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ABSTRACT

This study explored the casual linkage between the depth of development in Nigerian stock market and economic growth as well as the short-run and long-run dynamics of the stock market. We used annual data of growth rate of gross domestic product (GRGDP) at current market price, stock market capitalisation and value of stock traded ratio to gross domestic product from 1981 to 2015. The data were sourced from Nigerian Stock Exchange fact book of various issues and Nigeria Bureau of Statistics. Prior to estimation, the models were subject to diagnostic test such as heteroscedasticity, normality and multicollinearity test. The results of augmented Dickey-Fuller (ADF) and Phillips Perron (PP) and tests revealed that the variables are integrated of order one. The results of Granger causality test show that there is no causal linkage between depth of development in Nigerian stock market and economic growth at 5% level of significance. The Johansen co-integration test showed that there is a long-run linkage between depth of development in Nigerian stock market represented by market capitalisation and value of stock traded ratio to gross domestic product (GDP) and economic growth reflected by growth rate of GDP at 5% level of significance. The results of error correction model (ECM) indicates that once the GRGDP and market capitalisation ratio (or value of stock traded ratio) deviates away from the long-run equilibrium, then GRGDP makes all adjustment to restore the long-run equilibrium by correcting disequilibrium by about a factor of 1.25 (or 1.21). The result of this study provides evidence of the existence of a long-run relationship between depth of development in Nigerian stock market and economic growth. However, depth of development in Nigerian stock market does not propel economic growth neither does economic growth stimulate depth of development in Nigerian stock market. This study contributes to existing literature on the long-run significant relationship between stock market development and economic growth in the context of Nigeria.

BACKGROUND OF THE STUDY

The financial system in Nigeria in recent years has expanded, become stronger, more efficient and the quality of services provided by financial institutions have improved significantly. As part of financial development, the proper functioning of the Nigerian stock market will make a substantial contribution to economic growth. In empirically examining the subject matter, some studies have found that the stock market has a good performance in terms of size and liquidity, and hence has a positive effect on economic growth. In facilitating the stock market development and expanding the contribution of stock market development on economic growth, the Nigerian government introduced or modified several legislations and regulations that regulate and stimulate the expansion and performance of the stock market. One of the most important of these was the enactment of the Investment and Securities Act in 2007, whose objective was the provision of a legal and regulatory framework for the implementation of all stock market related activities, such as the sale and purchase of stocks, bonds and securities trading and investment funds.

The growing importance of stock markets around the world has opened a new avenue of research into the nexus between financial development and economic growth (Arestis et al. 2001). The general idea that economic growth is related to financial development was vehemently traced to the eminent scholarly work of Schumpeter in 1911 titled “The Theory of Economic Development”. The financial development role in economic growth has received much attention. However, the focus has been almost entirely on bank based financial institutions, while ignoring the possible impact of stock market development. The nexus between stock market development and economic growth is not generally accepted within the growth literature, owing in part to the inconsistencies in the results of the available studies on the relationship. The empirical nexus between financial market

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Received: 19 April 2016 – Accepted: 27 May 2016 – Published: 26 June 2016
development and economic growth still gives rise to contradictory evidence coupled with different views expressed by researchers on the subject matter. Harris (1997) envisaged the existence of no casual nexus between stock market development and economic growth; Luintel and Khan (1999) and Bahadur and Neupane (2006) established a bidirectional relationship between stock market development and economic growth; Chakraborty (2008) noted that it is economic growth that impacts on Indian stock market development while Atje and Jovanic (1993) asserted that stock market development leads to growth of the economy.

The casual nexus between stock market development and economic growth is not a big issue as it has received considerable attention by scholars. The Nigerian stock market witnessed a significant development after the introduction of the structural adjustment programme (SAP) in 1986 necessitating the argument on the probable nexus between stock market development and economic growth in Nigeria. One stream of the research indicates that stock market development promotes economic growth. Antagonist perspective is held by some researchers who are of the opinion that this effect is marginal or in extreme cases even negative. There exist a large number of studies that have assessed the casual nexus between stock market development and economic growth for both developed and developing countries. Some studies documented that the casual nexus between stock market development and economic growth in Nigeria is unidirectional and stock market has played an important role in promoting economic growth in the Nigerian economy; e.g. Ogumnuyia (2010), Ogboi and Oladipo (2012), Ezeabasili et al. (2013), Adenuga (2010) and Usman and Alfa (2013). On the other hand, Chizea (2012) found a bidirectional relationship between stock market development and economic growth in Nigeria. The empirical findings from related literature suggests that stock market development and economic growth have been inconclusive and it indicates that results are sensitive to the model employed and type of data used in the analysis (Odhiambo, 2010). Outcome also differs from country to country over the time period (Demetriades and Hussien, 1996).

