation.</p>		
<p>The ECM is given as -0.352131. This shows that the ECM is negative and significant (as seen in the probability value). Thus, we can say that the model is reliable.</p>		
<p>Coming down to the variables in the model, the coefficient of inflation (INFL) in the current period is 0.508183. This means that INFL is positively related to ASIV. This conforms to theoretical expectation which expects it to be positive as an increase in inflation by 1 unit will lead to an increase in all share indexes in the economy by 0.508183. Thus, it is statistically significant.</p>		

The coefficient of foreign direct investment (FDI) in the current lag is 0.293932. This suggests that FDI is positively related to ASIV and is statistically significant. The theoretical expectation shows that it is positive. This is further explained as a 1 unit increase in FDI will further increase ASIV by 0.293932.

The coefficient of exchange rate (EXRT) in the current lag is 2859.878. This suggests that EXRT is positively related to ASIV and is statistically significant. Hence, a 1 unit increase in exchange rate will boost the economy by 2859.878.

The coefficient of total savings (TSAV) in current lag is 781070.3. This suggests that TSAV is positively related to ASIV and is statistically significant. Hence, a 1 unit increase in total savings will boost the economy by 781070.3.

With respect to consumer price index (CPI), it is given as 78.30221 in lag one period. The sign is positive showing a positive relationship between CPI and ASIV. It means that an increase in consumer price index by 1 unit will stimulate all share indexes by 78.30221.

Therefore, from the results, it can be seen that the determinants of stock market volatility in Nigeria include exchange rate, total savings, consumer price index, foreign direct investment and inflation. This is because they have been found to be significant.

Table 4.2
(B): Error Correction Model Test Result

Dependent Variable: DASIV				
Method: Least Squares				
Sample (adjusted): 1983 2019				
Included observations: 37 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-21006.95	30971.34	-0.678271	0.5047
DASIV(-1)	647466.4	8360823.	0.077441	0.9390
DINFL	0.508183	0.146102	3.478277	0.0019
DINFL(-1)	-1788.548	1514.716	-1.180781	0.2503
DFDI	0.293932	0.126006	2.332685	0.0280
DFDI(-1)	5.649956	4.995736	1.130956	0.2688
DEXRT	-691.7934	1389.328	-0.497934	0.6235
DEXRT(-1)	2859.878	1657.251	1.725676	0.0984
DMS	-0.110941	0.109329	-1.014745	0.3199
DMS(-1)	0.019772	0.066146	0.298906	0.7675
DTSAV	781070.3	367062.8	2.127893	0.0448
DTSAV(-1)	59.73531	53.53118	1.115898	0.2765
DCPS	-34.63037	66.70654	-0.519145	0.6088
DCPS(-1)	78.30221	42.15383	1.857535	0.0767
ECM(-1)	-0.352131	0.155291	-2.267558	0.0335
R-squared	0.760501	Mean dependent var		1840.593
Adjusted R-squared	0.608093	S.D. dependent var		200647.8
S.E. of regression	125610.5	Akaike info criterion		26.61070
Sum squared resid	3.448973	Schwarz criterion		27.26377
Log likelihood	-477.2979	Hannan-Quinn criter.		26.84093
F-statistic	4.989894	Durbin-Watson stat		1.891604

Source: Author's Computation from EViews 9, 2021

Dependent Variable: DASIV	
Prob(F-statistic)	0.000420
<i>Source: Author's Computation from EViews 9, 2021</i>	

For Objective Two: To examine the effects of stock market volatility on selected macroeconomic performance indicator (GDP) in Nigeria.

Using Co-integration and Error Correction Mechanism Tests

The table below reveals results from the co-integration test for the second objective, part (a). The test was done using the trace test as well as the max eigenvalue test. The results reveal that there is long run relationship between the variables. The trace test reveals 4 co-integrating equations while the max -eigen value also reveals no co-integrating equation. Thus, this shows that the variables are co-integrated.

