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Financial Development: A Fillip or Impediment to Nigeria's Economic Growth

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ABSTRACT: Over the years, substantial theoretical and empirical studies have been conducted on the financial development-economic growth nexus. While a strand of the literature has found a positive linkage between this critical nexus, the other suggests otherwise. This study contributes to the debate by examining the finance-growth nexus for Nigeria using the bounds testing approach to cointegration within an ARDL framework proposed by Pesaran et al. (2001) and the augmented Granger causality test developed by Toda and Yamamoto (1995).Empirical evidence reveals that financial development significantly affects economic growth in the short and long run. The major implication for our study therefore is that financial regulatory institutions need to be strengthened to better maximize the gains from financial development especially its role towards real sector development and job creation for the growing population.

Keywords: Financial Development; Economic Growth; Co-integration; Causality
JEL Classifications: E44; O16; O55

1. Introduction

The relationship between financial development and economic growth has received attention from numerous theoretical and empirical studies since the seminal work of Schumpeter (1911). In the last decade, the direction of causality between finance development and economic growth has remained a contentious and unresolved issue. Studies on the subject matter have produced mixed results across countries and periods. There are three major conclusions on the relationship between financial development and economic growth. First is the supply-leading response which argued that financial development leads to economic growth. Second is the so called demand-following response which posited that economic growth leads to financial development. The third, however, argued that there is a bi-directional relationship between financial development and economic growth. These divergent views seem to stem from the fact that different estimation procedures and theories were employed for the studies.[1]

It is pertinent to note that, quite a number of studies have examined this crucial nexus in Nigeria (See amongst others, Ndebbio, 2004; Nnanna, 2004; Nzotta and Okeke, 2009; Afangideh, 2009; and Agu and Chukwu, 2008). However, most of these studies are deficient in terms of theory and methodology used. It is in this regard that this study intends improve on this studies by analyzing this important nexus using relatively more rigorous econometric techniques. Furthermore, our study includes traditional control variables (labor and capital)of the neo-classical growth model which have been neglected in previous studies.

The main objective of this study is to investigate the causal long-run relationship between financial development and economic growth in Nigeria by utilizing the augmented Granger causality test developed by Toda and Yamamoto (1995) to determine the dynamic relationship between

[1] Also, the results obtained are sensitive to choice of variable used as a proxy for measuring financial development and as such empirical evidence will differ from country to country.

financial development and economic growth. According to Toda and Yamamoto (1995), time series data could be either integrated of the different orders or non-cointegrated or both. In these cases, the ECM cannot be applied for Granger causality tests. This procedure provides the possibility of testing for causality between variables whether they are cointegrated or not and/or whether they have unit root or not.

In addition, the Autoregressive Distributed lag (ARDL) bound test technique proposed by Pesaran et al. (2001) is also used. The bounds test is straightforward procedure as it allows the co-integration relationship to be estimated using OLS once the lag order of the model is identified. Also, in addition to the possibility of simultaneously estimating the long- and short-run parameters of the model, stationary tests are not required.[2]All this justify the need and effort of this paper.

This paper is structured as follows; section 2 reviews empirical literature; section 3 data description and methodology; section 4 discusses empirical results; and section 5 concludes with policy implications.

2. Stylized Facts about Economic Growth and Financial Development in Nigeria

The Nigerian financial system has been recognized as major component of the country's growth and development agenda. The government had since the 1970s been characterized by high quasi total regulation as the government owned majority of the shares of most of the banks existing at the time. However, by the early 1980s, unfavorable and deteriorating economic conditions implied that the economy needed some form of structural adjustment. The banking system became weak and fragile and was thus unable to perform its primary function of financial intermediation. In 1986, the liberalization of the banking industry was a major component of the Structural Adjustment Programme (SAP) put in place at that time to drive the economy from austerity to prosperity.

In 2004, the banking sector reform/consolidation exercise in the banking industry took a leading role in the National Economic Empowerment and Development Strategy (NEEDS), which was in place at that time to drive the economic agenda of the government. This required all Deposit Money Banks (DMBs) to shore up their capital base from the hitherto N2.5billion to N25billion naira. This regulation reduced the number of banks from 89 to 25 commercial banks by the end of 2004.