Objectives of the Study

The major objective of this study is to explore the link between depth of development in Nigerian stock market and economic growth. Specifically, the study will:

1. Examine the casual linkage between the depth of development in Nigerian stock market and economic growth.
2. Assess the short-run and long-run dynamics of the depth of development in Nigerian stock market and economic growth.

Consequently, the directional hypothesis is that there is no casual linkage between the depth of development in Nigerian stock market and economic growth.

The rest of this article is organised follows: review of related literature (concept of stock market and economic growth, theoretical background and empirical reviews) and motivation and rational for the study, data and method, discussion and results which concludes study.

REVIEW OF RELATED LITERATURE

Concept of Stock Market

Stock market is the market where medium to long terms finance can be raised. Stock markets support resource allocation and spur growth through different channels. Stock markets can positively affect the average productivity of capital by reducing transaction costs and liquidity costs (Bencivenga et al., 1996; Levine, 1991). Stock markets can mobilise savings and spur the rate of investment by pooling resources on larger projects which would otherwise have difficulty accessing finance (Greenwood and Smith, 1997). Stock markets may promote and improve resource allocation and the average productivity of capital through the promotion of the acquisition of information about firms (Holmstrom and Tirole, 1993). Jensen and Murphy (1990) states that stock markets positively affect firm's investment decisions and the average return on investments by exerting a continuous and strict control over the management of firms. Devereux and Smith (1994) and Obstfeld (1994) note that stock markets can augment the rate of saving and the rate of investment by improving risk diversification through internationally-integrated stock markets and increasing the array of possible investments.

A well-functioning and developed stock market ensures that there is economic growth through the reduce cost of capital or equity for companies and also boost domestic savings and increase the equity and level of investment (Levine, 1996). Liquid stock market allows savings and investments in long term projects that have pay outs in the long term. As there is ease of entry and exist, an investor can sell equity at any time and thereby increasing investor confidence in long term projects. Stock market provides a medium were there can be hedging of risks as they integrate and allow investors to diversify risks. The other role a stock market plays in the economy is that resources are allocated to the most efficient places as investments mostly go to high risk, high return long term projects by government and private sector. This eventually leads to economic development.

Economic Growth

Economic growth can be illustrated as an upbeat change on the output of a nation's manufacturing of goods and services, stretching over a certain period of time.
(Kanu and Ozurumba, 2013). Besides, Antwi et al. (2013) defined economic growth in the simplest form, which is an increase in real GDP. Economic growth can expand people's choices and make human life better, because it enriches the society (Durning, 1992). Furthermore, Kanu and Ozurumba (2013) stated that economic growth can directly measure a nation's output and provides an idea of how well the economy of a country is, thus the country's leader are able to compare their performance with other countries.

Growth is not everything, but without growth there will be nothing at all (Thomas, 2003). Economic growth is vital because it will lead to higher quality of life, which the country can develop a better quality of our standard of living (Palmer, 2012). Moreover, Dollar and Kraay (2002) emphasised that growth on average does benefit the underprivileged as much as anyone else in a civilisation, so economic growth is a poverty lessening strategy used by policy makers. The study of Verger (2009) also stated that if a nation has a well and stable economic growth then the poverty rate in that nation will be reduced. The reduction or removal of poverty is necessary, as it will create a greater equality in society and providing a royal life as well as more wealth for all citizens (Agrawal, 2007). In addition, there will be more skilled and educated workforce, as the decrease of poverty also helps in the advancement of education (Agrawal, 2007). As a result, a country is able to reduce the poverty rate and increase their standard of living, provided when the country can achieve or obtain a consistent economic growth.

