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A RESEARCH PAPER

ON

STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM NIGERIA

BY

OBINNA FRANKLIN EZEIBEKWE

E-NUMBER: E12564151

SUPERVISOR: PROFESSOR MUKTI P. UPADHYAY

DEPARTMENT OF ECONOMICS,
EASTERN ILLINOIS UNIVERSITY,
CHARLESTON, IL, USA.
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 it is not a significant contributor to economic growth. This paper seeks to identify the empirical relationship between stock market development and long-run economic growth in Nigeria. 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.

Keywords: Stock market development, Financial institution, Financial intermediation, Economic growth, Time series econometrics
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 (the ease of buying and selling equities) engenders growth. 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. In addition, King and Levine (1993) show that capital accumulation, productivity, and sustained economic growth depend on the level of financial intermediation. Also, Greenwood and Smith (1997) prove that large stock markets ease savings mobilization thereby encouraging capital formation.

On the other hand, some authors argue that financial institutions (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 markets liquidity does not improve incentives for acquiring information about firms and exerting corporate governance. In a critical appraisal of Levine/Zervos model, Zhu et al. (2002) argue that when one properly controls for outliers, stock market liquidity no longer exerts any statistically observable influence on GDP growth. Furthermore, Mayer (1988) states that even large stock markets are not important for financing business corporations.
The importance of stock exchanges cannot be overemphasized. A United Nations Conference on Trade and Development (UNCTD) and World Federation of Exchanges (WFE) 2017 report identified two crucial roles stock exchanges play in an economy. First, 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). In addition, stock exchanges promote good corporate governance by assisting SMEs to develop their management capacity and strengthen their governance structures and growth potential. In addition, Levine (1991) posits that stock markets improve growth through liquidity creation which makes investments less risky because savers can buy and sell an asset (equity) more cheaply and quickly. It is worthy to note that certain enabling institutional structures and relevant policies affect the ability of a stock market to perform these functions efficiently.

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 if stock market development contributes to economic growth in Nigeria. This study is set up to shed light on how stock market development affects economic growth in Nigeria. I construct a multidimensional constant elasticity 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 vector error correction mechanism to study the speed of adjustment of the dependent variable to its equilibrium value. Hence, the objective of this paper is to determine the impact of stock market development on long-run economic growth of Nigeria from 1981 to 2017. 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

Considerable 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 by emphasizing its importance in easing savings mobilization (Greenwood and Smith 1997), providing liquidity (Bencivenga and Smith 1991; Levine 1991), promoting the acquisition and dissemination of information about firms (Boyd and Prescott 1986; Holmstrom and Tirole 1993), encouraging small and medium-sized enterprises by making funds available to them (UNCTD and WTF 2017), and diversifying risk through internationally integrated stock markets (Obstfeld 1994). However, other results argue that stock market development does not contribute positively to growth or that it is not a significant contributor to economic growth.

In a broad cross-section of 80 countries using data averaged over 1960-1989, King and Levine (1993) show that the financial system can promote economic growth. Various measures of financial development (the size of the formal financial intermediary sector relative to GDP, the importance of banks relative to the central bank, the percentage of credit allocated to private firms, and the ratio of credit issued to private firms to GDP) are strongly and positively associated with economic efficiency improvement, physical capital accumulation and real per capita GDP growth.

Similarly, Mohtadi and Agarwal (2001) examine the relationship between stock market development and economic growth for 21 emerging markets over 21 years, using a dynamic panel method and conclude that several indicators of the stock market performance positively affect economic growth and also stimulate the behavior of private investment. Levine and Zervos
(1996), using data on 47 countries from 1976 through 1993, show that stock market liquidity and banking development both positively predict growth, capital accumulation, and productivity when entered together in regressions, even after accounting for economic and political factors. The results corroborate the view that financial markets provide important services for 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 relationship 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) investigate the impact of stock markets and banks on economic growth using a panel dataset for 40 countries over the period 1976-1998 and applying the GMM techniques developed for dynamic panels. They find that stock markets and banks positively influence economic growth and these findings are not due to potential biases induced by simultaneity, omitted variables or unobserved country-specific effects.

