A RESEARCH PAPER

ON

STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM NIGERIA

BY

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ABSTRACT

Considerable debate exists on how stock exchanges affect economic growth. One line of research argues that stock market development is a positive and significant contributor to growth. On the other hand, other studies show that stock markets negatively affect growth or that they are not relevant contributors to economic growth. This paper seeks to identify the correlation between stock market development and long-run economic growth in Nigeria using the Vector Error Correction modeling. Empirical results suggest that stock market development, as proxied by market capitalization to GDP ratio, does not contribute significantly to long-run economic growth in Nigeria. The implication of this findings is that the Nigerian economy has not gotten to the stage where the stock market can play critical economic development roles. However, efforts must be made to utilize the revenue from crude oil exports for investment in education, health, and capital goods to boost the country’s ailing manufacturing sector for sustainable development and set up robust institutions necessary for financial markets to flourish.

Keywords: Stock market development, Financial intermediation, Economic growth, Time series econometrics, Nigeria

JEL Classification: G23, O16
1. INTRODUCTION

Does stock market development contribute significantly to economic growth in Nigeria? To answer this question, this paper reviews the debate on the impact of stock market development on economic growth and presents new empirical evidence with respect to the Nigerian economy.

Empirically, disagreements exist on the importance and roles of stock exchanges on economic growth and development. One line of research argues that stock markets are integral for economic growth because of their fund mobilization and allocation functions. Levine (1991) and Bencivenga et al. (1996) argue that stock market liquidity improves growth through liquidity creation which makes investments less risky because savers can buy and sell an asset (equity) more cheaply and quickly. Furthermore, the work of Holmstrom and Tirole (1993) shows that liquid stock markets have the potential of strengthening corporate governance and encouraging investors to get information about firms. Also, a United Nations Conference on Trade and Development (UNCTD) and World Federation of Exchanges (WFE) 2017 report suggest that stock exchanges mobilize resources to facilitate growth and development by pooling domestic and foreign resources and making funds available to small and medium-sized enterprises (SMEs) and promote good ethical corporate governance by assisting SMEs to develop their management capacity and strengthen their governance structures and growth potential.

However, some authors argue that financial institutions and markets (including stock markets) do not contribute significantly to economic growth. According to Lucas (1988), economists exaggerate the development impact of financial institutions. Stiglitz (1994) in Levine and Zervos (1996) argues that stock market liquidity does not improve incentives for acquiring
information about firms and exerting corporate governance. In a critical appraisal of the Levine/Zervos model, Zhu et al. (2002) argue that stock market liquidity is not relevant for economic growth after controlling for outliers. Lastly, Mayer (1988) states that even large stock markets are not important for financing business corporations.

Evidence on the roles of stock exchanges and ways to improve the stock market in an economy is limited (see Demirgüç-Kunt and Levine 1996; UNCTD and WTF 2017), not to mention for the Nigerian economy. Given its potential to spur growth, it becomes imperative to investigate the association between Nigeria’s stock market and economic growth. Therefore, the objective of this paper is to determine the impact of stock market development on the long-run economic growth of Nigeria using data for the period of 1981 to 2017. I construct a constant elasticity growth model with the real gross domestic product as the dependent variable and market capitalization to GDP ratio (an indicator for the size of stock markets) as the key independent variable.

Also, I control for major determinants of economic growth in Nigeria such as the contributions of Nigeria’s manufacturing sub-sector and the agricultural sector to the real gross domestic product, revenue from crude oil export to GDP ratio, and credit to the private sector to GDP ratio (an indicator for financial depth). Therefore, I evaluate whether there is a strong positive relationship between stock market development and economic growth that is independent of other variables associated with economic growth in Nigeria. Furthermore, I employ time series data that extends the period of analysis to 2017 to find out if the results of earlier studies are consistent with the present situation. Most studies on how stock market development affects economic growth studied a cross-section of countries or countries in a
geographical region. Here, I conduct a case study analysis to better understand how stock market development affects Nigeria’s long-run economic growth.