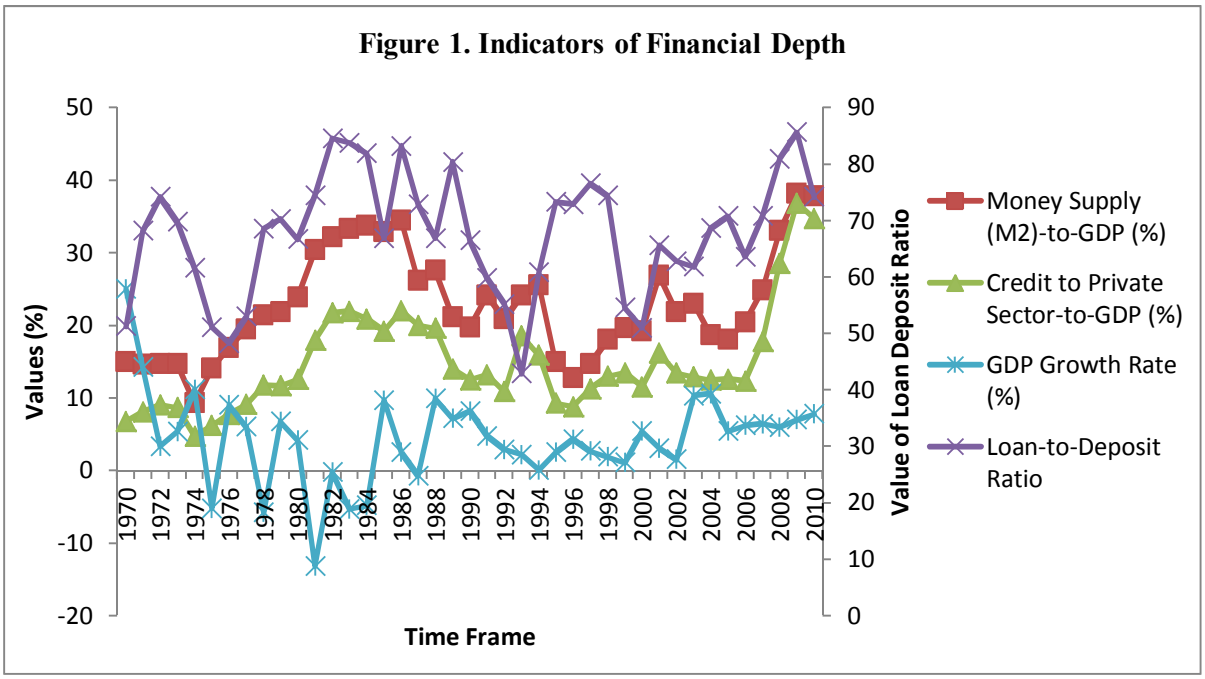
In 2009, as part of the broad economic measures to respond to the adverse effects of the global financial and economic crises, the Central Bank of Nigeria in conjunction with the fiscal authorities engineered measures to avert a collapse of the financial system with a view to maintaining economic growth. The essence of emphasis on the development of the Nigerian financial sector is in the theory of financial repression which posits that efficient utilization of resources via a highly organized, developed and liberal financial system enhances economic growth (McKinnon, 1973; Shaw, 1973, Odeniran and Udeaja, 2010).

Figure 1 depicts the trend of some selected indicators of financial development in Nigeria. Clearly, there seems to be a disconnection between the rate of growth of the economy and the movement of financial depth measures. While the ratios of money supply and credit to the private sector to GDP seemed to have moved in tandem since the 1970s to date, the opposite can be said for the other variables which exhibit a lopsided trend. It is expected that with higher financial development, the economy should grow but this has not been the case in Nigeria as shown in figure 1. The responsiveness of growth to financial sector development has been low. This may be due to the weak financial systems and inadequate regulation in the decades prior to the last. However, a closer inspection of the chart shows that from the period 2004 financial deepening measures took a sharp upward trend and this may have induced the growth rates witnessed in the last decade.

Table 1 shows the average value of money supply, credit to the private sector and real GDP. Contrary to the chart, table 1 tells an entirely different story as the co-movement of the variables is apparent. The increase observed between 1986 and 1990 was quite large and this may have been due to the liberalization and deregulation of the financial system induced by the structural adjustment programme at the time. The post-consolidation period (2006-2010) also witnessed a dramatic rise in the aggregate credit to the private sector from N1210408.99million to N6443305.94million during the period between 2006 and 2010. Similarly during the same periods, the growth rate of the economy

[2] This implies that co-integration can be tested whether the regressors are either I(0) or purely I(1).

doubled from about N9221560.97million to about N23503552million. The same was observed for money supply as the value more than quadrupled between 2001-2005 and 2006-2010.