Table 4.3
(A): Johansen Co-integration Test Result

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.572713	91.59588	76.97277	0.0025
At most 1 *	0.430235	60.13484	54.07904	0.0131
At most 2 *	0.369257	39.32121	35.19275	0.0169
At most 3 *	0.340188	22.26953	20.26184	0.0261
At most 4	0.169791	6.884896	9.164546	0.1326
Trace test indicates 4 cointegratingeqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at 5% significant 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	Prob.**
None	0.572713	31.46104	34.80587	0.1189
At most 1	0.430235	20.81363	28.58808	0.3524
At most 2	0.369257	17.05168	22.29962	0.2300
At most 3	0.340188	15.38464	15.89210	0.0599
At most 4	0.169791	6.884896	9.164546	0.1326
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at 5% significant level				
**MacKinnon-Haug-Michelis (1999) p-values				
<i>Source: Author's Computation from EViews 9, 2021</i>				
4.3(B) Error Correction Model Test Result				
<p>With respect to the overall result from table below, we can see that the R^2 is 61%. This can infer that the independent parameters explain changes in gross domestic product (LNGDP). The Adjusted R^2 is seen to be 46%. This is believed to confirm the former (R^2). The Probability of the f-statistic is 0.001801. Since it is less than 0.05, it can be concluded that the model is significant. The Durbin-Watson stat which explains the co-efficient of serial correlation of the error term shows that the null hypothesis of serial or autocorrelation of the error term should be rejected. The Durbin Watson is seen to be 1.946031 which shows the absence of serial correlation.</p>				

Hypothesized	Trace	0.05
The ECM is given as -0.783750. This shows that the ECM is negative and significant (as seen in the probability value). Thus, we can say that the model is reliable.		
With respect to the parameters themselves, we can see that all share index, the major independent parameter (ASIV) in the current lag is given as 67994.71. The sign is positive which corresponds to a priori expectation as an increase in all share index by 1 unit spurs gross domestic investment by 67994.71.		

With respect to total savings (TSAV), it is given as 0.502054 in the current lag. The sign is positive showing a positive relationship between total savings and gross domestic product. It corresponds with a priori expectation as an increase in total savings by 1 unit will stimulate gross domestic product by 0.502054. Total savings is insignificant in the first lag though it corresponds with a priori expectation.

With respect to exchange rate (EXRT), it is given as -10.54760 in the current lag and is statistically significant. The sign is negative showing a negative relationship between exchange rate and gross domestic product. In other words, a 1 unit increase in exchange rate will reduce gross domestic product by -10.54760. Exchange rate is also statistically significant in the second lag. The coefficient is 0.147911 and the sign is positive showing a positive relationship between exchange rate and gross domestic product. In other words, a 1 unit increase in exchange rate will spur gross domestic product by 0.147911.

Table 4.3
(B): Error Correction Model Test Result

Dependent Variable: DGDP				
Method: Least Squares				
Sample (adjusted): 1983 2019				
Included observations: 37 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.190945	0.176495	1.081867	0.2896
DGDP(-1)	0.591809	0.199756	2.962657	0.0064
DASIV	67994.71	35290.39	1.926720	0.0650
DASIV(-1)	-11605.47	37968.88	-0.305657	0.7623
DTSAV	0.502054	0.161544	3.107844	0.0047
DTSAV(-1)	2335444.	7264879.	0.321470	0.7504
DFDI	4.303577	4.860859	0.885353	0.3841
DFDI(-1)	1.845732	3.735493	0.494107	0.6254
DEXRT	-10.54760	4.731703	-2.229135	0.0359
DEXRT(-1)	0.147911	0.083300	1.775636	0.0880
ECM(-1)	-0.783750	0.283654	-2.763053	0.0113
R-squared	0.612350	Mean dependent var		0.168685
Adjusted R-squared	0.463253	S.D. dependent var		0.135039
S.E. of regression	0.074759	Akaike info criterion		50.99570
Sum squared resid	0.128546	Schwarz criterion		51.47462
Log likelihood	-932.4204	Hannan-Quinn criter.		51.16454
F-statistic	4.107075	Durbin-Watson stat		1.946031
Prob(F-statistic)	0.001801			
Source: Author's Computation from EViews 9, 2021				

Using the Second Macroeconomic Performance Indicator (Domestic investment)

4.4(A) Johansen Co-integration Test Result

With respect to the results from co-integration, the test was carried out in two ways. The trace test indicates the presence of 3 co-integrating equations. The max-eigenvalue test indicates the presence of no co-integrating equation. Thus, where there are conflicting results between the tests, the trace test prevails. Therefore, we can conclude that the parameters estimated are co-integrated.