This paper will empirically answer the following question emanating from the argument presented above. Does stock market development contribute significantly to long-run economic growth in Nigeria? I employ different empirical approaches to address the question posed by this study. First, I conduct a unit root test on the time series to determine whether they are stationary or nonstationary. Having established that the time series are nonstationary, I use the Johansen cointegration test to determine if there is a long-run, or equilibrium, relationship among the variables. Since the time series are cointegrated, I adopt the vector error correction mechanism to study the long-run and short-run relationships between the stock market and economic growth and the speed of adjustment of Nigeria’s economic growth to its equilibrium value. I find that stock market development, as proxied by market capitalization to GDP ratio, has a positive but insignificant impact on Nigeria’s long-run economic growth. I conclude that, after controlling for major determinants of growth in Nigeria, stock market development does not contribute significantly to long-run economic growth in Nigeria.

The remainder of the paper is organized as follows. Section 2 presents the literature review and section 3 presents the research methods. Results and discussions are reported in section 4. A final section gives the conclusion and recommendations.

2. LITERATURE REVIEW

Important debate exists on the relationship between stock market development and economic growth. Some results show that stock market development is a positive and significant contributor to economic growth. On the contrary, other results argue that stock markets are not
relevant to economic growth. This section presents the results of those studies with an emphasis on developing countries.

In a broad cross-section of 80 developed and developing countries using data averaged over 1960-1989, King and Levine (1993) study the link between financial development and economic growth. They find that financial development and growth are strongly and positively associated with economic growth indicators. Similarly, Mohtadi and Agarwal (2001) examine the relationship between stock market development and economic growth for 21 emerging markets over 21 years. They conclude that the performance of stock markets positively affects economic growth and also encourages private investment.

Using data on 47 developed and developing countries from 1976 to 1993, Levine and Zervos (1996) show that stock market liquidity and banking development positively predict growth, productivity, and capital formation, even after accounting for economic and political determinants of growth. Christopoulos and Tsiona (2004) investigate the long-run relationship between financial depth and economic growth for 10 developing countries. The empirical results support the view that financial depth is a positive contributor to growth, and that there is a one-way causality from financial depth to economic growth.

In a study of 16 selected low-income countries for the period of 20 years from 1995 to 2014, Bist (2018) investigates the long-run association between financial development and economic growth using panel cointegration analysis and confirms that financial development has a positive and significant impact on economic growth. Also, Beck and Levine (2001) analyze the impact of stock markets and banks on economic growth using a panel dataset for 40 countries
over the period 1976-1998. The results support the view that stock markets and banks positively influence economic growth and these findings are not due to endogeneity-induced biases.

On the other hand, some studies argue that financial (stock market) development does not contribute to growth. For example, in a study of 18 Sub-Saharan African countries, Demetriades and James (2011) suggest that there is no connection between bank credit and growth in Sub-Saharan Africa. Studying 84 countries covering the period 1975 to 2004, Demetriades and Rousseau (2015) provide evidence that financial depth is no longer a significant determinant of long-run growth. Similarly, Ananwude and Osakwe (2017) analyzed the short-run and long-run relationship between stock market development and economic growth in Nigeria from 1981 to 2015. The results show that stock market development is not important for Nigeria’s economic growth.

Also, Gries et al. (2009) analyze the causality between financial deepening and economic development for 16 sub-Saharan African countries. The empirical result states that the countries studied have not gained from financial deepening. Furthermore, Menyah et al. (2014) examine the causal relationship between financial development and economic growth for 21 African countries by constructing a financial development index based on four different financial development indicators. The results show that financial development has not made a significant impact on growth.