Nexus between GDP and Stock Market Development

The GDP is one the primary indicators used to gauge the health of a country's economy. It represents the total naira value of all goods and services produced over a specific time period. Usually, GDP is expressed as a comparison to the previous quarter or year. For example, if the year-to-year GDP is up 3%, this is thought to mean that the economy has grown by 3% over the last year. A significant change in GDP, whether up or down, usually has a significant effect on the stock market. The GRGDP and the growth rate of the economy have positive relationship (Singh, 1997). The higher the GRGDP, other things being equal, the more favourable it is for the stock market. Equity prices may rise due to the potential for higher profits from a healthy business climate.

Theoretical Framework

Economists have developed several growth theories over the years to explain economic growth. Economic growth theory is primarily based on a production function approach, which, in line with the microeconomic theory of the firm, assumes that economic growth on an aggregate level can be related to factor inputs and technology. In particular, changes in output are said to be caused by changes in the physical capital stock, labour, human capital and technology. This study is based on the premise of supply leading hypothesis. This hypothesis was selected as the theoretical framework because it centred on the positive linkage between stock market development and economic growth.

The finance-led growth theory or supply-leading hypothesis states that financial sector development stimulates and drives economic growth. Financial development promotes growth through a number of channels which include mobilisation of savings through attractive instruments, efficient allocation of capital, reduction of cost of information gathering, and a better access to investment information among others. Finance influences economic growth through two different but complementary channels, the accumulation channel and the allocation channel. The accumulation channel occurs through the impact of physical and human capital on economic growth (Pagano, 1993); while the allocation channel occurs through efficient resource allocation as a result of financial deepening that drives growth (King and Levine, 1993a). A large body of empirical studies by McKinnon (1973), King and Levine (1993a), King and Levine (1993b) and Beck et al. (2000), among others have indicated that financial development stimulates economic growth. However, financial development is only one factor amongst many other factors which affect the rates of economic growth. Thereby, a well-functioning financial system is considered to be a necessary but not a sufficient factor for economic growth.

Linkage between Stock Market Development and Economic Growth

The relationship between stock market development and economic growth has been comprehensively studied in the last few decades. This is not a virgin issue in economic literature and it has its origin from the concept provided by Schumpeter in 1911. Adamopolous and Dritsakis (2004) empirically examined the causal relationship among the degree of openness of the economy, financial development and economic growth by using a multivariate autoregressive VAR model in Greece for the period from first quarter 1960 to fourth quarter 2000. The results of co-integration analysis suggest that there is one co-integrated vector among GDP, financial development and the degree of openness of the economy. Granger causality tests based on error correction models (ECMs) show that there is a causal relationship between financial development and economic growth, but also between the degree of openness of the economy and economic growth. Guglielmo et al. (2004) examined the causal linkage between stock market development, financial development and economic growth using quarterly data from 1977.
to 1998. The empirical part of the study exploited the techniques developed by Toda and Yamamoto (1995) to test for causality in VARs, and emphasises the possibility of omitted variable bias. The evidence obtained from a sample of seven countries suggests that a well-developed stock market can foster economic growth in the long run. It also provides support to theories according to which well-functioning stock markets can promote economic development by fuelling the engine of growth through faster capital accumulation, and by tuning it through better resource allocation.

Nierwerburg et al. (2005) assessed the long-term relationship between financial market development and economic development in Belgium using annual data from 1830 to 2000. The study employed the unit root, (ADF), Granger causality test, Johansen co-integration and vector error correlation model (VECM). The study found strong evidence that stock market development caused economic growth in Belgium, especially in the period between 1873 and 1935.

Wai-Mun et al. (2008) explored causal relationships between stock market and the economy using formal tests of causality developed by C. J. Granger and yearly Malaysia data for the period 1977-2006. Results showed that stock market Granger-caused economic activity with no reverse causality observed. The longest significant lag length observed from the results was two years.

Adamopolous (2008) looked at the relationship between financial development and economic growth for Ireland for the period 1965-2007 using a VECM. The finding indicated that economic growth has a positive effect on stock market development. Causality test shows that economic growth causes credit market development.