Furthermore, Boubakari and Jin (2010) explore causality relationship between stock market and economic growth based on the time series data compiled from 5 Euronext countries (Belgium, France, Portugal, Netherlands and United Kingdom) for the period 1995: Q1 to 2008: Q4. The results of the study suggest a positive link between the stock market and economic growth for some countries for which the stock market is and highly active. However, the causality relationship is rejected for the countries in which the stock market is small and less liquid.

Also, a positive and significant relationship between financial development and growth has been recorded in sub-Saharan African countries. Ghirmay (2005) explores the causal link
between the level of financial development and economic growth in 13 sub-Saharan African countries. The results of the cointegration analysis provide evidence of the existence of a long-run relationship between financial development and economic growth in 12 out of 13 of the countries.

On the other hand, some studies argue that financial (stock market) development does not contribute to growth. Demetriades and James (2011), in a study of 18 Sub-Saharan African countries, suggest that the link between finance and growth in Sub-Saharan Africa is ‘broken’ and that there is no link between bank credit and economic growth. In addition, Rousseau and Wachtel (2011) show that financial development is no longer a strong contributor to growth in more recent data as it was in studies with data for the period from 1960 to 1989. Arcand et al. (2011) suggest that finance starts having a negative effect on output growth when credit to the private sector reaches 80-100% of GDP. In a study of 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. Ananwude and Osakwe (2017) applied the Ordinary Least Square and Autoregressive Distributive Lag (ARDL) models to determine 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 has a positive but insignificant effect on long-run economic growth.

In summary, there are divergent results on how stock market development affects economic growth. Some authors like King and Levine (1993), Levine and Zervos (1996), Mohtadi and Agarwal (2001) and Ghirmay (2005) suggest that financial (stock market) development positively and significantly contribute to growth; other authors such as Demetriades and James (2011) and Rousseau and Wachtel (2011) argue otherwise. These discrepancies in
results and conclusions can be attributed to factors such as different types of estimators used, different countries or groups of countries studied, different sample sizes and data sources, and the use of different indicators to proxy stock market development and financial depth.

3. **RESEARCH METHODS**

This study employs pre-estimation analysis such as graphical (trend) analysis, descriptive statistics and unit root test using 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 is used to tie the short-run behavior of the dependent variable to its long-run 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 can be expressed as:

\[ GROWTH = \alpha X + \beta(STOCK) + U \]

where GROWTH, the dependent variable, is the real per capita growth rate averaged over the relevant period; STOCK is the index of stock market development; \( \alpha \) is a vector of coefficients of the variables in \( X \); \( \beta \) is the estimated coefficient on \( STOCK \); and \( X \) is a set of control variables.
which includes initial income, initial education, a measure of political instability, the ratio of
government consumption expenditures to GDP, the inflation rate, and the black market exchange
rate premium.

Drawing from the regression equation above, I formulate the 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 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’s 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 which accounts for various errors, such as errors of omitted variables, errors of
measurement of the dependent variable, errors of the mathematical form of the model and the
effects of the erratic element which is inherent in human behavior. 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 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 (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 normal distribution will have a kurtosis of 3. Since the kurtosis statistics of MANUFAC and CREDITPS exceed 3, they are leptokurtic (peaked) relative to normal; while RGDP, MKTCAP, AGRIC, and OILEXPT are platykurtic (flat) 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, we 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)**

**Sample:** 1981-2017

<table>
<thead>
<tr>
<th>Source</th>
<th>RGDP</th>
<th>MKTCAP</th>
<th>MANUFAC</th>
<th>AGRIC</th>
<th>OILEXPT</th>
<th>CREDITPS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></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><strong>Median</strong></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><strong>Maximum</strong></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><strong>Minimum</strong></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><strong>Std. Dev.</strong></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><strong>Skewness</strong></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><strong>Kurtosis</strong></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><strong>Jarque-Bera</strong></td>
<td>5.099938</td>
<td>8.753150</td>
<td>12.76312</td>
<td>4.491192</td>
<td>5.470657</td>
<td>12.01823</td>
</tr>
<tr>
<td><strong>Probability</strong></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><strong>Sum</strong></td>
<td>1211748.</td>
<td>169993.7</td>
<td>96757.70</td>
<td>274809.8</td>
<td>154920.2</td>
<td>168262.4</td>
</tr>
<tr>
<td><strong>Sum Sq. Dev.</strong></td>
<td>1.28E+10</td>
<td>1.65E+09</td>
<td>1.05E+08</td>
<td>8.85E+08</td>
<td>9.08E+08</td>
<td>1.86E+09</td>
</tr>
<tr>
<td><strong>Observations</strong></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 (see 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 has to 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 4: Unrestricted Cointegration Rank Test (Trace)

<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 eqn(s) at the 0.05 level
*denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 5: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

<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 eqn(s) at the 0.05 level
*denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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\(^1\) 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, 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 (see Granger and Newbold 1974).