Based on the results of most studies reviewed, stock markets, or financial development in general, does not have a significant impact on the economic growth of African countries (Gries et al. 2009; Menyah et al. 2014). In an attempt to explain African financial underdevelopment, Andrianova et al. (2010) estimated an econometric model based on a dataset of African banks
and the empirical results suggested that the main reasons for the problem are unchecked moral hazard (banks’ inability to identify borrowers with no intention of repaying the loan) or adverse selection (bank’s inability to identify borrowers with poor investment projects). Also, they found that banks’ lending behavior does not depend on the level of economic growth and that a poor institutional framework has a more negative impact on bank lending than the high default rate.

3. RESEARCH METHODS

This study employs pre-estimation analysis such as graphical (trend) analysis, descriptive statistics and unit root test using the Augmented Dickey-Fuller (ADF) test. The graphical (trend) analysis and the descriptive statistics are used to reveal the behavior of the time series while the ADF test is applied to find out if the time series is stationary or nonstationary. The Johansen cointegration test is used to determine the long-run, or equilibrium, relationship among the time series; while the vector error correction model gives the long-run and short-run relationships between the stock market and economic growth and the speed of adjustment of Nigeria’s economic growth to its equilibrium value.

3.1. Theoretical Framework and Model Specification

I base this study on Levine and Zervos’ (1996) study of stock market development and long-run growth, over the period 1976 to 1993, in two ways. First, I use stock market development indicator that accounts for the size of stock markets (market capitalization to GDP ratio) to proxy stock market development. Second, I adopt the linear growth regression equation which expresses growth rate in terms of a composite stock market development variable and other explanatory variables such as initial income, initial education, political instability, the ratio
of government consumption expenditures to GDP, the inflation rate, and the black market exchange rate premium.

I formulate the constant elasticity model of this study as:

\[
\ln(RGDP_t) = \beta_0 + \beta_1\ln(MKTCAP_t) + \beta_2\ln(MANUFAC_t) + \beta_3\ln(AGRIC_t) + \\
\beta_4\ln(OILEXPT_t) + \beta_5\ln(CREDITPS_t) + U_t
\]

where \(\ln(RGDP)\), the dependent variable, is the natural logarithm of real gross domestic product; \(\ln(MKTCAP)\), the natural logarithm of market capitalization to GDP ratio, measures the size of the stock market. Market capitalization is the total value of listed shares on the Nigerian Stock Exchange; \(\ln(MANUFAC)\) is the natural logarithm of the manufacturing sub-sector contribution to Nigeria’s RGDP; \(\ln(AGRIC)\) is the natural logarithm of the agricultural sector’s contribution to RGDP, \(\ln(OILEXPT)\) is the natural logarithm of crude oil export revenue to GDP ratio, and \(\ln(CREDITPS)\) is the natural logarithm of credit to the private sector to GDP ratio. \(U_t\) is the error term assumed to be normally distributed. All the partial slope estimates (\(\beta_1, \beta_2, \beta_3, \beta_4, \text{ and } \beta_5\)) are expected to be positive.

4. DATA, RESULTS, AND DISCUSSION

The type of data required for this study is annual time series data sourced from the 2018 statistical bulletin of the Central Bank of Nigeria (CBN) for the period 1981 to 2017. The number of observations is 37, which is a large sample. All the time series data were initially expressed in Naira (billion) before transformations.
4.1. Graphical (Trend) Analysis

Figures 1 and 2 are graphs of the data for Real Gross Domestic Product (RGDP) and Market Capitalization (MKTCAP), both in billion Naira. The first impression we get from these graphs is that both time series seem to be “trending” upward. The RGDP (at 2010 constant prices) maintained an increasing trend for most of the period under review. In the year 1981, RGDP was ₦15,258.00 billion; it rose to ₦19,305.63 billion in the year 1990. Ten years later, RGDP was at ₦23,688.28 billion and in 2010, its value increased to ₦54,612.26 billion. The fall in global crude oil prices in 2015 plunged the Nigerian economy into recession and the RGDP fell from ₦69,023.93 in 2015 to ₦67,931.24 in 2016. RGDP in Nigeria witnessed an all-time high of ₦69,023.93 billion in 2015, a record low of ₦13,779.26 billion in 1984 and averaged ₦32,749.95 billion from 1981 to 2017.