Source: Central Bank of Nigeria Statistical Bulletin, 2011

Table 1. Some Selected Financial Sector Development Indicators

Period	Money Supply (M2) (N' Mill)	Credit to Private Sector (N' Mill)	Real GDP (N' Mill)
1970-1975	1478.06	756.45	11341.39
1976-1980	7818.54	4026.59	36864.65
1981-1985	18070.20	11287.94	55465.48
1986-1990	37699.34	25521.56	159560.53
1991-1995	174247.18	110004.42	872339.63
1996-2000	550937.86	373660.30	3197852.97
2001-2005	1900030.12	1210408.99	9221560.97
2006-2010	7491749.77	6443305.94	23503652.66

Source: Central Bank of Nigeria Statistical Bulletin, 2011

3. Review of Literature

Schumpeter (1911) asserted that a financial system that functions optimally will bring about efficiency in allocating resource from unproductive sector to productive sector. This thought remains the first framework for analyzing the finance-led growth hypothesis. Robinson (1952) argued contrarily that the relationship should run from growth to finance. According to this view, increase in economic growth leads to increase in demand for a particular financial instrument thereby creating a well-developed financial sector that will automatically respond to financial demand in the economy. This thought is often describe as growth-led finance hypothesis.

Goldsmith (1969), Shaw (1973) and McKinnon (1973) have contributed significantly to the literature on the relationship between financial development and economic growth relationship in a more formalized framework. The major contribution of these studies was the identifying of different channels of transmission in explaining the link between financial development and growth; however, all the studies agreed fundamentally that there is a significant and positive relationship between financial development and economic growth. For example, Goldsmith (1969) focuses on the investment efficiency link between financial development and economic growth. On the other hand,

Shaw (1973) and McKinnon (1973) show the importance of financial liberalization in promoting domestic savings which leads to investment and hence economic growth.

Since the introduction of both finance-led growth and growth-led finance hypotheses, scholars have subjected the relationship between financial development and economic growth to significant debate in the literature. While most empirical studies suggest a direct link between economic growth and financial development proxies, the interpretation of these results remain the main controversy. Fry (1978) in his study of seven less developed countries in Asia, used annual observation to test the relationship between money and financial deepening in economic development and opined that financial condition influences savings and growth. He concluded that interest rate ceiling discourages financial institution from taking risk. This constraint affects large proportion of potential investors in the economy.

Odiambho (2004) used three proxies of financial development namely; the ratio of bank claims on the private sector, the ratio of M2 to GDP and the ratio of currency to narrow money to investigate the link between financial development and economic growth proxied by real GDP per capita in South Africa. His result reveals that economic growth leads to increase in the three financial indicators implying a causality that runs from economic growth to financial development. In the same vein, Guryay et al. (2007) examines empirically the link between financial development and economic growth for Northern Cyprus. The result of the Ordinary Least Squares technique shows that there is an insignificant positive effect of financial development on economic growth. The causality test reveals that economic growth granger cause financial development.

Using annual data from 1975-2005 for Turkey, Ozturk (2008) found that there was no long-run relationship between financial development and economic growth and the results show a one-way causality running from economic growth to financial development.

Odhiambo (2008) in another study on the link between financial development and economic growth for Kenyan economy revealed that the direction of causality between these two variables depends on the financial indicator used as a proxy of financial development. He however concluded that overall real economic growth would lead to development in the financial sector and not otherwise.

Acaravci et al., (2009) review the literature on finance-growth nexus and investigate the causality between financial development and economic growth in Sub-Saharan Africa for the period of 1975–2005. Using Panel cointegration and Panel GMM estimation for Causality, the empirical results show a bidirectional causal relationship between the growth of real GDP per capita and domestic credit provided by banking sector for the panels of 24 Sub-Saharan African countries. The findings imply that African countries can accelerate their economic growth by improving their financial systems and vice versa.

Blanco (2009) examined the relationship between financial development for Latin American countries for the period 1961-2005, shows that finance development does not have a causal effect on economic growth, but that real economic growth leads to development in the financial sector. Likewise, in a study, Hurlin and Venet (2008) used a new panel Granger causality technique test the direction causality between financial development and economic growth for 63 sampled countries. Their results show that economic growth granger cause finance and not the reverse.