Table 4.4
(A) Error Correction Model Test Result

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.608412	93.00749	76.97277	0.0018
At most 1 *	0.461162	58.31830	54.07904	0.0200
At most 2 *	0.415349	35.43968	35.19275	0.0470
At most 3	0.260940	15.58028	20.26184	0.1949
At most 4	0.111937	4.392360	9.164546	0.3568
Trace test indicates 3 cointegratingeqn(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	Prob.**
None	0.608412	34.68919	34.80587	0.0516
At most 1	0.461162	22.87862	28.58808	0.2259
At most 2	0.415349	19.85939	22.29962	0.1058
At most 3	0.260940	11.18792	15.89210	0.2382
At most 4	0.111937	4.392360	9.164546	0.3568
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
<i>Source: Author's Computation from EViews 9, 2021</i>				
4.5(B): Error Correction Model Test Result				
The table below shows the results of the error correction model where DI is the dependent variable and second macroeconomic performance indicator.				
Looking at the results from the test conducted, the coefficient of all shares index volatility (ASIV) in the lag one period is 0.495704. This means that ASIV is positively related to DI. This conforms to theoretical expectation which expects it to be positive as an increase in all share index by 1 unit will lead to an increase in domestic investment in the economy by 0.495704. Thus, it is statistically significant.				

Hypothesized	Trace	0.05
The coefficient of total savings (TSAV) in current lag is 0.487973. This suggests that TSAV is positively related to DI and is statistically significant. Hence, a 1 unit increase in total savings will boost the economy by 0.487973.		

The coefficient of foreign direct investment (FDI) in the current lag is -502043.6. This suggests that FDI is negatively related to DI and is statistically significant. The theoretical expectation shows that it is positive. This is further explained as a 1 unit increase in FDI will reduce DI by -502043.6.

The result from the ECM reveals that it conforms to economic theory as it is statistically significant and negative. The value of the coefficient is given as -2.090698. This means that the overall model is stable and significant as the ECM is a condition for stability.

The result also reveals the findings from the R^2 , adjusted R^2 , the p-value of the F-statistics and the Durbin Watson statistics. The value of the R^2 is given as 0.794533 which suggests goodness of fit of the model. It also suggests that the independent variables in the model significantly explain changes in growth of Nigeria as about 79.5% of changes in the rate of DI of the country is attributed to the independent variables. The Adjusted R^2 is given as 0.715507. This further confirms the result of the R^2 . The F-statistics is given as 2049.425 while the p-value of the F-statistics is given as 0.000001. This implies that the model is significant and reliable. The value of Durbin Watson is given as 1.965715 showing the absence of autocorrelation in the model.

Table 4.5
(B): Error Correction Model Test Result

Dependent Variable: DDI				
Method: Least Squares				
Sample (adjusted): 1983 2019				
Included observations: 37 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.163395	0.116573	-1.401652	0.1744
DDI(-1)	1.358516	0.228871	5.935725	0.0000
DASIV	-224318.1	1764404.	-0.127135	0.8998
DASIV(-1)	0.495704	0.198172	2.501385	0.0190
DTSAV	0.487973	0.212563	2.295663	0.0311
DTSAV(-1)	-0.035753	0.099928	-0.357790	0.7238
DFDI	-502043.6	250376.7	-2.005153	0.0574
DFDI(-1)	7.988708	195.7600	0.040809	0.9678
DEXRT	-0.039254	0.028229	-1.390562	0.1777
DEXRT(-1)	0.001495	0.020053	0.074527	0.9412
ECM(-1)	-2.090698	0.650370	-3.214627	0.0051
R-squared	0.794533	Mean dependent var		6.440759
Adjusted R-squared	0.715507	S.D. dependent var		2.686108
S.E. of regression	0.096421	Akaike info criterion		-1.552810
Sum squared resid	0.213830	Schwarz criterion		-0.906394
Log likelihood	44.50339	Hannan-Quinn criter.		-1.322820
F-statistic	2049.425	Durbin-Watson stat		1.965715
Prob(F-statistic)	0.000001			
Source: Author's Computation from EViews 9, 2021				

