

STOCK MARKET VOLATILITY AND ECONOMIC GROWTH IN NIGERIA USING VAR AND ECM

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Abstract

The study examines stock market volatility and economic growth in Nigeria using VAR and ECM, while some researchers say that stock market is inefficient other believe it is efficient in the weak-form. Therefore, these different conclusions provide the inspiration for carrying out this thesis. This study discusses volatility of stock market and economic growth in Nigeria tries to establish whether a long-run causality relationship exist between stock market volatility and economic growth proxy (RGDP). The variable used includes bank credit to private sector (BCPS), liquid liabilities (LL), capital investment (INVT), trade openness (TRADO) and market capitalisation (MCAP). The variables were tested for stationarity and found to be integrated of order 1(1). The study applies the VAR and ECM for the analysis. The result revealed the absence of leverage effect and no ARCH effect and the Johanson cointegration test result revealed one cointegrating vector for the country Nigeria. The VEC result showed that the system would always return to equilibrium with a speed adjustment of 4% and 8% for Nigeria. It was showed that in both Nigeria, none of the variables used for the analysis caused economic growth either in the short-run or in the long-run since they are not statistically significant in explaining growth. However, a long-run causality exists between RGDP and the independent variables used for the analysis. Therefore it is recommended that adequate policy measures are used in the countries and financial intermediaries are properly linked to the real sector of the economy, while a stable macroeconomic environment should be created not only to encourage indigenous investors but also attract foreign investors.

Keywords: Stock market, VECM, Real GDP, Trade openness, Liquid liability, financial reforms

Researchers have established that there exist a relationship between stock market and economic growth (Eichengreen et al, 2011). However, the development of new endogenous theories of growth seems to have created a renewed interest in search for the potential role of the financial intermediaries in promoting economic growth and development. However, Ndako (2013) and Levine & Zervos (2002) have showed in their studies that financial development impacts positively on economic

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growth using investment, saving, capital productivity and effective management of information. However, a major issue of contentious in the study of financial development and economic growth using time series analysis is the direction of causality. Parick (1966) in Ndako (2013) explains that financial development has positive link with economic growth via a “supply-leading” hypothesis and that economic growth can stimulate financial development through “demand following” hypothesis. Having formulated the “supply-leading” and “demand following” hypotheses, empirical conclusions on the direction of causality between financial development and economic growth still remains inconclusive.

Recently, there has been an increasing application of multivariate Vector Autoregressive (VAR) model to time-series studies on financial development and economic growth. Popular works among the study that uses multivariate VAR include Luintel and Khan (2008), Masih, Al-Elg&Madani (2009) and Wolde-Rafael (2009). The reason adduced for the application of multivariate Vector Autoregressive (VAR) is that endogenous growth models have explained that the interaction between financial development and economic growth often occurs through a number of channels such as through investment, productivity and savings. Thus, there is the desire for researchers to empirically explore these channels through the application of multivariate VAR methodology.

The argument on whether it is the stock market or the banking sector that positively impact more on economic development has also not been adequately resolved. Researchers like Nakuruma, (2015), Allen &Gale (2007) and Capasso (2008) have all argued that the stock market has a positive impact on the economic growth, while the study of Stiglitz, (2010) and Singh, (2008) favour the banks’ role in the growth process. To Blackburn, Bose &Capaaso(2005) stock markets and banks are necessary in promoting economic growth while they consider stock markets as complementing role of banks rather than being substitutes.

Statement of the Problem

Nation Building is the development of a nation, by making efforts by all the citizens to create a worthwhile, prosperous, pleasant, united, peaceful and buoyant economy to the advantage of all, (Ahmed, 2019). If that is done, there would be interaction by the people in the market in a united, peaceful and pleasant atmosphere. To Abbas, Khan, &Shah, (2010),nation-building may involve the use of propaganda and major infrastructural development to foster social harmony and economic growth. According to him, three factors determine the success of nation-building over the long-run. These are "the early development of civil-society organisations, the rise of a state capable of providing public goods evenly across a territory, and the emergence of a shared medium of communication. These can be done especially when stock market volatility determines economic growth in country. To enable the functioning of the market, education is the key.