Ndebbio (2004) used two financial deepening variables namely the degree of financial intermediation measured by M2 as ratio to GDP, and the growth rate of per capita real money balances to investigate the link between financial deepening, economic growth and development for Sub-Saharan African countries. The findings of the study reveal that development in the financial sector of these countries spurs sustainable economic growth. Azege (2004) established that there exist a moderate positive relationship between financial deepening and economic growth. He concluded that the overall economic growth noticed within the period of the study was attributed to the development of financial intermediary institutions in Nigeria. Consistently with this, La Porta et al. (1998) study suggested that financial sectors dominated by greater proportion of state-owned banks tend to have slower growth in the economy.

While Nnanna (2004) relied on ordinary least square regression technique and found that financial sector development did not significantly affect per capita growth of output, Nzotta and Okereke (2009) on the other hand utilized two stages least to anise data between 1986 t0 2007 and concluded that financial deepening did not support economic growth in Nigeria. However, Afangideh (2009) analyzed the finance growth linkage using three stage least square on a data dataset spanning

1970 to 2005. He found that a developed financial system reduces growth financing constraints by increasing bank credit and investment activities with resultant rise in output. Agu and Chukwu (2008) employed the augmented Granger causality test to ascertain the direction of causality between financial deepening and economic growth in Nigeria between 1970 and 2005. Their findings support both demand- and supply-leading hypotheses, depending on the financial deepening variable that is used.

Odeniran and Udeaja (2010) examined the linkage between financial sector development and economic growth in Nigeria using Granger causality test. They find the existence of a bi-directional relationship between some of the proxies of financial development and economic growth. The authors found that except the ratio of money supply to GDP measure, all other financial development proxies granger cause output even at the 1percent level of significance.

Wadud (2005) employed a cointegrated vector autoregressive model to examine the long-run causal relationship between financial development and economic growth for 3 South Asian countries namely Bangladesh, India and Pakistan. Disaggregating financial system into "bank-based" and "capital market based" categories, the empirical results of the error correction model indicate causality that runs from financial development to economic growth.

Abu-Bader and Abu-Qarn (2008) employed four different measures of financial development and applied Toda and Yomamoto Granger causality test technique to examine the causal link between financial development and economic growth for six countries namely; Israel, Syria, Egypt, Algeria, Tunisia and Morocco. Their empirical findings show that causality runs from finance to growth in five out of the six countries while a weak causality that runs from economic growth to finance was found in the case of Israel.

Demetriades and Hussein (1996) analysed time series evidence from 16 countries and their findings revealed that finance is a leading factor in the process of economic growth. They concluded that majority of these countries; there is evidence of bi-directional causality, while in some countries, financial development leads to economic growth. Luintel and Khan (1999) used multivariate VAR for a sample of ten less developed countries and found that there is bi-directional causality between financial development and output growth for all the countries in the study.

Hondroyiannis et al. (2004) used two financial indicators namely banking system and stock market to assess empirically the relationship between the development and economic performance in Greece over the period 1986-1999. Their empirical results indicate a bi-directional causality between finance and growth in the long-run. While the estimation of the short-run dynamic model suggests that both bank and stock market financing promotes economic growth.

Al-Awad and Harb (2005) used panel co-integration and variance decomposition to investigate the relationship between financial development and economic growth in some Middle East countries and found that in the long run, these two variables are related while in the short-run, the panel causality results suggest that economic growth brings about noticeable changes in financial development. However, no clear evidence of direction of causation was noticed for individual countries' causality tests.

Khan (2008) used the Autoregressive Distributed Lag (ARDL) framework to examine the relationship between financial development and economic growth in Pakistan from 1961-2005. His results reveal that in the short and long run, financial development and investment impact positively on economic growth. The result also reveal that in the short-run, real deposit rate impact significantly on real output while in the long-run real deposit rate and economic growth have an insignificant positive relationship. Also, Mohammed and Sidiropoulos (2006) made use of the autoregressive distributed lag (ARDL) model for co- integration analysis by Pesaran and Shin (1999) to examine the impact of financial development on economic growth in Sudan from 1970 to 2004.Their empirical results suggested a weak relationship between financial development and economic growth. They concluded that, poor quality of bank credit allocation, inefficient allocation of resources by banks and absence of an appropriate investment climate required to foster significant private investment are the major factors hindering the promotion of economic growth in Sudan.