From Figure 2, Market Capitalization (MKTCAP) maintained an increasing trend, albeit with fluctuations, for most of the period under review. It stood at ₦5.00 billion in 1981; increased to ₦16.30 billion in 1990; greatly rose to ₦472.30 billion in 2000; another giant stride, ₦9,918.21 billion, was recorded in 2010 and ₦21,128.90 billion in 2017. MKTCAP in Nigeria reached an all-time high of ₦21,128.90 billion in 2017; a record low of ₦5.00 billion in 1982 and 1983, and averaged ₦4,594.424 billion.
4.2. Descriptive Statistics

The characteristics of the distribution of the variables are presented in Table 1 below. Skewness and Kurtosis are measures of shape. That is, they provide insights into the shape of a distribution. Specifically, skewness is a measure of symmetry in a distribution. A perfectly symmetrical dataset (for example, a normal distribution) will have a skewness of zero. All the
variables are positively skewed, implying that they have longer right tails. Kurtosis measures the tailedness of a distribution. A normally distributed dataset will have a kurtosis of 3. Since the kurtosis statistics of MANUFAC and CREDITPS exceed 3, they are leptokurtic (more outliers) relative to normal; while RGDP, MKTCAP, AGRIC, and OILEXPT are platykurtic (fewer outliers) relative to normal. The Jarque-Bera is a test for normality and a normally distributed dataset will have a Jarque-Bera value of zero. Based on the $p$-values, I conclude that RGDP, AGRIC, and OILEXPT are normally distributed at 5 percent level of significance and MKTCAP is normally distributed at 1 percent level of significance.

**Table 1: Descriptive Statistics (Billion Naira)**

<table>
<thead>
<tr>
<th></th>
<th>RGDP</th>
<th>MKTCAP</th>
<th>MANUFAC</th>
<th>AGRIC</th>
<th>OILEXPT</th>
<th>CREDITPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>32749.95</td>
<td>4594.424</td>
<td>2615.073</td>
<td>7427.291</td>
<td>4187.033</td>
<td>4547.632</td>
</tr>
<tr>
<td>Median</td>
<td>22449.41</td>
<td>300.0000</td>
<td>1758.606</td>
<td>4703.644</td>
<td>1286.216</td>
<td>431.1684</td>
</tr>
<tr>
<td>Maximum</td>
<td>69023.93</td>
<td>21128.90</td>
<td>6684.218</td>
<td>17179.50</td>
<td>14323.15</td>
<td>22290.66</td>
</tr>
<tr>
<td>Minimum</td>
<td>13779.26</td>
<td>5.000000</td>
<td>1018.907</td>
<td>2303.505</td>
<td>7.201200</td>
<td>8.570050</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>18889.20</td>
<td>6760.654</td>
<td>1707.070</td>
<td>4958.767</td>
<td>5023.337</td>
<td>7195.179</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.801592</td>
<td>1.189917</td>
<td>1.410600</td>
<td>0.649675</td>
<td>0.857408</td>
<td>1.384191</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.141006</td>
<td>2.881205</td>
<td>3.565347</td>
<td>1.893251</td>
<td>2.220295</td>
<td>3.362866</td>
</tr>
<tr>
<td>Probability</td>
<td>0.078084</td>
<td>0.012568</td>
<td>0.001692</td>
<td>0.105864</td>
<td>0.064873</td>
<td>0.002456</td>
</tr>
<tr>
<td>Observations</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

*Source:* Author’s computation (2018)

### 4.3. Unit Root Test

I employ the Augmented Dickey-Fuller (ADF) test to determine if the time series are stationary or non-stationary (Dickey and Fuller, 1981; Said and Dickey, 1984). The results of the Augmented Dickey-Fuller test (with intercept and with intercept and trend) are shown in Table 2
and Table 3 respectively, for all the variables. As revealed, all the variables are integrated of order one, $I(1)$; that is, they are nonstationary.