Over the years, Nigeria has adopted various economic and financial reforms aimed at promoting economic growth and development. However, in theoretical and empirical researches, the relative causality between financial development and economic growth has remained inconclusive. Therefore, these different conclusions both at the theoretical and empirical levels provide the inspiration for carrying out this thesis. In Nigeria, huge amount of bank credit is channeled by the banking sector to the productive sector of the economy. From 1960, bank credit to the productive

sector of the economy has been on the steady increase reaching over 20% of GDP in 1987, a period which coincided with the deregulation of the Nigerian nominal interest rates. This figure however, falls to 10% between 1988 and 1996 and later stabilizes at 15% between 1998 and 2004. Bank deposit, which measures the size of money in the economy, also shows a steady increase, rising from 10% in 1960 to 30% of GDP between 1980 and 1987 but decline to 10% and rises again to over 20% of GDP from 1997 to 2004.

Research Questions

Given the magnitude of the low level of development in Sub-Sahara Africa and the role of stock market volatility as well as the inconclusive nature of the stock market volatility and economic growth in Nigeria, the following research questions were asked:

- (a) What is the nature of causality between stock market volatility and economic growth in Nigeria?
- (b) Is there a long run relationship between stock market volatility and economic growth in Nigeria?
- (c) Does stock market volatility impact positively or negatively on economic growth in Nigeria?

Objectives of the Study

The general objective of this thesis is to determine stock market volatility and economic growth in Nigeria and South Africa. The specific objectives of the thesis are:

- (a) To evaluate causal relationship between stock market volatility and economic growth for Nigeria.
- (b) To examine the long-run dynamics and long-run relationship between economic development and stock market volatility using data from Nigeria.
- (c) To evaluate the volatility of the stock market in Nigeria.

Statement of Hypotheses

The hypotheses that are formulated for this thesis tested the relationship between financial development and economic development and to test the volatility of the stock market in Nigeria and South Africa.

- (a) H_0 :- There is no significant relationship between stock market and economic growth in Nigeria.
- (b) H_0 :- There is no significant long-run relationship between economic growth and stock market volatility in Nigeria.
- (c) H_0 :-Stock markets in Nigeria are not significantly volatile.

Scope of the Study

The study examines stock market volatility and economic growth in Nigeria using data that span from 1998 – 2018. The work cover the entire African emerging economies but data would be limited to Nigeria. The choice of Nigeria for this study is due to their relative role in the economy of Sub-Sahara Africa. Nigeria is the most populous country in Africa with about 180 million people and the second biggest stock exchange in the continent of Africa. According to the World Bank, (2009) Nigeria contributes over 41% of GDP of the entire West Africa economy. Nigeria

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has bank assets of over \$10 billion in Sub-Saharan Africa which is attributed to their years of financial reforms. The country has the highest number of listed companies in their stock exchange. The country is selected based on data availability and the requirement that the country have over 10 years of continuous data as well as a free and comparatively well-developed stock exchange market.

Justification of the Study

Nigeria has channeled huge amount of bank credit to the productive private sector of the economy over the years. Central Bank of Nigeria Annual Reports (2009) reveals that since 1960, bank credit to the private sector has been on steady increase reaching over 20% of GDP in that year, a period which coincides with the deregulation of the Nigerian nominal interest rates. The figure however fell to 10% between 1988 and 1996 and later stabilized at 15% between 1998 and 2004. Also, Bank deposit, revealed a steady increase to about 30% of GDP between 1980 and 1987 but decline to 10% and rises again to over 20% of GDP from 1997 to 2004. Similarly, market capitalization in Nigeria increase steadily from 20% in 2005 to 50% in 2007 when the market was liberalised in 1995. In spite of this increase in market capitalisation, the Nigeria stock market lost almost 70% of market capitalization due to the 2008 global financial crisis, CBN (2009).