Against this backdrop, it pertinent to note that understanding the relationship between financial development and economic growth is critical to the overall growth and sustainable development of any country. In addition, the hypothesis regarding the relationship between financial development and economic growth has no specific direction of causality in terms of whether the

country is developed or developing. Lastly, the results obtained may be sensitive to the financial indicator used as a proxy for financial development as well as the estimation approach.

4. Methodology

4.1. Analytical Framework and Model Specification

Theoretical linkages between financial development and economic growth as earlier noted can be traced back to Schumpeter (1911) and, relatively, more recently, Mckinnon (1973) and Shaw (1973). In their models, government regulations and restrictions inhibit financial development and thus negate overall growth of the economy. Similarly, the more recent endogenous growth hypothesis, in which services provided by financial intermediaries are modelled have reached similar conclusions (Khan and Senhadji, 2000). These models suggest a positive relationship between financial intermediation and growth. King and Levine (1993) constructed an endogenous growth model in which financial systems evaluate prospective entrepreneurs, mobilize savings to finance the most promising productivity-enhancing activities, diversify the risks associated with these innovative activities, and reveal the expected profits from engaging in innovation rather than the production of existing goods using existing methods.

The growing body of empirical studies have been driven by these hypotheses and have for instance found cross-country differences in average growth rates.[3] These studies are usually based on regression analysis for large cross-section of countries using the following basic equation:

$$y_i = \beta_0 + \beta_1 FD_i + \beta_2 X_i + e_t \quad (1)$$

Where y_i is the rate of growth of the i[th] economy, FD_i is an indicator of financial depth, X_i is a set of control variables and e_t is the error term.

Some other studies as have adopted a microeconomic approach to the nexus. Rajan and Zingales (1996) analysed the linkage between industry-level performance across countries and financial development. Similarly, for example, while Demirguc-Kunt and Maksimovic (1996) argued that firms with access to more developed stock markets grew faster; Jayaratne and Strahan (1996) showed that when individual states in the United States relaxed interstate branching restrictions, bank lending quality increased significantly leading to higher growth.

Based on the theoretical and empirical review, we specify a growth equation model closely related to that of Mankiw et al. (1992) which is derived from a neo-classical growth model that relates real GDP to gross fixed capital formation and the growth rate of population. However, our model departs from this specification in that we include a financial development indicator/measure. Thus, our model is thus specified as follows:

$$EG = \emptyset_0 + \emptyset_1 FD + \emptyset_2 POP + \emptyset_3 ln(GFCF) + \mu \quad (2)$$

Where Y is the growth rate of real GDP,POP is the growth rate of population while μ is the error term. The indicator of financial development is denoted by $FD$and is captured by the ratio of broad money to GDP.Apriori, we expect$\emptyset_1 > 0, \emptyset_2 > 0, \emptyset_3 > 0$.

4.2. Estimation Technique

Unit Root Test

The Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests will be utilised for this study. For the ADF, the null hypothesis is that the variables have unit root against the alternative hypothesis that it does not. The ADF test is base on a parametric correction for higher order correlation based on the assumption that the dependent variable follows an AR(p) process and adding p lagged difference terms of the dependent variable to the right hand side of the test regression and is specified as follows:

$$\Delta y_t = \alpha y_{t-1} + x_t'\delta + \gamma_1 \Delta y_{t-1} + \gamma_2 \Delta y_{t-2} + \cdots + \gamma_p \Delta y_{t-p} + \epsilon_t \quad (3)$$

Where y is a nonstationary series, optional exogenous regressors$x_t'$are optional exogenous regressors which may consist of constant, or a constant and trend, and $\delta$are parameters to be estimated, and the $\epsilon_t$is assumed to be white noise.

The PP test is an alternative non-parametric method of controlling for serial correlation when testing for a unit root. The PP method is based on estimating the Dickey Fuller test equation given as follows[4]:

[3]See King and Levine (1993), Levine (1997) and Khan and Senhadji (2000) for an extensive survey of the theoretical and empirical literature.

$$\Delta y_t = \alpha y_{t-1} + x_t'\delta + \epsilon_t \quad (4)$$

All symbols have been defined earlier. The PP test is used to supplement the ADF test.