Table 2: ADF Test on all the Time Series - with intercept

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF value before first differencing</th>
<th>ADF value after first differencing</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(RGDP)</td>
<td>0.0321</td>
<td>-3.3397**</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(MKTCAP)</td>
<td>-0.8568</td>
<td>-5.8049***</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(MANUFAC)</td>
<td>0.5311</td>
<td>-5.1736***</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(AGRIC)</td>
<td>0.1453</td>
<td>-5.7963***</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(OILEXPT)</td>
<td>-2.0546</td>
<td>-5.3088***</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(CREDITPS)</td>
<td>-0.9138</td>
<td>-5.8660***</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Source: Author’s computation (2018)

Notes: ADF Critical values: 1% level: −3.63; 5% level: −2.95; 10% level: −2.61.

*** and ** denote stationary at 1% and 5% levels of significance, respectively.

Table 3: ADF Test on all the Time Series - with intercept and trend

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF value before first differencing</th>
<th>ADF value after first differencing</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(RGDP)</td>
<td>-2.4213</td>
<td>-3.2593*</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(MKTCAP)</td>
<td>-2.5590</td>
<td>-5.7167***</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(MANUFAC)</td>
<td>-2.2680</td>
<td>-5.7133***</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(AGRIC)</td>
<td>-2.0971</td>
<td>-5.7399***</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(OILEXPT)</td>
<td>-1.8559</td>
<td>-5.1630***</td>
<td>I(1)</td>
</tr>
<tr>
<td>ln(CREDITPS)</td>
<td>-2.0232</td>
<td>-5.8169***</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Source: Author’s computation (2018)

Notes: ADF Critical values: 1% level: −4.24; 5% level: −3.54; 10% level: −3.20.

*** and * denote stationary at 1% and 10% levels of significance, respectively.
4.4. Cointegration Test

Since all the time series are $I(1)$, I employ Johansen cointegration test to determine if there is a long run, or equilibrium, relationship among the variables (see Johansen and Juselius 1990). This test requires that all the time series be integrated of the same order (that is, integrated of order one). Before determining the cointegrating rank ($r$), the lag order must be known. In practice, it is chosen by one of the model selection criteria based on the levels VAR (Vector Autoregressive) model. In this paper, the VAR order 1 was chosen using the Schwarz criterion. This criterion was chosen because of its ability to choose the order correctly in large samples.\(^1\)

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Trace Statistic</th>
<th>0.05 Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r = 0^*$</td>
<td>0.731727</td>
<td>116.3100</td>
<td>95.75366</td>
<td>0.0009</td>
</tr>
<tr>
<td>$r \leq 1^*$</td>
<td>0.543653</td>
<td>70.25870</td>
<td>69.81889</td>
<td>0.0461</td>
</tr>
<tr>
<td>$r \leq 2$</td>
<td>0.373187</td>
<td>42.80116</td>
<td>47.85613</td>
<td>0.1375</td>
</tr>
<tr>
<td>$r \leq 3$</td>
<td>0.318668</td>
<td>26.45243</td>
<td>29.79707</td>
<td>0.1158</td>
</tr>
<tr>
<td>$r \leq 4$</td>
<td>0.242970</td>
<td>13.02271</td>
<td>15.49471</td>
<td>0.1140</td>
</tr>
<tr>
<td>$r \leq 5$</td>
<td>0.089467</td>
<td>3.280362</td>
<td>3.841466</td>
<td>0.0701</td>
</tr>
</tbody>
</table>

Source: Author’s computation (2018)
Notes: Trace test indicates 2 cointegrating eq(s) at the 0.05 level
*denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) $p$-values

