



NIGERIA STOCK EXCHANGE MARKET AND ECONOMIC GROWTH: A JOHANSEN COINTEGRATION AND CAUSALITY APPROACH

Usman A. Usman*

Abdulmumini Baba Alfa**

Abstract: *This paper seeks to investigate the impact of stock exchange market on economic growth in Nigeria spanning 1981 to 2010. The study applies the Johansen Cointegration test approach and Granger Causality test and the result reveals that there is a positive long run relationship between Market Capitalization, Value traded and economic growth in Nigeria. While the granger causality test indicates a bi directional relationship between Market Capitalization and Value Traded in stock market. There is also a uni direction between market capitalization and Real GDP with causality running from RGDP to Market Capitalization. Conversely, value traded granger causes Real GDP in the short run. Policy implication for this study is that Nigeria stock exchange market remains a driver for sustainable growth and development generating surplus savings from public and private entities or actors for medium and long term investment boosting fixed capital formation (domestic investment) thus, a sound institutional framework for regulators and actors in the market and inspiring investor confidence cannot be understated for sustainable growth and development in Nigeria economy. Capital market should be well instituted to absorb shocks emanating from the global market.*

*Post-Graduate Student, Department of Economics, Usmanu Danfodiyo University Sokoto, Nigeria

**Department of Economics, IBB University LAPAI, Niger State Nigeria



1. INTRODUCTION

Investment remains the major catalyst to economic growth, while resource mobilization and allocation forms a vital pre-requisite to investment, the role of financial intermediary like stock exchange market in securing liquidity for long term investors cannot be undermined. These assist profitable investors in expanding their portfolio investment. However despite the performance of Nigerian stock market, there has been a large downturn in economic activity particularly in the real sector. Most productive activity will prefer long term borrowing relative to short term and the major objective of stock exchange market is to buy and sell securities by harnessing surplus public and private savings from actors and this is further invested optimally in real sector to facilitate economic growth. While global challenges have affected institutions deteriorating performances and policy objectives, Nigeria capital market remain firm and indispensable in sustaining growth. Muhammad (2004) contends that Nigerian Capital Market in the 21st century has demonstrated readiness to face future global challenges in the competitive market. Although there are vast empirical literatures indicating positive long run relationship between stock market and economic growth, it is equally essential only not to show the channels but to posit the causality relationships. This study intends to fill the gap by investigating the channel through which the relationship is established and the causality flow. Thus this paper is divided into seven sections with the introduction inclusive. While section two explains the theoretical framework, section three deals review of literature, section four explains the methodology, section five deals the result and discussion, section six captures the conclusion while section seven explains the policy implication of the study

2. THEORETICAL FRAMEWORK

The theory that underpins this study is the endogenous growth theory on financial intermediation as major driver of economic growth Lewis, 1995 and Rostow, 1961 underscores the relevance of savings and investment as pre-requisite for country's development process. Nations will have to strengthen up from merely low saving and investor economy to large saver and investor economy to sustain growth and development. While many literatures have been generated on the significance of savings and investment, the importance of stock exchange market on economic growth cannot be de-emphasized



considering the enormous contributions of financial intermediation in resource allocation and capital accumulation (McKinnon, 1973 and Shaw, 1973).