Obreja et al. (2008) examined the correlation between capital market development and economic growth in Romania using a regression function and VAR models. The results show that the capital market development is positively correlated with economic growth, with feedback effect, but the strongest link is from economic growth to capital market, suggesting that financial development follows economic growth, economic growth determining financial institutions to change and development.

Vazakidis and Adamopoulos (2009) studied the causal relationship between stock market development and economic growth for France for the period 1965-2007 using a VECM. The finding showed that economic growth has a positive effect on stock market development, while interest rate has a negative effect on stock market development in France. Economic causes stock market development in France.

Boubakari and Dehuan (2010) explored 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 links between the stock market and economic growth for some countries for which the stock market is liquid and highly active.

Wong and Zhou (2011) examined the relationship between stock market development and economic growth in five developed economies, using annual data for the period of 1988 to 2008 and employing panel data model of analysis. The result brought out an important theory to support for the proposition that the stock market development is one of the key drivers of economic growth in developed and developing countries, whatever the modes of their financial systems, stage of their economic development and types of economic system.

Caporale and Spagnolo (2011) estimated a bivariate VAR-GARCH model to examine linkages between stock market and economic growth in three CEEC countries (the Czech Republic, Hungary and Poland). The empirical findings suggest that there is unidirectional causality running from stock markets to growth in the levels, this linkage becoming stronger following the EU accession, which appears to be beneficial, presumably as a catalyst for institutional building and development.

Peia and Roszbach (2012) re-examined the empirical relationship between financial and economic development while taking into account their dynamics and differentiating between stock market and banking sector development for 26 developed economies of the world using quarterly data, 1973 to 2011 and applying fully modified ordinary least square (OLS) and Granger causality test. The results indicates that stock market development tends to cause growth, while a reverse or bi-directional causality is present between banking sector development and output growth.

Mohammed et al. (2013) examined the co-integration relationship and causality direction between the stock market and the economic growth of Malaysia. The study used time series quarterly data over a timescale of 15 years spanning from the first quarter of 1991 to the last quarter of 2009. The empirical results suggest that there exists a long and short-run correlation between stock market and economic growth; however, Granger causality test suggests a unidirectional causality relationship.

Nguyen and Pham (2014) ascertained the causality relationship between stock market development and economic growth in Canada and Australia based on the time series data for the period of 1981 Q3 to 2012 Q3. The results indicate that stock market and economic growth has long-run relationship and that the stock market development does help improve the future growth in some developed countries.

Studies on the Linkage between Stock Market Development and Economic Growth in Nigeria

Ogwumike and Salisu (2009) assessed the short run, long run and the causal relationship between financial development and economic growth in Nigeria from 1975 to 2008. Using the Bound test approach, this study finds a positive long-run relationship between financial development and economic growth in Nigeria.
Ogunmuyiwa (2010) explored the relationship as well as the channel through which investor's sentiment and liquidity affect growth by using appropriate econometric technique on time series data from 1984-2005. Empirical evidence shows that both investor's sentiment and stock market liquidity Granger-cause economic growth in Nigeria.

Usman and Alfa (2011) while applying the Johansen co-integration test approach and Granger Causality test, result unveiled a positive long-run relationship between stock market and economic growth and unidirectional relationship between market capitalisation and GDP with causality running from GDP to market capitalisation.

The direction of relationship between stock market development and economic growth was determined by Chizea (2012) using a time series data from 1980 to 2010. The study applied the Granger causality test and the finding identified the presence of a bi-directional relationship between stock market development and economic growth in Nigeria.

Ogboi and Oladipo (2012) assessed the effect and casual relationship between stock market development and economic growth in Nigeria. The study employed annual time series data from 1981 to 2008, error correction mechanism model and granger causality pairwise test and the findings revealed that stock market has a negative effect on economic growth, a unidirectional causality between stock market development and economic growth.

Edame and Okoro (2013) determined the linkage between capital market development and economic growth, employing OLS for a time frame of 1970 to 2010. The findings indicated that capital market variables captured in the model such as market capitalisation, number of deals and value of transactions were all positive and significant in promoting economic growth in Nigeria.