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Max-Eigen Statistic</th>
<th>0.05 Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r = 0^*$</td>
<td>0.731727</td>
<td>46.05130</td>
<td>40.07757</td>
<td>0.0095</td>
</tr>
<tr>
<td>$r \leq 1$</td>
<td>0.543653</td>
<td>27.45754</td>
<td>33.87687</td>
<td>0.2397</td>
</tr>
<tr>
<td>$r \leq 2$</td>
<td>0.373187</td>
<td>16.34873</td>
<td>27.58434</td>
<td>0.6360</td>
</tr>
<tr>
<td>$r \leq 3$</td>
<td>0.318668</td>
<td>13.42972</td>
<td>21.13162</td>
<td>0.4135</td>
</tr>
<tr>
<td>$r \leq 4$</td>
<td>0.242970</td>
<td>9.742347</td>
<td>14.26460</td>
<td>0.2294</td>
</tr>
<tr>
<td>$r \leq 5$</td>
<td>0.089467</td>
<td>3.280362</td>
<td>3.841466</td>
<td>0.0701</td>
</tr>
</tbody>
</table>

Source: Author’s computation (2018)
Notes: Max-Eigenvalue test indicates 1 cointegrating eq(s) at the 0.05 level
*denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) $p$-values

\(^1\) See Paulsen (1984) and Tsay (1984) for proof that the consistency property of Schwarz criterion is maintained for integrated processes.
The trace and maximum Eigenvalue statistics reject the null hypothesis of no cointegration and suggest that there is at least one cointegrating equation, at 5 percent level of significance. Hence, the cointegrating rank \( r \) is 1. The implication of this result is that, for although all the time series are individually nonstationary, \( I(1) \); that is, they have stochastic trends, their linear combination is stationary, \( I(0) \). The linear combination cancels out the stochastic trends in the six time series. In this case, I state that the six variables are cointegrated. Cointegration makes regressions involving \( I(1) \) variables to be meaningful and not spurious (Granger and Newbold, 1974).

4.5. Vector Error Correction Modeling (VECM)

Since the variables are all \( I(1) \) and cointegrated, I apply the VECM to estimate the long-run and the short-run impacts of the explanatory variables on the dependent variable. The VECM takes all the variables as endogenous.

4.5.1. Short-Run Model and Result

I have established that eq. (1) is cointegrated; that is, there is a long run, or equilibrium, relationship among the time series. However, there may be disequilibrium in the short run. Therefore, one can treat the error term in eq. (1) as the Error Correction Term (ECT). And we can use this error term to tie the short-run behavior of \( ln(RGDP) \), the dependent variable, to its long-run value. This is called the Vector Error Correction Model (VECM).

Having identified the VAR order \( p \) as 1 using the Schwarz Criterion for the cointegration test, we can also use this VAR order to choose the number of lagged differences in a VECM because \( p-1 \) lagged differences in a VECM correspond to a VAR order \( p \) (Lütkepohl, 2005). Hence, once we know \( p \), we know the number of lagged differences. As a result, in this VECM
based on Schwarz criterion, no lagged differences appear because 1 minus 1 is zero. I formulate the vector error correction model in a general form as:

\[
\Delta \ln RGDP_t = \beta_0 + \sum_{i=0}^{p-1} \beta_i \Delta \ln(RGDP_{t-i}) + \sum_{m=0}^{p-1} \beta_m \Delta \ln(MKTCAP_{t-m}) + \sum_{n=0}^{p-1} \beta_n \Delta \ln(MANUFAC_{t-n}) \\
+ \sum_{p=0}^{p-1} \beta_p \Delta \ln(AGRIC_{t-p}) + \sum_{r=0}^{p-1} \beta_r \Delta \ln(OILEXPT_{t-r}) + \sum_{c=0}^{p-1} \beta_c \Delta \ln(CREDITPS_{t-c}) + \varphi ECT_{t-1} + \epsilon_t
\]

where \(\Delta\) is the first difference operator, \(p\) is the lag order and \(\epsilon_t\) is the random error term. Based on \textit{a priori} expectation, I expect \(\varphi\), the coefficient of \(ECT_{t-1}\), to be negative and statistically significant.