Bound Testing Cointegration

To investigate the long-run relationship between economic growth, the financial development indicator and control variables (population growth and gross fixed capital formation), the ARDL bounds test for cointegration was adopted for this study. Originally introduced by Pesaran and Shin (1999) and later extended by Perasan et al. (2001), the ARDL modelling approach unlike other cointegration techniques as earlier highlighted allows the co-integration of variables of different order of integration. That is the regressors maybe integrated of order one I(1), order zero I(0) or mutually integrated. Also, the ARDL approach is suitable for small sample size study such as the present study. The ARDL models used in this study are expressed as follows:

$$\Delta EG_t = \beta_0 + \sum_{i=1}^{q}\beta_{1i}\Delta EG_{t-i} + \sum_{i=1}^{q}\beta_{2i}\Delta FD_{t-i} + \sum_{i=1}^{q}\beta_{3i}\Delta PG_{t-i} + \sum_{i=1}^{q}\beta_{4i}\Delta \ln GFCF_{t-i} + \beta_{5i}y_{t-1} + \beta_{6i}FD_{t-1} + \beta_{7i}PG_{t-1} \quad (5)$$
$$+\beta_{8i}\ln GFCF_{t-1} + e_t$$

Where $\Delta EG_t, \Delta FD_t, \Delta PG_t, \Delta lnGFCF_t, e_t$ are the first differences of GDP growth rate, financial development indicators (Money Supply GDP ratio), population growth rate and the logarithm of gross fixed capital formation respectively.

The bounds test is a Wald Test (or *F*-test) in which the joint significance of coefficients for lagged variables is tested with *F*-statistics calculated under the null hypothesis. The distribution of the test statistics under the null is non-standard, in which critical values depend on the order of integration of variables involved. For a given significance level of β, if the *F*-statistic falls outside the critical bound, a conclusive inference can be made without considering the order of integration of the underlying regressors.[5] In cases where the *F*-statistic falls inside the lower and upper bounds, a conclusive inference cannot be made. Here, the order of integration for the underlying explanatory variables must be known before any conclusion can be drawn.

Stability Test

Bahmani-Oskooee and Brooks (1999) however argued that the existence of a cointegration derived from Equation 5 does not necessarily imply that the estimated coefficients are stable. Thus, cumulative sum (CUSUM) and cumulative sum ofsquares (CUSUMSQ) stability tests based on the recursive regression residuals are carried out and the two tests incorporate the short-run dynamics to the long-run through residuals (Oyinlola and Babatunde, 2009). The statistics of the two tests are updated recursively and plotted against the break points of the model. Providing that the plot of these statistics fall inside the critical bounds of 5% significance, one assumes that the coefficients of a given regression are stable. The outputs of the two tests are usually presented in geometrical form.

Augmented Granger Causality Test

We consider the Granger non-causality test using the Toda-Yamamoto (T-Y) procedure which is applicable regardless of whether a series is I(0), I(1) or I(2), not-cointegrated or cointegrated of any arbitrary order. This implies that it avoids the potential bias associated with unit root and cointegration tests (see Rambaldi and Doran, 1996). As pointedout by Clarke and Mirza (2006) pre-tests for unit root and cointegration might suffer from size distortions, which often imply the use of an inaccurate model for the non-causality test. To obviate some of these problems, TY, based on augmented VAR modelling, introduced a Wald test statistic that asymptotically has a chi square ($\chi 2$) distribution irrespective of the order of integration or cointegration properties of the variables. The TY approach fits a standard vector auto-regression model on levels of the variables (not on their first differences) and therefore makes allowance for the long-run information often ignored in systems that require first differencing and pre-whitening(Clarke and Mirza, 2006). The approach employs a modified Wald test (MWALD) for restrictions on the parameters of the VAR (k) where k is the lag length of the system. The basic idea of the TY approach is to artificially augment the correct order, k, by the maximal order

[4]However, the t ratio of the α coefficient is modified so that serial correlation does not affect the asymptotic distribution of the test statistic.

[5]For example, if the *F*-statistic is lower (higher) than the lower (upper) critical bound, then the null hypothesis of no cointegration is rejected (accepted).

of integration, say dmax. Once this is done, a (k+dmax)th order of VAR is estimated and the coefficients of the last lagged dmax vectors are ignored (Caporale and Pittis, 1999).

