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Does Stock Market Development Cause Economic Growth? A Time Series Analysis for Nigerian Economy

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Abstract - The study is aimed at examining the relationship between Nigerian stock market development and real GDP. Secondary data was obtained from CBN (central Bank of Nigeria) bulletin for the period of 1960 to 2010. The study employed the unit root test, long-run Granger non causality to see whether stock market development can cause economic growth. The results shows that; there exist a unidirectional relationship between total deals and GDP, total values and GDP and Total Deals and Total Values a long run relationship between stock development and economic growth. Specifically indicating about 1.047% increase and 0.091% decrease in GDP, suggesting a negative contribution of Total Values in the model.

Keywords - Stock Market Development, Real GDP Growth, Toda and Yamamoto Causality Test, Nigeria.

1. INTRODUCTION

Various effect of the financial sector development especially stock market development on the economy came to the attention of academician, researcher as well as policy makers notice and deliberation in the last few decades. Financial liberalization versus international financial integration, economist focus much attention on stock market development due to it significant effect on the real economic growth, as suggested by [1], [2] for China, [3] for India. Nigeria due to its enormous population and vast national resources has tremendous and potential financial stock market, suitable for the development of the stock market.[4],[5], [6], and some many other illustrated that a strong link exist between stock market development and economic growth in their studies using various indicators.

Stock market as a financial entity plays a crucial role in the modern economy. This is because economic growth and development brings effective and sufficient financial sector capable of pulling domestic saving and mobilizing profitable investment.

It is evident that Nigeria stock market has influenced the country's economic growth, this is as put by [7] in his regression analysis to investigate whether stock market influenced economic growth the result which established that there is a positive relationship between stock market development and economic growth and called for all inclusive policies geared towards that direction. In yet another study by [8] suggests that an organized and well managed stock market can stimulate huge investment opportunities by recognizing and financing project.

[9] Posited that stock market has both short and long run effect on economic growth; while the number of listed companies remains insignificant and that shock in the stock market will trigger off a negative consequence on investors and usual takes a long time to restore.

The present value of a stock market today is discounted sum of the respected future cash flows (dividend and capital gain), meaning today's stock market simply reflect the expected future dividends, there economic growth, [10]

Stock market being a significance component of the financial sector in must developing nations and Nigeria in particular, the banking system and stock exchange work hand in hand to actualize the micro economic objective of the economy.

2.0 METHODOLOGY AND DATA MEASUREMENT

In this study the traditional causality test developed by [11] and its modified version by [12] were employed to investigate the causal relationship between the variables considered i.e GDP, total cash and total values; using data obtained from Central Bank statistical bulletin from 1960 – 2010.

2.1 Granger Casualty Test

In 1969 Granger developed a test name after him to investigate the relationship between two variables. He simply put that if the past values of a variable say Y significantly contribute to forecasting the future value of another variable say, x then y is said to granger cause x. conversely, if the past value of x, statistically contribute to the prediction of the value of y we can confident said that x granger cause y.

The test is established based on the regression equation as follows:

$$Y_t = \alpha_o + \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{j=1}^{k} \gamma_t X_{t-j} + u_t$$

$$X_t = \beta_o + \sum_{i=1}^{n} \beta_i X_{t-i} + \sum_{j=1}^{k} \delta_t Y_{t-j} + v_t$$

When Y_t and X_t are the variables, u_t and v_t are independent error terms and t is the time, i and j are the lags number.

The hypotheses to be test are

H_o: $\gamma_t = 0$ against $\gamma_t \neq 0$

H_1 $\delta_t = 0$ against $\delta_t \neq 0$

Unidirectional causality exist between the pair of the variable x, y if $\alpha = 0$, but $\gamma_t \neq 0$ i.e x is said to cause y, similarly $\beta_i = 0$ but $\delta_t \neq 0$ then y is said to cause.

Moreover, y both the parameters x_i and i are both different from zoo then bilateral causality exist between the pair of the variables. And finally, depending is observed if both the coefficient 2: and are both non-significant statistically.

Akaike and Schwarz information criterion (AIC and SIC) was employed to select the lag length; while the causality was applied under the assumption that all the pair of variables is stationary at same order of integration.