Literature Review

Trade Openness and Financial Development

Since international trade plays a crucial role in economic development of a country, Beck and Levine (2011) provides a formal link between international trade and financial development by exploring the impact of trade openness. Their result indicates that the better the financial system of a country, the higher the shares of manufactured export to GDP. Svaleryd and Vlachos (2012) find a significant relationship between financial development and trade openness. Their work further indicate that financial sector is a source of comparative advantage while Rajan and Zingales (2013) explain through their interest group theory of financial development that some incumbent interest groups oppose financial development since it brings about competition. This competition will leave the incumbent groups in a weaker position as competition increases through cross border trade and financial flows. Therefore Rajan and Zingales (2013) suggest that simultaneous openness of both trade and finance as this promote financial development. Baltagi, Demetraides and Siong (2009) and Housem Mbarek (2011) through panel data obtained from developed and developing countries show that trade openness have significant impact on financial development. The major consensus among economists over the world is that a well-developed financial system benefits a country's economic growth. This is achieved through its positive effect on capital accumulation and technological progress, hence on the labour productivity of economic institutions.

Stock Market Volatility

Stock market volatility is the statistical measure of the dispersion of stock market returns on a given security or market index. Stock market is either measured using standard deviation or the variance between returns from that same security or market index. It refers to the amount of uncertainty or risk related to the size of changes in a security's value (Hongyu and Zhichao (2006). A higher volatility

indicates that the price of the security can change dramatically over a short time period in either direction. However, using of vector error correction model (VECM and variance decomposition (VDC) technique, Masih, Al-Elg and Madani (2009) obtained results that contrast that of Ang and Mckibbin (2007) for Saudi Arabia. After examining the direction of causality between financial development and economic growth in a multivariate VAR framework, their findings show a unidirectional causality from financial development to economic growth.

Stock Market Volatility and Economic Growth

The importance of stock market volatility on economic growth has received much attention, and a highly inadequate number of research works have been conducted to investigate the relationship between stock market volatility and economic growth in the case in Nigeria. The work of Campbell, Lettau, Malkiel, & Xu, (2011) suggests that stock market volatility has significant predictive power for real GDP but the work of Guo (2012) shows that the relationship between stock market volatility and economic growth is not fully robust to deserve model specifications. Raju and Ghosh (2014) examines the volatility of stock prices for a number of countries came into conclusion that both in Indian and Chinese stock market volatility is higher compared to other emerging economies.

Stock Markets, Banks and Economic Growth

There are divergence views about the specific role of banks and stock markets in promoting the economic growth of a country. The role of stock market and banks in economic growth in this study is anchored on the theoretical framework of Boyd and Smith (1998) in Kanu (2011), in which he affirms that both banks and stock markets are necessary in promoting economic growth. Viewing the role of the stock markets, Emrah&Nisfet (2019) presented a model in which financial intermediation and the rate of economic growth are endogenously determined. Their model uses dynamic programming to explain that through research, collection and analysis of information, the flow of resources could be enhanced which could leads to economic growth and through this process financial intermediation becomes positively linked with economic growth. Guo, (2012) believed that the stock market play a critical role in the efficient allocation of resources which helps in promoting specialization, reducing savings mobilizing cost and ultimately achieving high economic growth.

Theoretical Framework

This study anchored on the endogenous growth theory propounded by Pagano (1993) which incorporate the role of financial intermediaries in Financial Development and Economic Growth. Pagano stated that Schumpeter (1911) that explains that a well-developed financial system can facilitate technological innovation and economic growth through the provision of financial services and resources to investors who are ready to invest in new products. Emrah&Nisfet (2019), citing Schumpeter (1911) study which was later advanced as the McKinnon-Shaw hypothesis, was a policy analytical tool for developing countries with strong recommendation for high capital accumulation and decentralized financial intermediation.

Data Presentation

Nature, Type and Sources of Data

This study used secondary data sourced from Central Bank of Nigeria (CBN) database, Nigerian Stock Exchange (NSE) and the World Bank Development Indicators. Annual time series data sourced from these institutions were used for analysis.

Estimation Technique

The Vector Error Correction (VEC) estimation technique was used. The Vector Error Correction (Restricted Vector Autoregressive) estimation technique is a system equation, which take all the variables as dependent and independent variables.