Oladipo and Bakare-Aremu (2013) explored the link between capital market development and economic growth in Nigeria. Applying co-integration and error correction modelling to stock market and macroeconomic time series data, they found evidence that the variables; all share index, number of deals and market capitalisation have individual positive and significant combined impact on economic growth and presence of unidirectional causality relationship running from capital market to economic growth.

The existence of causality linkage between stock market performance and economic growth in Nigeria was looked into by Osuala et al. (2013) using the general-to-specific autoregressive distributed lag (ARDL), bound testing approach and time series data covering the period 1981–2011. The outcome divulged a long-run relationship between stock market development and economic growth with no causal relationship between stock market development and economic growth.

Adefeso et al. (2013) appraised the long-run and causal relationship between both stock market development and economic growth in Nigeria using annual data from 1980-2010. VECM and co-integration technique of analysis were employed to analyse the data. The study found that stock market development as well as banking activity was co-integrated with economic growth in Nigeria.

Okodua and Ewetan (2013) studied the relationship between stock market performance and economic growth in Nigeria. It utilised the bounds testing co-integration procedure also known as autoregressive distributed lag estimation procedure. It found that in the long run, output in the Nigerian economy is less sensitive to changes in stock market capitalisation, long-run growth of the Nigerian economy is highly sensitive to marginal variations in interest.

The relationship between stock market and economic growth of Nigeria was appraised by Igbedika (2014), using time series data from 1999 to 2011. The study employed OLS techniques and established the existence of a link between stock market development and economic growth.


Motivation and Rationale for the Study

The growing importance of stock market in developing countries around the world over the last few decades has shifted the focus of researchers to explore the linkage between stock market development and economic growth. Many stock markets especially those in developing countries face constraints which result in serious implications such as liquidity issues, absence of activities and absence of well-developed investor's base which are likely to hamper the effectiveness of the stock market towards economic growth (Onokwo et al., 2015). Nigeria is not a production driving economy depend virtually on imports for all her needs even. Majority of the industries have been forced to close down operation due to lack of basic infrastructure resulting in high cost of production. Thus, the growth rate of economy is negatively affected. The rationale behind the conduct of this research is hinged to two major findings emerging from studies on the linkage between stock market development and economic growth in Nigeria.

First, the supply leading hypothesis states that stock market development promotes economic growth, because creation of financial institutions and markets improves the supply of financial services, which enhances economic growth. This hypothesis is based on lower cost of acquiring information, as financial intermediaries can reduce information costs by acquiring and comparing information about many investment opportunities in the interest of all their savers and by ensuring that resources
are efficiently allocated to best projects. However, the empirical result of Josiah, Adedinra and Apketi (2012) reports that Nigeria stock market has not contributed positively to economic growth; Donwa and Odia (2010) states that Nigeria stock market has not impacted significant on economic growth. This is also surprising as Ogboi and Oladipo (2012) reports that stock market has negative effect on Nigeria economic growth.

Second, the direction of linkage between stock market development and economic growth in Nigeria is still a topic of conversation. Chizea (2012) reports the presence of bidirectional linkage between stock market development and Nigeria economic growth; Ezeabasili et al. (2013) and Oladipo and Bakare-Aremu (2013) report unidirectional linkage running from stock market to economic growth of Nigeria; Usman and Alfa (2011) asserted also unidirectional linkage but running from economic growth to stock market. On the contrary, Osuala et al. (2013) and Okonkwo et al. (2014) established the presence of no casual linkage between stock market development and economic growth. In view of this inconsistency in empirical findings, it is the sole aim of this study to explore the linkage between the depth of development in Nigeria stock market and economic growth as well as the short-run and long-run dynamics. This is to have more empirical evidence on the exact nature of linkage between stock market development and economic growth in Nigeria by applying adequate and appropriate methodology covering a period of 35 years.

METHODOLOGY

This article adopted a test of causation to explore the linkage between the depth of development in Nigeria stock market and economic growth. Annual/yearly data casing the time frame 1981 to 2015 were collected from the Nigeria Stock Exchange (NSE) and National Bureau of Statistics (NBS). The data were analysed using various econometric tools such as unit root (ADF and PP), OLS regression, Johansen co-integration, granger causality test and ECM.