3. REVIEW OF LITERATURE

Ezeoha *et al* (2009) investigate the relationship between stock market development and private investment in Nigeria applying Johansen cointegration analysis and VECM spanning 1970 to 2006. The authors found a positive significant relationship between domestic private investment and stock market development in Nigeria. Kolapo and Adaramola (2012) in their study investigate the impact of capital market on economic growth on Nigeria applying the ADF and Johansen cointegration test and granger causality test, the authors report a long run relationship between capital market and economic growth and a bi directional relationship between GDP and value of transaction traded while the result also indicates Uni direction between GDP and capital market i.e. market capitalization granger causing GDP. Sabiu *et al* (2011) contend that market liquidity influences economic growth other than market size using Nigerian data spanning 1970 to 2009 and applying the ADF stationarity test ADRL technique analysis. Bernard and Austin (2012) examine the role of stock market development on economic growth in Nigeria using Nigerian data for the sample period 1994 to 2008 applying OLS regression, result reveals that market capitalization and market liquidity have negative effect on economic growth though not significant while turnover ratio has a positive effect on economic growth. Riman *et al* (2008) argue that there is a positive long run relationship between stock market and economic growth in Nigeria and a uni direction flowing from market capitalization to GDP in the period 1970 to 2004. Joseph and Ose (2011) applied the OLS and range of econometric techniques and reported that capital market has a positive and statistical significant effect on Nigerian economy. Thus the growth of Nigerian economy lies essentially on expanding the capital market through investor friendly climate which will boost FDI and Portfolio investment. Augustine and Pius (2010) applied range of econometric tools to investigate the impact of stock market development on long run economic growth spanning 1986 to 2006 approximately 21 years, evidence indicates a positive long run relationship between stock market size, turnover ratio and growth while market liquidity has a negative long run effect on economic growth in Nigeria. Ogunmuyiwa (2010) used the ADF stationarity test and the granger causality test to examine the relationship and the channel through which investor



sentiment and stock market liquidity affect economic growth in Nigeria in the period 1984 to 2005. While investor's sentiment is measured as market share turnover and value trade they exert a long run relationship and indicate a bi directional flow with economic growth.

Donwa and Odia (2010) used OLS to investigate the impact of capital market on economic growth in Nigeria from 1981 to 2008 applying range of econometric techniques the authors having total new issues, volume of transaction, total listed equities and Government stocks as variables for capital market, capital market does not impact significantly on economic growth during the sample year period.

Ojo and Adeusi (2012) applied the ADF, Johansen integration test and they found that Market capitalization has a positive impact on economic growth while Value of transaction traded number of deals and All Share Index are negatively related with growth in the long run.

Ezeoha *et al*(2009) employed the tools of econometric analysis to examine the impact of stock market on private investment in Nigeria spanning 1970 to 2006 and result indicates a positive long run relationship between stock market development and domestic investment in Nigeria.

Ogege and Ezike (2012) and Adenuga (2012) employed the vector error correction model using quarterly data of 1990 to 2009 findings revealed that stock market development has a positive influence on economic growth in Nigeria. Bernard and Austin (2012) examine the role of stock market on economic growth in Nigeria from 1999 to 2008 applying the OLS technique, result shows that market capitalization proxy as market capitalization has a negative effect on growth though not significant. Value traded ratio and turnover ratio proxy as market liquidity. The former has negative influence but not significant while the latter has a positive influence on economic growth in Nigeria.

4.METHODOLOGY

Table 1 Variable Measurement

Variables	Variables Definition
Economic Growth	Real GDP is used as proxy for economic growth
Market Size	Market Capitalization is used as proxy for Market size
Market Liquidity	Value Traded is used as proxy for market liquidity



Data

The data used for this study is time series spanning the period 1981 to 2010 and it is sourced from the CBN Statistical bulletin

Model specification

$$GDP = \beta_0 + \beta_1 Macap + Valtraded + \mu_t \dots \dots \dots (1)$$

$$LOGGDP = LOG\beta_0 + \beta_1 LOGMacap + \beta_2 LOGValtraded + LOG\mu_t \dots \dots \dots (2)$$

The estimated residuals are subject from OLS to differencing and the estimated differenced residual is regressed on their lags using the ADFGLS unit root diagnostic test for stationarity if stationary at first difference it is 1(1)

$$\Delta Y_t = \beta_0 + \beta_1 y_{t-1} + \sum \alpha_i \Delta y_{t-1} + \mu_t \dots \dots \dots (1)$$

Where

Δy = the first differenced values of series, β = intercept, β_1 = estimated parameter of first lag value of series, Y_{t-1} = first lag value of series variables, α_1 = vector of the estimated parameter of lagged value of differenced value series, ΔY_{t-1} = vector of lagged values of differenced value series, μ_t = white noise.