Tests for Cointegration

The Jurgen, (2019) citing Johansen & Juselius (1992) maximum likelihood long-run cointegration model was adopted. This is to establish whether there exists a long-run relationship among the variables of interest. The acceptance or rejection of the null hypothesis would depend on both the Trace test and maximum Eigenvalue statistics. The decision rule would be such that rejects the null hypothesis of $r \leq 0$ against the alternate $r \geq 1$ at 5% level of significance. The cointegration, normality and heteroskedasticity tests for the model were performed in line with Arago and Nieto (2005) to determine the long-run relationship between stock market development and economic growth.

Vector Error Correction Model (VECM)

A VAR system consist of a set of m variables, each of which is expressed as a linear function of p lags of itself and all the other $m - 1$ variables, plus an error term. The VAR model was applied because of its unique qualities which include: (1) once the variables are cointegrated or not cointegrated, it becomes easy to distinguish between the short-run dynamics and long-run causality using either unrestricted VAR or restricted VAR (VEC). (2) VAR model eliminates the problems of endogeneity by treating all the variables as potentially endogenous (Ang and McKibbin 2007).

A VAR of order p model is expressed as:

$$X_t = \alpha + A_1x_{t-1} + \beta_2x_{t-2} + \dots + \beta_{p-1}x_{t-p} + \mu_t \dots\dots\dots 1$$

The VAR can be expressed in the form of VECM if the variables are I(1) order of integration:

$$\Delta x_t = \Omega_{y0} + \Omega_1x_{t-1} + \Omega_2\Delta x_{t-1} + \Omega_3\Delta x_{t-2} + \dots + \Omega_{p-1}\Delta x_{t-p+1} + \alpha x_{t-p} + \mu_t \dots\dots\dots 2$$

Where $x_t = \Omega_{y0} = (4 \times 1)$ vector of intercept with elements Ω_{j0} and $\Omega_i =$ an $(n \times n)$ coefficient matrices with elements $\Omega_{jk}(i)$ while $\mu_t =$ an independently and identically distributed n -dimensional vector with zero mean and constant variance. Thus, if Ω is of rank $1 < r < 4$, then it can be decomposed into $\Omega = \alpha\phi'$, where ϕ is the matrix of cointegrating vectors and α is the matrix of adjustment. Therefore, $\Delta x_t = \Omega_0 + \Omega_1x_{t-1} + \Omega_2\Delta x_{t-1} + \Omega_3\Delta x_{t-2} + \dots + \Omega_{p-1}\Delta x_{t-p+1} + \alpha(\phi' x_{t-p}) + \mu_t \dots\dots 3$

Model Specification

The following models were specified for study.

$$\text{LnRGDP} = f(\text{BCPS}, \text{TradeO}, \text{LL}, \text{INVT}) \dots\dots\dots 4$$

where, LnRGDP = Logged value of Real Gross Domestic Product, BCPS = Bank Credit to Private Sector, LL = Liquid Liability and INVT = Capital Investment

Mathematically, equation 3(4) is expressed as

$$\text{LnRGDP} = a_0 + a_1\text{BCPS} + a_2\text{LL} + a_3\text{INVT} + U_i \dots\dots\dots 5$$

Model II (Stock Market Volatility for Nigeria)

$$\text{Log}\theta^2_{i-1} = \beta_0 + \sum q_{i-1} \left\{ \alpha_i |\epsilon_{t-1}| + \text{Ci}(\epsilon_{t-1}) \right\} + \sum p_{j=1} \beta_j \log(\theta^2_{t-j})$$

$$|\theta_{t-1}| \quad (\theta_{t-1})$$

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Data Interpretation

Unit Root Test

Variables	Levels	Prob	First Difference	Prob	Decision
LRGDP	1.047790	0.9962	-4.410305	0.0013	I(1)
BCPS	-2.076366	0.2549	-4.780487	0.0006	I(1)
LL	-2.392988	0.1516	-4.9224960	0.0004	(1)
INVT	-1.750511	0.3973	-5.9176627	0.0000	I(1)
ADF Test Statistic					
1%	3.670170				
5%	-2.963972				
10%	-2.621007				

Source: Authors Regression Analysis, 2019.