The result of eq. (2) above is presented below in Table 6 as:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>(t)-statistic</th>
<th>(p)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C)</td>
<td>0.041711</td>
<td>0.00534</td>
<td>7.80961</td>
<td>0.0000</td>
</tr>
<tr>
<td>(ECT_{t-1})</td>
<td>-0.471352</td>
<td>0.08846</td>
<td>-5.32837</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

\(n = 36\) \quad \text{\(R^2 = 0.455\)} \quad \text{\(\text{Adj. } R^2 = 0.439\)} \quad \text{\(F\)-stat. (\(p\)-value) = 28.39 (0.0000)}

\textbf{Source:} Author’s computation (2018)

As revealed, the coefficient of \(ECT_{t-1}\) appears with the expected negative sign and it is statistically significant at 5 percent level of significance. This confirms that the time series are indeed cointegrated. The coefficient of \(ECT_{t-1}\) implies that the system adjusts any disequilibrium towards long-run equilibrium at about 47.1 percent speed of adjustment annually. There is no short-run dynamics among the variables.

The R-Squared is 0.455 and suggests that the variation in the dependent variable that is explained by the independent variable is 45.5 percent, the remaining 54.5 percent is explained by other factors that affect the \(\ln(RGDP)\) but are not included in the model but are accounted for by the error term. The \(F\)-statistic tests the overall significance of the regression. The overall
regression is found to be significant at 5 percent level of significance because its \( p \)-value is less than 0.05.

4.5.2. Long-Run (Cointegrating) Model and Result

The cointegrating equation for testing the long-run impact of the regressors on \( \ln(RGDP) \) is specified as:

\[
ECT_{t-1} = \ln(RGDP_{t-1}) - \beta_0 - \beta_1 \ln(MKTCAP_{t-1}) - \beta_2 \ln(MANUFAC_{t-1}) - \beta_3 \ln(AGRIC_{t-1}) - \beta_4 \ln(OILEXPT_{t-1}) - \beta_5 \ln(CREDITPS_{t-1})
\]

where \( ECT_{t-1} \) is the lagged error correction term because a linear combination of eq. (1) is \( I(0) \).

The result of eq. (3) above, with 36 included observations, derived from vector error correction mechanism is presented as:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>( t )-statistic</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \ln(MKTCAP_{t-1}) )</td>
<td>0.023416</td>
<td>0.02928</td>
<td>0.79965</td>
<td>0.4302</td>
</tr>
<tr>
<td>( \ln(MANUFAC_{t-1}) )</td>
<td>0.069261</td>
<td>0.04328</td>
<td>1.60033</td>
<td>0.1200</td>
</tr>
<tr>
<td>( \ln(AGRIC_{t-1}) )</td>
<td>0.688153</td>
<td>0.04984</td>
<td>13.8077</td>
<td>0.0000</td>
</tr>
<tr>
<td>( \ln(OILEXPT_{t-1}) )</td>
<td>0.046733</td>
<td>0.01697</td>
<td>2.75440</td>
<td>0.0099</td>
</tr>
<tr>
<td>( \ln(CREDITPS_{t-1}) )</td>
<td>0.092352</td>
<td>0.04052</td>
<td>2.27916</td>
<td>0.0299</td>
</tr>
<tr>
<td>( C )</td>
<td>3.666174</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Source: Author’s computation (2018)

Note: n/a means not applicable.