Error correction model (ECM) and Vector Auto Regression Error Correction Model due to both [13] and [14] were used to test for co integration between the variable, though, these test is not easily achieved, whence the regiment of the sufficient sank causally of trace and Eigen value test.

2.2 Toda and Yamamato Test

In 1995 Toda and Yamamato proposed a causality test as an attractive to improve the power of traditional causality test. The testing produce is similar to that of Granger causality test, but extra lags are required as argumentation, based on the maximum order of integration of the series under investigation. This produce moves parameters estimation valid even when the VAR is not co integrated.

Step 1: The series must be stationary and its maximum order of integration d_{max} must be identified. Unit root known as augmented [15] test is a popular test for stationarity is then applied to identify the order. This simply requires estimating the relationship.

$$\Delta y_t = (\theta - 1) y_t \sum_{j=1}^{k} \delta_j \Delta y_{t-j} + \varepsilon$$

ε_t = error term and $\varepsilon_t \backsim N(0, \delta^2$

The hypotheses to be tested there are presented in table 3.

Ho: $\theta<1$ i.e the series is non-stationary versus the H_1: alternative that the series is stationary.

Step 2: we then construct a vector autoregressive model at the ($k + d_{max}$) lags, where k stands for the included optimal lagged numbers obtained through AIC/SIC criteria. Then, suppose the two series y_t and x_t are of different integration order and k=1 i.e I(0) and I(1) respectively, it implies that d_{max}=1; hence the need for additional lag at most one. This then give rise to VAR (2). A test statistic is the applied to examine the relationship between; called Wald test, which is asymptotically χ^2 distribution applicable at different cointegration order, and non cointegration, provided the order and the true length of the lag of the model is same or less.

2.3 Data Measurement

The data used in this study is an annual figure of the Nigerian stock market spraining over forty years (40) i.e 1960 – 2010. These are result of the daily, monthly frequency of the total activities on the floor of the dynamic stock market.

The variables of the study are: Economic development measured in 1993 – 1994 = 100, and stock market development measured by the constant prices: real market capitalization i.e total deals and real vector auto regression model are built based on the variables considered in the study; assuming a stationarity in the data, or achieved through difference where the read arise as must of economic variables are not analyze stationary; to avoid spurious regression.

However, our focus here is to examine the relationship between stock market development and real GDP via total deal and total value (transactions).

3.0 EMPERICAL RESULTS

Tables 1 and 2 presents the results of the unit root test for stationarity; which indicates that all the variables are non-stationary at levels; but stationary when difference once, since the critical values are less than the test statistics at 0.05 and 0.01, but greater that the test statistics in the first difference for the ADF and PHILIP PERRON test, which amount to the rejecting the null hypotheses at 0.05 and 0.01 levels of significance after the first difference; meaning the series are integrated of order one I(1).

3.1 Johansen Cointegration Rank Test

Johansen maximum Eigen value test was employed to identify order of cointegration of the variables as one of the requirement for VECM; which requires that there cointegration relationship must exist' as

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Table 1 The ADF Unit root Test for identification of order of integration for the variables

Level		First Difference	
Var	t – stat intercept. intercept and trend	Intercept. intercept and trend	
LGDP	0.2425	-6.1844	-3.9641
		-6.1187	
LTOTALDLS	1.7740	-8.6127	-1.0993
		-9.0478	
LTOTALVLS	-0.1742	-7.3957	-1.5786
		-7.3912	
CRITICAL VAL. 5%	-2.92	-3.50	
		-3.50	
1%	-3.38	-4.16	
		-4.16	

Table 2 PHILIPS PERRON TEST

Level		First Difference	
Var	t – stat intercept. intercept and trend	Intercept. intercept and trend	
LGDP	0.6070	-3.8485	-11.4168 -11.5414
LTOTALDLS	1.4942	-1.2056	-8.6019 -9.2349
LTOTALVLS	-0.1452	-1.6773	-7.4220 -7.4162
CRITICAL VAL.	5% -2.60		-2.92
	1% -3.59		-3.38

Result of table 1 and 2 indicate non stationary at level but stationary after first difference