The unit root test revealed that real gross domestic product (RGDP) is integrated of order one (1). The p-value of RGDP at levels is 0.9962, greater than 0.05 significant level while that of the first difference is 0.0013 and is less than 0.05 significant level. Secondly, the value of RGDP at levels (1.0478) is less than ADF critical values at 1%, 5% and 10% respectively but the values of ADF critical values is less than the value of RGDP at first difference (-4.4103). Thus, RGDP is stationary at first difference. Bank credit to private sector (BCPS) is integrated of order one (1) i.e.I(1). The p-value at first difference (0.0006) is less than 0.05 significant level while that of levels (0.2549) is greater than 0.05 significant level. The ADF critical values at 1%, 5% and 10% is less than BCPS value at first difference (-4.7805) but greater than the BCPS at levels. Thus, the BCPS is stationary at first difference.

Liquid liability (LL) is stationary at first difference judging from its p-value (0.0004) at first difference which is less than 0.05 significant level. Its prob. value at levels 0.1516 > 0.05 significant level. Also, the value of LL at levels (-2.3930) is less than ADF critical values at 1%, 5% and 10% respectively while the value at first difference (-4.92410) is greater than ADF critical values at 1%, 5% and 10%. Thus, we conclude that liquidity liability is integrated of order one (1). Capital investment (INVT) is stationary at first difference with a p-value of 0.0000 which is less than 0.05 significant level but its prob. value at levels, is 0.3973 and is greater than 0.05 significant level. Also, the ADF critical values at 1%, 5% and 10% is less than INVT values at first difference but greater than INVT value at levels. Thus, INVT is stationary at levels and first difference.

Cointegration Test

The Johansen cointegration test was carried out and the result is presented in table 4.2 below.

Table 4.2 Johansen Cointegration Test

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Hypothesized No of CEs	Eigen Value	Trace Statistic	5% Critical Value	Prob.	Max. Eigen Statistic	5% Critical Value	Prob.
None	0.595732	50.76310	47.85613	0.0260	28.07596	27.58434	0.0433
At Most 1	0.329081	22.68714	29.79707	0.2618	12.37230	21.13162	0.5114
At Most 2	0.280127	10.31485	15.49471	0.2573	14.26460	14.26460	0.1998
At Most 3	0.004049	0.125770	3.841466	0.7229	3.841466	0.7229	0.7229

Source: Author’s Regression Result, 2019.

The result in table revealed that there is only one (1) cointegrating equation. This conclusion was reached from the p-value of Trace Statistic (0.0260) and that of Maximum Eigen Statistic (0.0433) which is less than 0.05 significant level. The other p-values of Trace Statistic and Maximum Eigen Statistic are greater than 0.05 significant level. Therefore, we conclude that a long run relationship exist among the variables in the model.

Vector Error Correction (VEC) Estimate

Cointegrating Eq	CointEq1
LRGDP(-1)	1.000000
BCPS(-1)	-0.099173
	0.03570
	-2.77811
LL(-1)	-0.066239
	0.02852
	-2.32217
INVT(-1)	0.011980
	0.03723
	0.32178
C =	-7.962501

Error Correction	D(LRGDP)	D(BCPS)	D(LL)	D(INVT)
CointEq1	-0.037256 0.01417 -2.62839	3.848946 1.39129 2.76647	4.031499 1.49441 2.69772	-1.420430 0.40444 -3.51213
D(LRGDP(-1))	0.036721 0.17217 0.21328	7.315518 16.8994 0.43289	0.228685 18.1520 0.01260	-1.692194 4.91252 0.34447
D(LRGDP(-2))	0.021471 0.17217 0.21328	-2.451344 15.5813 -0.15733	-2.156616 16.7362 -0.12886	8.729438 4.52936 1.92730
D(BCPS(-1))	0.002541 0.00392 0.64882	0.115705 0.38448 0.30094	0.037795 0.41298 0.09152	-0.017171 0.11176 -0.15363
D(BCPS(-2))	-0.004610 0.00392 -1.17466	0.214274 0.38521 0.55626	0.199912 0.41376 0.48316	0.046694 0.11198 0.41700

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D(LL(-1))	-0.005605 0.00376 -1.48890	0.357056 0.36952 0.96626	0.473908 0.39691 1.19399	-0.074990 0.10742 -0.69811
D(LL(-2))	-0.000416 0.00358 -0.11618	-0.007853 0.35188 -0.02232	0.064175 0.37796 0.16979	-0.087090 0.10229 -0.85142
D(INVT(-1))	0.002370 0.00547 -0.43347	0.039224 0.53674 0.07308	-0.016159 0.57652 -0.02803	-0.044191 0.15603 -0.28323
D(INVT(-2))	-0.010595 0.00512 -2.06884	0.574054 0.50265 1.14205	1.113498 0.53991 2.06238	-0.262318 0.39173 -0.66964
C	0.047694 0.01373 3.47393	-0.021927 1.34757 -0.01627	0.033505 1.44745 0.02315	-0.262318 0.39173 -0.66964

Source: Author's Regression Analysis, 2019.