To undertake the, for a VAR with 2 lags, such that k=1 and dmax=1, we estimate the following system of equations:

$$\begin{bmatrix} \ln EG_t \\ \ln POP_t \\ \ln GFCF_t \\ \ln MG_t \end{bmatrix} = A_0 + A_1 \begin{bmatrix} \ln EG_{t-1} \\ \ln POP_{t-1} \\ \ln GFCF_{t-1} \\ \ln MG_{t-1} \end{bmatrix} + A_2 \begin{bmatrix} \ln EG_{t-2} \\ \ln POP_{t-2} \\ \ln GFCF_{t-2} \\ \ln MG_{t-2} \end{bmatrix} + \begin{bmatrix} \varepsilon_{\ln EG_t} \\ \varepsilon_{\ln POP_t} \\ \varepsilon_{\ln GFCF_t} \\ \varepsilon_{\ln MG_t} \end{bmatrix} \quad (6)$$

In Eq. (6), $A_1 \ldots A_2$ are four 4×4 matrices of coefficients with A_0being the 4×1 identity matrix, ε_s are the disturbance terms with zero mean and constant variance. From Eq. (6) we can test the hypothesis that financial development measured by MG does not Granger cause economic growth (EG), with the following hypothesis:

$$H_0 = a_{14}^1 = a_{14}^2 = 0$$

Where $a_{14's}^i$ are the coefficients of the financial development variable in the first equation of the system presented in Eq. (6). Additionally, we can test the opposite non-causality from economic growth (lnEG) to financial development in the following hypothesis:

$$H_0 = a_{41}^1 = a_{41}^2 = 0$$

Where $a_{41's}^i$ are the coefficients of the economic growth variable in the second equation of the system presented in Eq. (6).

4.3. Sources of Data

Annual covering the period 1970–2010 is utilised for this study and the variables of interest are ratio of broad money to GDP (MG) captures financial development and growth rate of real gross domestic product (EG) as a measure for economic growth. Traditional control variables within the neo-classical growth model such as population growth (POP) and gross fixed capital formation (GFCF) were included as explanatory variables in the empirical specification. Data was obtained from the Central Bank of Nigeria Statistical Bulletin online (2011) and supplemented by World Bank Development Indicators (WDI) online (2012).

5. Exposition and Discussion of Results

The results of our cointegration tests are presented in Table 2. As is evident from the table, there is a long-run cointegrating relationship among the series under consideration. The calculated F-statistic of 8.49 is higher than the upper bound critical values of 5.61, 4.35 and 3.77 at the 1%, 5% and 10% significance level respectively as tabulated in Narayan (2005). This shows that the null hypothesis of no cointegration among output growth, gross fixed capital formation, population growth, and financial development is rejected.

Table 2. Bound Testing for Cointegration Analysis

Computed F-Statistic	Critical Bounds					
	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
8.49	4.29	5.61	3.23	4.35	2.72	3.77

Table 2 gives the estimates of the aggregate growth-financial development model. We assessed the effect of population growth, gross fixed capital formation and financial development on economic growth. We find that our one period lagged measure of financial development (MG) had a positive and statistically significant effect on economic growth in the long-run meaning that an improvement in the financial system leads to growth in output. Specifically, a 1% improvement in the financial system leads to improvement in the financial system by about 0.45%. Also, a 1% increase in labor leads to a fall in output growth by almost 5.7%, suggesting that higher population does not

improve growth as majority of the Nigerian labor force are unemployed and the expected effect on growth is eroded. An increase in capital stock (GFCF) by 1% led to an improvement in long run growth by almost 0.31% in Nigeria. The estimated contemporaneous parameters revealed that financial development had no effect on output growth. However, contrary to its long run estimate, the one period lagged GFCF was found to negatively affect growth while population growth significantly affected growth in the short-run.

In addition, Table 3 presents diagnostic tests of our model and suggests an absence of major diagnostic problems such as serial correlation, non-normality and specification errors. These results indicate that our estimated growth model is well specified. Thereafter, we checked for the stability of our model given the importance of stability for broad based effective growth strategy planning and policy making. This motivated the need to check whether the estimated growth has shifted over time as an important part of this empirical study.