Variables Description

GRGDP at current base price is the dependent variable and the proxy for economic growth. The choice of GRGDP is based on the fact that it captures the actual change in GDP from the previous year to the current and, thus, if the economy has grown it is positive and, if it has not, then it will be negative. MCR (market capitalisation ratio to GDP) and VSTR (value of stock traded ratio to GDP) are the stock market development variables/independent variables. First, the choice of MCR and VSTR as measures of stock market development were based on World Bank (2013) global proxy for measuring the depth of stock market development. Second, Nzotta (2004) asserted that stock market depth is measured by relating monetary and financial aggregates such as market capitalisation and value of stock traded to the GDP. Furthermore, they reflect the traditional characteristics of stock markets as noted by Inanga and Emenuga (1997).

Model Specification

This study adopted the model of Choong et al. (2003) with slight modifications. In the model, the researchers expressed economic growth as a function of stock market development (measured by the size and liquidity level of the stock market). The general model of the study is developed as follows:

\[ Y_{it} = \alpha_i + \beta_i X_{it} + \epsilon_{it} \]

where \( Y_{it} \) is economic growth/dependent variable for Nigeria \( i \) in year \( t \), \( \alpha_i \): constant coefficient for \( i \), \( \beta_i \): slope coefficient of the independent variables of \( i \), \( X_{it} \): depth of development stock market \( i \) in year \( t \) and \( \epsilon_{it} \) is the error term of \( i \) in year \( t \).

NOTE \( Y_{it} \) is economic growth represented by growth rate in gross domestic product. \( \beta_i X_{it} \) on the other hand reflects the depth of development of in Nigeria stock market surrogated as market capitalisation ratio (MCR) to GDP at current base price and value of stock traded ratio to GDP at current base price. In order to accommodate the specific objectives of the study as well as reflecting the intents of \( Y_{it} \) and \( \beta_i X_{it} \) in Eq. 1, the model was disintegrated in its functional form as follows:

\[ GRGDP_{it} = \alpha_i + \beta_i MCR_{it} + \epsilon_{it} \]

In order to avoid issues of multicollinearity as suggested by Gujarati (2004) in the specified models, each of the measures of stock market development depth was tested differently, thus:

\[ GRGDP_{it} = \alpha_i + \beta_i MCR_{it} + \epsilon_{it} \]

\[ GRGDP_{it} = \alpha_i + \beta_i VSTR_{it} + \epsilon_{it} \]

where: \( GRGDP \) is the growth rate in gross domestic product; \( MCR \) is market capitalisation ratio to GDP; \( VSTR \) is value of stock traded ratio to GDP; \( \alpha_i \) is constant coefficient of \( i \), \( \beta_i \) is the slope of the independent variables of \( i \) in year \( t \), and \( \epsilon_{it} \) is standard error of \( i \) in year \( t \).

RESULTS AND DISCUSSION OF FINDINGS

Summary of Descriptive Statistics

Empirical estimation started with the estimation of the descriptive characteristics of the data. The summary of statistics of the variables in the models is presented in Table 1.

The mean value of MCR to GDP is higher than that of value of stock traded ratio to GDP. The changes
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Test for multicollinearity

The result of the correlation matrix in Table 3 for the variables indicates that all the variables are correlated with GDP growth rate. The correlation among the stock market development depth indices depicts that value of stock traded ratio and MCR are positively correlated with a coefficient of 91.42%, and by implication value of stock traded ratio and MCR are substitutes to each other hence, not advisable to include both in the same model as they may suggest comparable features of stock market development.

Stationarity Test

Augmented dickey-fuller (ADF) test

The result of the ADF test in Tables 4 and 5 depicts that the ADF test statistic for all the variables are less than the critical values at 5% level at constant without trend and at constant with linear trend except GRGDP. Consequently, the null hypothesis is rejected and hence variables are not stationary except GRGDP. This is consistent with the standard theory, which assumes that most macroeconomic variables are not static at level, but becomes stationary at the first difference (Enders, 1995).
A Johansen co-integration approach

As can be seen from Tables 6 and 7, the result of the unit root test established that the ADF test statistic for all the variables were greater than the critical values at 5% first difference at constant without trend and at constant with linear trend. The null hypothesis for the variables at their first difference could not be rejected. Hence, all the variables are stationary at their first difference at the 1% level of significance. The results of the ADF indicates that the variables are integrated of order one i.e. $1(1)$.