The VEC estimate is without an ECM and p-values for its t-statistic which would help in ascertaining the speed of adjustment and the statistical significance of the variables. To determine the ECM and p-values, the system equation of VEC estimate was subjected to further analysis using ordinary least square.

VEC System Estimate with ECM and Probability Values

The VEC system estimate in table below shows that the coefficient of the error correction model (ECM) is largely negative and statistically significant judging from the p-value of its t-statistic (0.0103) which is less than 0.05 significant level. This implies that the model will return to equilibrium if disequilibrium occurs. The speed of adjustment to equilibrium in the case of displacement is approximately 4%.

VEC System Estimate

Variables	Coefficient	Std Error	t-statistic	Prob.
ECM(-1)	-0.037256	0.014174	-2.628388	0.0103.
D(LRGDP(-1))	0.036721	0.172172	0.213279	0.8317
D(LRGDP(-2))	0.021471	0.158743	0.135254	0.8928
D(BCPS(-1))	0.002541	0.003917	0.648821	0.5183
D(BCPS(-2))	0.004610	0.003924	-1.174657	0.2436
D(LL(-1))	-0.005605	0.003765	-1.488897	0.1404
D(LL(-2))	-0.000416	0.003585	-0.146179	0.9078
D(INVT(-1))	0.002370	0.005468	0.433465	0.6658
D(INVT(-2))	-0.010595	0.005121	-2.068845	0.0418

R-squared = 0.35

Source: Author's Regression Result

The lag values of Real Domestic Product (RGDP) are not statistically significant in explaining economic growth in the long-run. Their p-values of 0.8317 and 0.8928 are > 0.05 significant level. The variables are not significant. The sign of their coefficients are positive, implying a positive influence on economic growth. Bank credit to private sector (BCPS) is not statistically significant in explaining economic growth in the long-run. The p-values of its lags (0.5183 and 0.2436) are

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>0.05 significant level. The positive sign of its coefficient shows that in the long-run, it influences economic growth positively.

Liquid liability (LL) is not statistically significant in explaining economic growth in the long-run from the p-values (0.1404 and 0.9078) of its lags. The sign of its coefficients are negative implying that it negatively affects growth.

The second lag of capital investment (INVT) is statistically significant in explaining economic growth in the long run. Its p-value (0.0418) is less than 0.05 significant level. The coefficient is negative, implying a negative influence on growth. But the coefficient of the first lag is negative meaning that it influences growth negatively and its p-value (0.6658) is greater than 0.05 significant level which makes it not statistically significant in explaining economic growth. The R-Squared of 35% implies that 35% of the systematic variation in the dependent variable (RGDP) is explained by the independent variables (BCPS, LL and INVT).

Regression Result for Stock Market Volatility

Unit Root Test

Variable	Levels	Prob.	First Difference	Prob.
MCAP	-2.459741	0.1344	-5.743916	0.0000
ADF test Statistic				
1%	-3.661661			
5%	-2.960411			
10%	-2.619160			

Source: Author's Regression Analysis

The unit root test shows that market capitalization (MCAP) is stationary at first difference. The p-value at first difference is 0.0000 and is less than 0.05 significant level while that of levels is 0.1344 and is greater than 0.05 significant level. On the other hand, the values of ADF test statistic at 1%, 5% and 10% respectively are greater than MCAP value at levels but less than MCAP value at first difference. Thus, we affirm that MCAP is integrated of order one (1).