4.5. Cointegrating Equation (Long-Run Model)

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 (2) is stationary.

The result of (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.
In the long run, $ln(MKTCAP)$ has a positive but insignificant impact on $ln(RGDP)$ at 5 percent level of significance. A percent increase in $ln(MKTCAP)$ will result in 0.023 percent increase in $ln(RGDP)$ on average, all things being equal. 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. In the long run, $ln(MANUFAC)$ has a positive and insignificant impact on $ln(RGDP)$ at 5 percent level of significance. A percent increase in $ln(MANUFAC)$ will result in 0.069 percent increase in $ln(RGDP)$ on average, all things being equal.

In the long run, $ln(AGRIC)$ has a positive and significant impact on $ln(RGDP)$ at 5 percent level of significance. A percent increase in $ln(AGRIC)$ will result in 0.688 percent increase in $ln(RGDP)$ on average, all things being equal. In the long run, $ln(OILEXPT)$ has a positive and significant impact on $ln(RGDP)$ at 5 percent level of significance. A percent increase in $ln(OILEXPT)$ will result in 0.047 percent increase in $ln(RGDP)$ on average, all things being equal. In the long run, $ln(CREDITPS)$ has a positive and significant impact on $ln(RGDP)$ at 5 percent level of significance. A percent increase in $ln(CREDITPS)$ will result in 0.092 percent increase in $ln(RGDP)$ on average, all things being equal.

### 4.6. Vector Error Correction Model (VECM)

I have established that (2) 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 (2) 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 $p$ (see Lütkepohl 2005). Hence, once we know $p$, we know the number of lagged differences. Thus, 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:

\[
\Delta \ln RGD_{t} = \beta_{0} + \sum_{i=0}^{p-1} \beta_{i} \Delta \ln (RGDP_{t-i}) + \sum_{m=0}^{p-1} \beta_{m} \Delta \ln (MKTCAP_{t-m}) + \sum_{n=0}^{p-1} \beta_{n} \Delta \ln (MANUFAC_{t-n}) \\
+ \sum_{v=0}^{p-1} \beta_{v} \Delta \ln (AGRIC_{t-v}) + \sum_{r=0}^{p-1} \beta_{r} \Delta \ln (OILEXPT_{t-r}) + \sum_{c=0}^{p-1} \beta_{c} \Delta \ln (CREDITPS_{t-c}) + \varphi ECT_{t-1} + \varepsilon_{t}
\]

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

The result of (4) above is presented below in Table 7 as:

### Table 7: VECM Result

<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>
<tr>
<td>$n = 36$</td>
<td>$R^2 = 0.455$</td>
<td>Adj. $R^2 = 0.439$</td>
<td>F-stat. (p-value) = 28.39 (0.0000)</td>
<td></td>
</tr>
</tbody>
</table>

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.
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 (0.0000) is less than 0.05.

4.6.1. 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)

Also, 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 model is structurally and dynamically stable.

Figure 3: Plot of Cumulative Sum of Recursive Residual
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 showed that the speed of adjustment of \( \ln(RGDP) \) to equilibrium is about 47.1 percent annually. The estimated results show that market capitalization to GDP ratio (a proxy for the size of Nigeria’s stock market) has a positive but insignificant impact on Nigeria’s long-run economic growth. As a result, I conclude that stock market development does not contribute significantly to long-run economic growth in Nigeria. This result agrees with the findings of Ananwude and Osakwe (2017).

Based on the findings of this research, I recommend that policymakers should tackle impediments militating against the development of Nigeria’s stock market, such as low market liquidity, bureaucracy, poor information about listed companies, low participation rate, low returns on investment, poor knowledge of financial services among Nigerians, lack of transparency of stockbrokers, legal and regulatory barriers. 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 stock) 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