**Phillips Perron (PP) Test**

The result of the PP test in Tables 8 and 9 shows that the PP test statistic for all the variables are less than the critical values at 5% level at constant and without linear trend and constant and with linear trend except GRGDP. Consequently, the null hypothesis is rejected and hence variables are not stationary except GRGDP.

As can be seen from Tables 10 and 11, the result of the unit root test indicated that the PP test statistic for all the variables were greater than the critical values at 5% first difference at constant and without linear trend and constant and with linear trend. The null hypothesis for the variables at their first difference could not be rejected. Hence, all the variables are stationary at their first difference.
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Relationship between Depth of Development in Nigeria Stock Market and Economic Growth

The result of the co-integration test in Tables 14–17 reveals the presence of two co-integration vectors. The trace statistic and the maximum eigenvalue indicate four (4) co-integrating vector equations at the 5% level of significance. The results of the trace statistic and the maximum eigenvalue have provided enough evidence to reject the null hypothesis of no co-integration between the variables at 5% level of significance. This implies that there are long-run linkage between depth of development in Nigerian stock market represented by market capitalisation and value of stock traded ratio to GDP and economic growth reflected by GRGDP at 5% level of significance. This supports the works of Adamopolous and Dritsakis (2004), Alexandra (2012), Mohammed, Hossain and...
Sadi (2013), Nguyen and Pham (2014), Ogwumike and Salisu (2009) and Usman and Alfa (2011) on the existence of a long-run relationship between stock market development and economic growth. On the contrary, it refutes the study of Harris (1997) that there is no casual linkage between stock market development and economic growth. Furthermore, it could not confirm the work of Chiza (2012) on the existence of a bidirectional linkage between stock market development and economic growth in Nigeria. The null hypothesis that there is no casual linkage between the depth of development in Nigeria stock market and economic growth could not be rejected.

**ECM**

Having established the presence of a casual linkage between the depth of development in Nigeria stock market and economic growth, the short-run dynamics or ECM is hereby determined. According to Engle and Granger (1987), if a set of variables are co-integrated, then there exists an Error Correction Model (ECM) to describe the short-run adjustment to equilibrium. This is to indicate whether or not all the variations within the dependent variable in the model are as a result of the co-integrating vectors attempting to return to equilibrium and the error correction term that captures this variation. The result of the ECM for Eqs. 3 and 4 are summarised in Tables 18 and 19.

The error correction result depicted in Tables 18 and 19 divulge that the error correction term or speed of adjustment coefficient for the equation is again correctly signed with the expected negative sign, expressing that there is a tendency by the model to correct and move towards the equilibrium path following disequilibrium in each period and by implication a significant error correction is taking place. The model indicates that only a factor of 1.25 and 1.21 of the error generated in the last period and economic growth, the short-run dynamics between the depth of development in Nigeria stock market and economic growth could not be rejected.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ECM for eq. 3.</th>
<th>ECM for eq. 4.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>Coefficient</td>
<td>Standard error</td>
</tr>
<tr>
<td>C</td>
<td>0.337325</td>
<td>2.75068</td>
</tr>
<tr>
<td>D(GRGDP(-1))</td>
<td>0.188607</td>
<td>0.26263</td>
</tr>
<tr>
<td>D(GRGDP(-2))</td>
<td>-0.009694</td>
<td>0.18277</td>
</tr>
<tr>
<td>D(MCR(-1))</td>
<td>-0.099978</td>
<td>0.32922</td>
</tr>
<tr>
<td>D(MCR(-2))</td>
<td>-0.694777</td>
<td>0.33128</td>
</tr>
<tr>
<td>ECM (-1)</td>
<td>-1.255488</td>
<td>0.33712</td>
</tr>
</tbody>
</table>

**Source:** Computer analysis using E-views 8.0.
period is corrected in the current period for Eqs. 3 and 4, respectively. The value of the t-statistic and the error term’s coefficient are not statistically significant at 5%.

Table 20: Granger causality test result for eq. 4.