Volatility Presence (Residual Test for Volatility Presence)

The residual test for volatility presence in the period between 1985–1992 witnessed low volatility and high volatility was witnessed between 1993-1999. Similarly, the period between 2000 – 2003 witnessed another low volatility which changed to high volatility between 2004-2008 while the period between 2010–2017 witnessed yet another high volatile.

To confirm this, heteroskedasticity test (ARCH) was conducted in the result reveal that the observed R-squared value for the residual heteroskedasticity test is 13.50692 with a p-value of 0.0002 which is less than 0.05 significant level implies that there is ARCH effect in the model i.e there is the presence of volatility. Thus, we can proceed to ascertaining the leverage effect using EGARCH.

EGARCH Estimate

Variables	Coefficient	Std. Error	z-statistic	Prob.
C	10.39004	1.059623	9.805418	0.0000
C(2)	2.775463	1.690732	1.641575	0.1007
C(3)	1.450564	0.613516	2.364345	0.0181

C(4)	0.666531	0.662544	1.006019	0.3144
C(5)	0.015911	0.309288	0.051444	0.9590

Source: Author's Regression Result, 2019

The fourth coefficient [C(4)] measures the leverage effect i.e. the magnitude of the effect of positive and negative shocks on current volatility. Theoretically, the sign of the fourth coefficient must be negative and statistically significant. A negative sign and statistical significance of the coefficient implies that there is leverage effect. From the analysis, the fourth coefficient is positive and not statistically significant judging from the p-value of 0.3144. Therefore, there is absence of leverage effect. This implies that as stock return rises, it becomes highly volatile. In other words, there are signs of high volatile stock return in the Nigeria stock market and this does not encourage future investment by investors. The second and third coefficients measure the effect of previous year residual variance on current variance while the fifth coefficient measures the correlation between the past variance and current variance. These coefficients are positive implying a positive correlation between the past variance and current variance.

Discussion of Findings

The financial development analysis using vector error correction (VEC) estimate had shown that the Nigeria financial sector is highly underdeveloped. None of the variables used (bank credit to the private sector, liquidity liability, capital investment) caused growth either in the long run or short run. Though, the model would return to equilibrium in the case of displacement, its speed of adjustment (4%) is very low. This explains why the variables are not statistically significant in explaining economic growth.

The financial development analysis of South Africa, using vector error correction (VEC) estimate is not significantly different from the result obtained for Nigeria financial development. Although, the Johannesburg Stock Exchange (JSE) is rated as the 18th largest exchange in the world, South Africa stock market is still underdeveloped as revealed by the variables used for the study. This is because variables (bank credit to the private sector, liquid liability, and trade openness and capital investment) used for the analysis does not caused growth either in the long run or short run. Though, the model would return to equilibrium in the case of displacement, it also has low speed of adjustment of 8% approximately. As a result, since the variables are not statistically significant they cannot be used to explain economic growth in South Africa.

Conclusion

The main objective of this study is to examine the causal relationship between financial development, stock market volatility and economic growth in Nigeria using data from 1989 – 2017. To achieve its objective the study uses multivariate VAR framework to evaluate the long-run relationships between stock market volatility and economic growth using RGDP, BCPS, LL INVT and TradO as variables. It also employs the Vector Error Correction Model (VECM) based causality tests to establish a link between stock market and economic growth. It thus established the long-run causality between stock market and economic growth. The financial development indicators used include bank credit to private sector (BCPS), liquid liabilities (LL) and capital investment (INVT), while market capitalization

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(MCAP) and trade openness (TRADO) are used as stock market indicators. The ECM result revealed that the system would return to equilibrium if disequilibrium occurs and that a long-run causality exists between economic growth in the study.

Recommendations

From the results of the analysis carried out, the following recommendations are made.

- Adequate policy measures are required to ensure that financial intermediaries are properly linked to the real sector of the economy.
- For Nigeria to gain maximally from their stock markets it is recommended that they should maintain a stable macroeconomic environment that would assure indigenous investors of their investment and attract foreign investors. This is so because sound and consistent macroeconomic policies are imperative for attracting foreign investments into the country and stable macroeconomic environment helps reduce the level of uncertainty and volatility.
- The government of the countries should work on policies that would successful lush their stock market into global stock markets and deepen the equity market to complement other sectors of the economy to achieve a sustainable growth.

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