By log linearization the equation will be

$$LRGDP = \beta_0 + \beta_1 Lmacap + \beta_2 Lvaltraded + \mu_t \text{ where } \mu_t \sim 1(0) \dots \dots \dots (2)$$

The equation (2) shows when two or more series are cointegrated implying a long run relationship between series.

Where

Lrgdp= Natural log of real GDP, β_1 =estimated constant parameter or intercept, $lmacap_{t-1}$ =lag value of market capitalization as proxy of market size, β_1 = estimated coefficient vector of market capitalization, β_2 =estimated coefficient vector of value trade proxy as market liquidity, $lvaltraded_{t-1}$ =lagged value traded value. This implies that there will be linear combination between series

$$\mu_t = Lrgdp_t - \beta_1 malcap_{t-1} - \beta_2 Lvaltraded_{t-1} - \beta_0 \dots \dots \dots (3)$$

The Johansen cointegration test indicates the number of cointegration vectors which determine the presence of long run comparing the trace statistics and critical values or



Eigen value at most times. Thus the number of lag length is not done arbitrary rather it is determined by the final procedure error, Hannan-Quinn information criteria and AIC e.t.c.

The VECM in equation (4) is modeled to capture the nature of long run if any in Johansen cointegration analysis.

$$Lrgdp_t = \alpha_0 + \beta_1 lmacap_{t-1} + \beta_2 lvaltraded_{t-1} + \beta_0 \dots \dots \dots (4)$$

This will indicate the normalized cointegration coefficients demonstrating RGDP as dependent variables and other series as controlled, independent or explanatory variables.

$$EC_t = lrgdp_t + \beta_1 lmacap_{t-1} + \beta_2 lvaltraded_{t-1} + \beta_0 \dots \dots \dots (5)$$

While the RGDP normalizes as 1, it takes the form of dependent variable. However signs of coefficients in VECM equation changes as they were positive, all signs changes to negative in the interpretation and vice versa due to crossing of signs in equation (5). It becomes negative as indicated in equation (6)

$$lrgdp_t = -\beta_0 - \beta_1 lmacap_{t-1} - \beta_2 lvaltraded_{t-1} + \mu_t \dots \dots \dots (6)$$

The Granger causality test is administered in form of VAR approach to indicate the short run behavior or direction of causality between series and it is modeled as:

$$\Delta Y_t = \sum_{i=1}^n b_{1t} \Delta y_{t-1} + \sum_{i=1}^n C_{it} \Delta_{t-1} + \sum_{i=1}^n d_{it} \Delta Z_{t-1} + e_{it} \dots \dots \dots (7)$$

$$\Delta X_t = \sum_{i=1}^n b_{2t} \Delta Y_{t-1} + \sum_{i=1}^n C_{2t} \Delta X_{t-1} + \sum_{i=1}^n d_{2t} \Delta Z_{t-1} + e_{2t}$$

$$\Delta Z_t = \sum_{i=1}^n b_{3t} \Delta Y_{t-1} + \sum_{i=1}^n C_{3t} \Delta X_{t-1} + \sum_{i=1}^n d_{3t} \Delta Z_{t-1} + e_{3t}$$

4. RESULT AND DISCUSSION

Table 2 Result for ADFGLS Test

Variable	Level value	Differenced value
Natural log of GDP	-1.403(8)	-3.844(8)***
Natural log of market capitalization	-2.483(1)	-3.873(1)***
Natural log of value traded	-1.638(1)	-4.177(1)***

Source: Author's calculation using STATA software



The result for ADFGLS test indicates that all variables were not stationary at level value but were stationary at first difference and integrated of order one 1(1). This shows that there exists a cointegration between series.