4.6 Granger Causality Result

Objective Three: Testing For the Causal Relationships

From the table below, it can be seen that causality runs only one way. This means uni-directional causality exists between the variables under study (that is, ASIV, DI and GDP). This is obvious as when domestic investment granger causes all share index, all share index does not granger cause domestic investment. Also, the table reveals that gross domestic product granger causes all share index but this is not the same as all share index does not granger caused gross domestic product. Similarly, gross domestic product does not granger caused domestic investment, domestic product granger causes gross domestic product.

Table 4.6
Granger Causality Result

Pairwise Granger Causality Tests			
Sample: 1981 2019			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LNDI does not Granger Cause LNASIV	37	4.24825	0.0231
LNASIV does not Granger Cause LNDI		0.36069	0.7000
LNGDP does not Granger Cause LNASIV	37	5.19534	0.0111
LNASIV does not Granger Cause LNGDP		0.49608	0.6135
LNGDP does not Granger Cause LNDI	37	1.34520	0.2748
LNDI does not Granger Cause LNGDP		8.40076	0.0012
Source: Author's Computation from EViews 9, 2021			

5.0 Conclusion And Policy Recommendation

5.1 Conclusion

The stock market degree of capitalization has always been used as a benchmark to evaluate the performance of the Nigerian stock market towards economic growth. It is a major performance indicator used in determining the worth of the market and a parameter that cannot be ignored by operators and dealers in capital market.

The demand for the services of the stock market is a derived demand, hence, there should be sustained effort to stimulate productivity in both the public and private sectors. The government through its respective specialty units should boost savings and investors' confidence by putting in place policies which give equal importance to both bank-based financial sector as well as the market-based stock economy in order to enhance capital formation, encourage private sector to invest in capital market.

The increasing importance of financial markets has reinforced the need to study the impact of stock market volatility on some macroeconomic performance indicators in Nigeria. It is therefore pertinent to note that many determinants other than those mentioned in this study influence the development of stock market in an economy, but it would be difficult to capture all these determinants in our model so only few of them were used.

5.2 Policy Recommendations

In all stages of economic growth in Nigeria, great reliance has been placed on the stock market as the medium of interaction which facilitates the exchange of the long-term funds within the nation's economic units to achieve an optimal financial flow so as to optimize investment and growth. For the stock market to achieve this objective, it is recommended that:

Firstly, the governments of the Nigeria nation should empower their agencies, ministries and departments to effectively collect and analyse data. Proper data is the bedrock of every research. Use of accurate data, will produce more reliable.

The result from the analysis shows that the all shares index is one of the best proxies for stock market volatility in Nigeria. The efficiency of this parameter ought to be a point of interest to the government; therefore, this study recommends that the governments should make consensus effort towards the revitalization and improvement in the overall efficiency of the significant determinants, because if this improves the Nigerian stock market it can boost the growth of the overall economy. Moreover, there is a need to invigorate and strengthen the financial market; more companies should be encouraged to get listed on the floor of the market. Small and medium entrepreneurs should be allowed to access the market for investible funds given their close affinity with the grass root funds mobilization ability.

The government should make sure that conscious efforts should be made to make sure that financial institutions are in order because they are the ones that control the rate of interest in the economy and these interest rates can influence the level of investment in the economy. A stable interest rate is necessary for attracting FDI, and all these lead to stock market volatility.

The government should also put in measures to ensure that the output of the nation is on the increase, as this not only improves the stock market but also determines overall growth in the economy.

Declarations

ETHICS APPROVAL AND CONSENT TO PARTICIPATE: Not applicable

CONSENT FOR PUBLICATION: Not application

AVAILABILITY OF DATA AND MATERIAL:

Dataset used and/or analysed during the current study are available on World Bank databank.

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AUTHORS' CONTRIBUTIONS

Danladi D. Jonathan- He analysed the dataset on stock market volatility and macroeconomic variables.

Falaye M. Helen- She interpreted the analysed data and she gathered the literature used for the study.

The two authors' read and approved the final manuscript

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