Table 3 Johansen test for Cointegration Rank

Unrestricted co integration Rank Test

Hypothesized No. of co integration	Eigen Value	Trace Stat	5%crit.value	probability
Nome*	0.439609	46.23857	35.19275	0.0022
At most 1	0.255254	18.44076	20.26184	0.0873
At most 2	0.085585	4.294572	9.164548	0.3700

Trace test indicate 1 co integration relation at the 5% level of significance

*denote rejection of the hypothesis at 5%

Result of co integration relation

$\beta = \{1.000\ -1.046521\ 0.091261\}^T$

$\alpha = [0.057575\ 0.233310\ 0.212527]^T$

The above result show that the co integration relation with restricted constant is

Ec_t^{ML} = GDP-1. 015978 – 1.047 + 0.091

Ec_t^{ML} = GDP -1.015978 -1.047TOTALDLS + 0.091TOTALVLS

OR GDP = 1.015978 +1.047TOTALDLS - 0.091TOTALVLS

The Equation Above can be interpreted as follows: the coefficient of 1.047 of total number of deals transactions at the Nigerian stock exchange (total dls) is the estimated output elasticity following that both Gross Domestic Product (GDP) and Total number of Deals (total dls) appear in logarithms (lutkepohl, 2005), a 1% dgp increase obtained I Nigeria will induced a similar increase of 1.047% of total dls and 0.091 decrease in the value of transactions in Nigeria.

3.2 VECM Model Checking

The following test on the residuals is applied to check for the adequacy of our VECM Model. The Portmanteau test, Autoregressive Conditional Heteroskedasticity LM test for Arch effect and Jarque-Bera test for Normality.

Table 4 results of the VECM test for serial correlation and ARCH

Type of test	Test Statistics	P-Value	Decision
Portmanteau	16.29963	0.9934	Accept H_O
LB	107.7037	0.0627	
ARCH LM	383.9373	0.0000	Accept H_O
Jacque – Berra			Reject H_0

The results of Table 4 shows that the null hypothesis of no serial correlation and conditional Heteroskedasticity will be accepted for portmanteau (LB) test and ARCH LM Test since their p-values are greater than the significance values of 0.05 and 0.01. However, in Jarque-

Bera test the null hypothesis is rejected which indicate that the residuals are normal.

Table 5 Pair Wise Granger Causality Test

Null hypothesis	F – statistics	Probability	DECISSION
Total Dls Does not Granger cause GDP	1.38641	0.2604	Reject H_0
GDP Does not Granger cause Total Dls	7.64429	0.0014	Accept H_0
total Vls Does not Granger cause GDP	0.46047	0.6341	Reject H_0
GDP Does not Granger cause total Vls	6.63903	0.0031	Accept H_0
total Vls Does not Granger cause Total Dls	3.41947	0.0419	Accept H_0
total Dls Does not Granger cause Total Vls	0.41355	0.6639	Reject H_0

The results of table 5 indicate that there is a unidirectional Granger Causality between total deals and GDP, Total Values and GDP and Total Deal and Total Values, since their null hypotheses are rejected.

4.0 Discussion and Conclusion

The study investigate the relationship between Nigerian stock exchange transaction and real GDP growth in Nigeria; using data obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin (2010), for the period 1960 to 2010. In analyzing the relationship between these all important economic variables as far as economic growth is concerned. This is borne out of the desire exhibit by most developing nations and Nigeria in particular; is putting more efforts aimed at improving economic growth with special attention on GDP.

Several test such as: ADF and PHILIP PERRON TEST were employed to test fir the order of the cointegration which showed that all the three variables: GDP, Total Deals, and Total Values are cointegrated of order one I(1). The results of the test of the null hypotheses on no serial correlation and conditional heteroscedasticity were accepted for portmanteau LB and ARCH LM test, since their p-values are greater than 0.05 and 0.01 level of significance; but Jarque-Bera test residuals are normal. The Johasen test shows that VECM 2 has a cointegration of the rank 1.

Moreover, the pairwise Granger causality test shows a unidirectional causality between GDP and Total Deals, GDP and Total Values and Total Deals and Total Values. The analysis of whether stock development cause and economic growth; suggest an existence of a long –run relationship between stock development and GDP (economic growth). Specifically, the finding suggest that the contribution of total deals to GDP (economic growth) is about 1.047% and 0.091% decreases in total values transaction; meaning total values contributes negatively in the model.

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