Table 3 Result for Optimal Lag Length Selection to be Included in Cointegration Test

```
. varsoc lgdp lmarcap valtrade, maxlag(4) lutstats
```

Selection order criteria (lutstats)
Sample: 1985 2010 Number of obs = 26

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-401.483				6.5e+09	22.3696	22.3696	22.3696
1	-308.826	185.31	9	0.000	1.1e+07	15.9345	16.0599	16.37
2	-300.911	15.83	9	0.071	1.2e+07	16.018	16.2688	16.889
3	-275.098	51.626	9	0.000	3.5e+06	14.7247	15.1009	16.0312
4	-256.738	36.72*	9	0.000	2.0e+06*	14.0047*	14.5063*	15.7467*

Source: Author's calculation using STATA software

The test for optimal lag selection indicates that four (4) lags be included in subsequent analysis as defined by SBIC, HQIC FPE and LR.

Table 4 Result for Johansen Cointegration Test between Market Capitalization, Value Traded and Economic Growth

```
. vecrank lgdp lmarcap lvaltrade, lag (4)
```

Johansen tests for cointegration
Trend: constant Number of obs = 26
Sample: 1985 2010 Lags = 4

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	30	40.553095	.	33.1927	29.68
1	35	53.539171	0.63173	7.2205*	15.41
2	38	56.836925	0.22405	0.6250	3.76
3	39	57.149438	0.02375		

Source: Author's calculation using STATA software

The result for Johansen cointegration test indicates not more than one cointegration vector owing to trace statistics less than the critical value at rank one and two. This indicates a long run relationship between dependent and controlled variables since trace statistics is greater than the critical value at 5% level of significance. Thus, reject the null hypothesis of no long run relationship between series.



Table 5 Result for Vector Error Correction Model

Identification: beta is exactly identified

Johansen normalization restriction imposed						
beta	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
_ce1						
lrgdp	1	.	.	.	.	.
lmarcap	-.0355834	.0391515	-0.91	0.363	-.1123189	.0411521
lvaltrade	-.1188017	.0317276	-3.74	0.000	-.1809867	-.0566166
_cons	-11.39207	.	.	.	.	.

Source: Author's calculation using STATA software

The equation for Johansen normalized restriction imposed will be:

$$EC_t = lrgdp - .0355834 lmarcap_{t-1} - .1188017 lvaltraded_{t-1} - 11.39207$$

Rgdp is seen as the dependent variable since it has normalized as the dependent variable taking the form of 1.

$$lrgdp = 11.39207 + .355834 lmarcap_{t-1} + 1188017 lvaltraded_{t-1} + EC_t$$

(0.91)** (3.74) ***

The growth equation indicates that there is a positive relationship between (market size) market capitalization and Real GDP although not significant while (market liquidity) value traded has a positive and significant relationship with Real GDP. This finding is in line with sabiu *et al* (2011), Ogunmuyiwa (2010) and Bernard and Austin (2012). However, it is contrary with the findings by Agustin and Pius (2010) and Ojo and Adeusi (2012).

The short run relationship will be established using the Granger Causality through VAR representation. This will indicate the direction of causality or flow between series variables.

Table 6 Granger Causality Test

Dependent variable	Independent variable	Chi-Square	Remarks
Natural log of RGDP	Natural log of Market Capitalization	.0063595 (0.845)*	Market capitalization does not cause RGDP
Natural log of RGDP	Natural log of value traded	.0892673 (0.000)***	Value traded granger causes RGDP
Natural log of Market Capitalization	Natural log of RGDP	2.183506 (0.031)***	RGDP granger causes market capitalization
Natural log of Market Capitalization	Natural log of value traded	-.2584061 (0.068)***	Value traded granger causes market capitalization
Natural log of Value Traded	Natural log of RGDP	-.2581562 (0.837)*	RGDP does not cause value traded
Natural log of Value Traded	Natural log of market capitalization	1.263016 (0.000)***	Market capitalization granger causes value traded

Source: author calculation using STATA software



The result for granger causality test indicates that there is a bi-directional relationship between market capitalization and value traded in the stock exchange market. It also shows a uni-direction between market capitalization and Real GDP with causality running from RGDP to Market Capitalization. However, the result also reveals that value traded in the stock exchange market granger causes Real GDP in the short run.