There is a positive association between \( \ln(MKTCAP) \) and \( \ln(RGDP) \). However, the size of the impact is not statistically and economically significant. This means that stock market development, as proxied by market capitalization to GDP ratio, does not contribute significantly to Nigeria’s long-run economic growth. This result suggests that the Nigerian economy has not gotten to the development stage and/or does not have the institutions necessary for the proper

\footnote{The variables are in lag 1 as suggested by the Schwarz criterion.}
functioning of the stock market (Goldsmith, 1969; Herger et al., 2008). Similarly, \( \ln(\text{MANUFAC}) \) has a positive but insignificant impact on \( \ln(\text{RGDP}) \). This result underscores the poor performance of the Nigerian manufacturing sector. As a result, Nigeria remains dependent on imported goods. The Nigerian government must use the revenue from crude oil exportation for investment in capital goods to encourage the diversification of the economy and to ensure sustainable development (Okonjo-Iweala, 2012).

In the long run, \( \ln(\text{AGRIC}) \) is positively correlated with \( \ln(\text{RGDP}) \) and the impact is both statistically and economically relevant. This result underlines the important role the agricultural sector plays in the Nigerian economy and calls for more efforts towards developing the sector. Similarly, \( \ln(\text{OILEXPT}) \) has a positive and significant impact on \( \ln(\text{RGDP}) \). The Nigerian economy is a monocultural one based on crude oil exportation. The volatility of oil prices, depleting nature of crude oil, and the current move towards renewable energy suggest the urgent need to diversify the Nigerian economy. Likewise, \( \ln(\text{CREDITPS}) \) has a positive and significant impact on \( \ln(\text{RGDP}) \).

4.5.3. Model Diagnostics

Table 8 below presents the results of the serial correlation and heteroscedasticity tests with 36 included observations. We accept the null hypothesis in both cases at 5 percent level of significance since the \( p \)-values are greater than 0.05 and conclude that the vector error correction result is robust.

<table>
<thead>
<tr>
<th>Test</th>
<th>Null hypothesis</th>
<th>Test Statistic</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autocorrelation LM Test</td>
<td>No Serial Correlation at lag 1</td>
<td>37.7515</td>
<td>0.3892</td>
</tr>
<tr>
<td>White Test (with cross terms)</td>
<td>Homoscedasticity</td>
<td>35.8987</td>
<td>0.7348</td>
</tr>
</tbody>
</table>

Source: Author’s computations (2018)
In addition, I checked the stability of the model to ascertain if it is dynamically stable using the Cumulative Sum (CUSUM) test presented by Brown et al. (1975). Since the CUSUM line falls within the 5% significance lines, I conclude that the coefficients are dynamically stable and that there is no structural break. Therefore, these results are good for forecasts.

**Figure 3: Plot of Cumulative Sum of Recursive Residual**

![Cumulative Sum of Recursive Residual](image)

5. **CONCLUSION AND RECOMMENDATIONS**

This paper has followed a systematic and logical process to investigate the long-run impact of the size of Nigeria’s stock market on Nigeria’s economic growth from 1981 and 2017. The unit root test shows that all the variables are integrated of order 1, $I(1)$. The Johansen cointegration test provided evidence of a long-run relationship among the variables and the vector error correction model was used to determine the short-run and long-run estimates and the speed of adjustment.

The estimated results show that market capitalization to GDP ratio (a proxy for the size of Nigeria’s stock market) is no relevant for Nigeria’s long-run economic growth. This result agrees with the findings of Ananwude and Osakwe (2017). Based on the findings of this
research, I recommend that the revenue from crude oil exports be efficiently utilized for investment in education, health, and capital goods to boost the country’s ailing manufacturing sector for sustainable development. Also, there is a need for the establishment of robust economic and political institutions necessary for financial markets to thrive.

Although this paper has shed light on the nature of the relationship between the size of Nigeria’s stock market and economic growth, more work remains to be done to improve our understanding of how stock exchanges affect economic growth in Nigeria. Due to insufficient data, this study only analyzed the impact of the size of Nigeria’s stock market (market capitalization to GDP ratio) on economic growth. Further research should study how the liquidity (ease of buying and selling securities) and volatility of the stock market affect economic growth in Nigeria. Such studies could study the policies that will work better towards the creation of an environment that ensures the development of a well-functioning Nigerian stock exchange.
REFERENCES