<table>
<thead>
<tr>
<th>Null hypothesis: Obs F-statistic Probability Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCR does not Granger Cause</td>
</tr>
<tr>
<td>GRGDP</td>
</tr>
<tr>
<td>34</td>
</tr>
<tr>
<td>0.10256</td>
</tr>
<tr>
<td>0.7509</td>
</tr>
<tr>
<td>No Causality</td>
</tr>
<tr>
<td>GRGDP does not Granger Cause</td>
</tr>
<tr>
<td>MCR</td>
</tr>
<tr>
<td>0.48430</td>
</tr>
<tr>
<td>0.4917</td>
</tr>
<tr>
<td>No Causality</td>
</tr>
</tbody>
</table>

Source: Computer analysis using E-views 8.0.

Table 21: Granger causality test result for eq. 4.

<table>
<thead>
<tr>
<th>Null hypothesis: Obs F-statistic Probability Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSTR does not Granger Cause</td>
</tr>
<tr>
<td>GRGDP</td>
</tr>
<tr>
<td>34</td>
</tr>
<tr>
<td>0.59080</td>
</tr>
<tr>
<td>0.5534</td>
</tr>
<tr>
<td>No Causality</td>
</tr>
<tr>
<td>GRGDP does not Granger Cause</td>
</tr>
<tr>
<td>VSTR</td>
</tr>
<tr>
<td>0.01573</td>
</tr>
<tr>
<td>0.9010</td>
</tr>
<tr>
<td>No Causality</td>
</tr>
</tbody>
</table>

Source: Computer analysis using E-views 8.0.

Granger Causality Test

From Tables 20 and 21, it is observed that none of the stock market development depth variables granger cause economic growth. The p-value of the F-statistic in the pairwise granger causality performed with a maximum lag of 1 in Tables 20 and 21 is not significant at 5%. That is, causality does not flow from stock market development depth variables to economic growth and vice versa. Therefore, no causal linkage between dependent and explanatory variables at 5% level of significance. Thus, the depth of development in Nigeria stock market does not impact on economic growth.

CONCLUSION

This study empirically explored the causal linkage between depth of development in Nigeria stock market and economic growth. Our study also assessed the short-run and long-run dynamics of the depth of development in Nigeria stock market and economic growth. The empirical analysis was carried out on time series data from 1981 to 2015. Prior to estimation, the models were subject to diagnostic test such as heteroscedasticity, normality and multicollinearity test. The results of ADF and PP and tests revealed that the variables are integrated of order one i.e., I (1). This suggests the variables of the study are non-stationary at their levels and then stationary at their first difference. The results of Granger causality test show that there is no causal linkage between depth of development in Nigeria stock market and economic growth at 5% level of significance. Study also applied Johansen co-integration test to estimate the long-run linkage between the observed variables and the analysis showed that there is a long-run linkage between depth of development in Nigeria stock market represented by market capitalisation and value of stock traded ratio to GDP and economic growth reflected by GRGDP at 5% level of significance. Therefore, null hypothesis that there is no casual linkage between the depth of development in Nigeria stock market and economic growth could not be rejected.

ECM was estimated to see how the disequilibrium is corrected in the short-run. The results of ECM indicates that once the GRGDP and MCR (or VSTR) deviates away from the long-run equilibrium, then GRGDP makes all adjustment to restore the long-run equilibrium by correcting disequilibrium by about a factor of 1.25 (or 1.21). The result of this study provides evidence of the existence of a long-run relationship between depth of development in Nigeria stock market and economic growth. However, depth of development in Nigeria stock market does not propel economic growth neither does economic growth stimulate depth of development in Nigeria stock market. To the best of our knowledge on basis of available studies online, this is the first study to assess the short-run and long-run dynamics on stock market development depth and economic growth in Nigeria. This study contributes to existing literature on the long-run significant relationship between stock market development and economic growth in the context of Nigeria.

REFERENCES


Statement of originality of work: The manuscript has been read and approved by all the authors, the requirements for authorship have been met, and that each author believes that the manuscript represents honest and original work.

Sources of funding: None.

Competing interest / Conflict of interest: The author(s) have no competing interests for financial support, publication of this research, patents, and royalties through this collaborative research. All authors were equally involved in discussed research work. There is no financial conflict with the subject matter discussed in the manuscript.

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