6. CONCLUSION

This paper investigates empirically the impact of stock exchange market on economic growth in Nigeria applying time series data spanning 1981 to 2010. The study employs the diagnostic stationarity test which confirms stationarity of variables at first difference 1(1). Subsequently, the Johansen cointegration test indicates a long run relationship between series while the VECM posit a positive relationship between controlled variables of stock exchange market and economic growth in Nigeria. The granger causality test shows a bi-directional flow between market capitalization and value traded in stock market. Furthermore, there is a uni-direction between market capitalization and Real GDP with causality running from RGDP to Market Capitalization. Conversely, value traded granger causes Real GDP in the short run.

7. IMPLICATIONS FOR POLICY

The result for this sample period indicates evidence of positive impact of stock exchange market on economic growth in Nigeria. Policy implication for this study is that Nigeria stock exchange market remains a driver for sustainable growth and development generating domestic savings and surplus entities for medium and long term investmentboosting fixed capital formation (domestic investment) thus, a sound institutional framework for regulators and actors in the market and inspiring investor confidence cannot be understated for sustainable growth and development in Nigeria economy.

REFERENCES

1. Augustine U and S. I. Pius (2010) Stock Market Development and Economic Growth: Evidence from Nigeria European Journal of Economics, Finance and Administrative Sciences ISSN 1450-2275 Issue 25
2. Bernard A. U and A. A. Austin (2012): The role Stock Market Development on Economic Growth in Nigeria. A Time Series Analysis International Multidisciplinary Journal, Ethiopia Vol 6(1) 51-70.



3. Donwa P and J Odia (2010) An Empirical Analysis of the Impact of the Nigerian Capital Market on Her Socio-economic Development *Kamla-Raj J Soc Sci*, 24(2): 135-142
4. Ezeoha A., E. Ogamba, N. O Onyiuke (2009) Stock Market Development and Private Investment Growth in Nigeria, *Journal of Sustainable Development in Africa* Vol 11 no 2.
5. Joseph I. E. and E. D. Ose (2011) An Empirical Analysis of the impact of Capital Market Activities on the Nigerian Economy *JORIND* 9(2) December 1596 – 8308
6. Kolapo F. T. and A. O. Adaramola (2012) The Impact of the Nigerian Capital Market on Economic Growth *International Journal of Developing Societies vol 1(1)* 11-19
7. Lewis, W.A (1995) *Theory of Economic Growth* Homewood Richard D. Irwin
8. McKinnon, R (1995) *Money and Capital in Economic Development* Washington Brookings Institution
9. Muhammad, B.A.S. (2004) Assessment of the Nigerian Capital Market *Nigerian Journal of Accounting Research* Vol. 1(2)
10. Ogege S and J. E. Ezike (2012) Nigerian Capital Market and Economic Development: A Critical Appraisal *International Business Research*; Vol. 5(8).
11. Ogunmuyiwa M. S (2010) Investor's Sentiment, Stock Market Liquidity and Economic Growth in Nigeria *Kamla-Raj J Soc Sci*, 23(1): 63-67
12. Ojo O. M and S.O Adeusi (2012) Impact of Capital Market Reforms on Economic Growth: The Nigerian Experience *Australian Journal of Business and Management Research* 2 (2) 20-30
13. Riman H. B., I. E. Ezzo, E. Eyo (2008) Stock Market Performance and Economic Growth in Nigeria: A Causality Investigation. *Global Journal of Social Sciences* Vol 7 no 2 85-91
14. Rostow W. W. (1961) *Stages of Economic Development A Non Communist Manifesto*, Cambridge University Press
15. Sabiu M. O., I. P. Nwosa, A. M. Agbeluyi (2010) Financial Development, Foreign Direct Investment and Economic Growth in Nigeria, *Journal of Emerging Trends in Economic and Management Sciences* 2(2) 140-154.
16. Shaw, E. (1973) *Financial Deepening in Economic Development* New York Oxford University Press