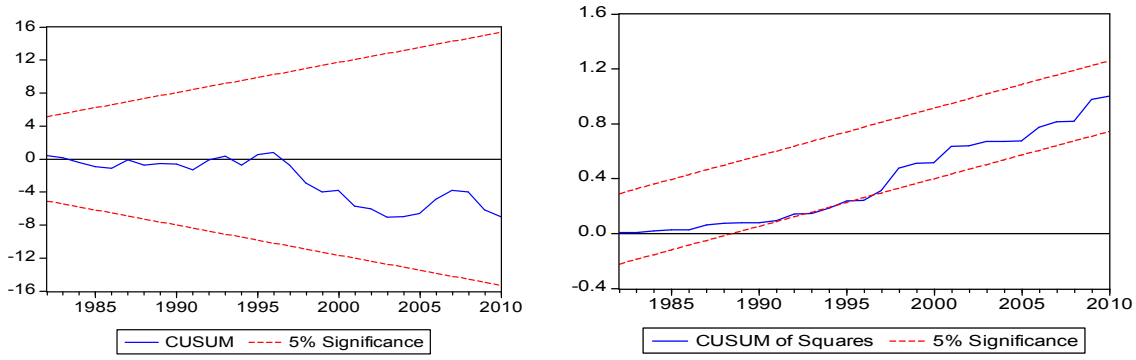
Table 3. The Estimated UECM for the Growth-Financial Development Model

Variable	Coefficient	*Standard Error*	*t-statistics*
C	5.045*	0.844	5.98
EG(-1)	-0.335**	0.1	-3.335
PG(-1)	-5.666*	0.909	-6.234
GFCF(-1)	0.305***	0.116	2.639
MG(-1)	0.449*	0.11	4.081
D(EG(-1))	0.364***	0.169	2.155
D(GFCF(-1))	-0.294***	0.132	-2.237
D(PG(-3))	11.833*	1.986	5.959

Notes: *, ** and *** denote significance at 1%, 5% and 10% respectively. Dependent variable is dEG. Sample: 1970 to 2010. Included observations: 38. R-squared: 0.605224; Durbin-Watson: 1.92. LM=1.0130[.603]; Reset:1.5893[.207],Jaque-Bera: 1.0130[.603].

Figures 2 and 3 depict the CUSUM and CUSUM Square tests of parameter stability and it indicates that the parameters are stable during the sample period.

Figure 2. CUSUM and CUSUM of Squares



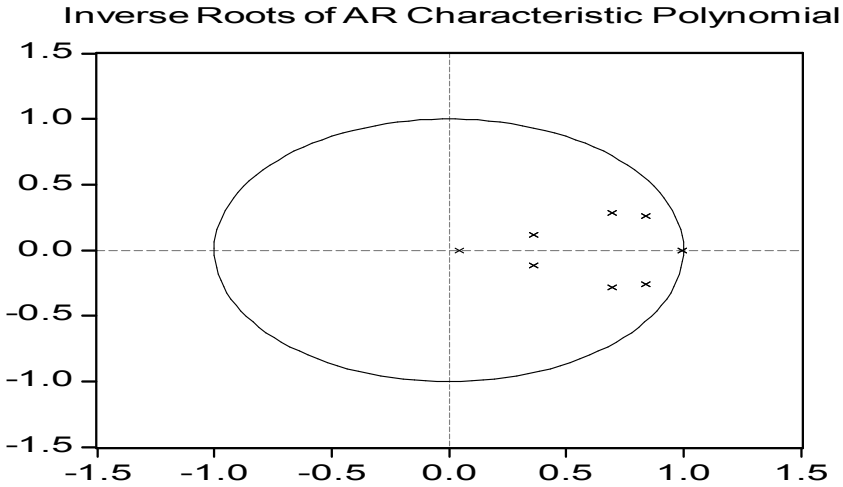
The result of the Toda-Yamamoto causality test as shown in panel 1 of table 4 reveals that, contrary to theoretical expectation, we cannot reject the null hypothesis of no causality from population growth (PG) and gross fixed capital formation (GFCF) to economic growth. However, in line with theory, we reject the null hypothesis of no causality from our financial development measure (money supply to GDP ratio (MG)) at the 10percent significance level. In sum, we have reasonable evidence to lend support to the postulation that financial development leads to economic growth in Nigeria. However, the result depicted in panel 3 of table 4 shows that economic growth does not lead to financial development. In other words we cannot reject the null hypothesis of no causality from economic growth to financial development.

Table 4. Toda-Yamamoto Causality Test Results

Panel 1: Dependent variable: EG			
Exclude	Chi-sq	df	Prob.
GFCF	2.64248	2	0.2668
MG	4.88731	2	0.0868
PG	3.94578	2	0.1391
All	8.79782	6	0.1853
Panel 2: Dependent variable: GFCF			
Exclude	Chi-sq	df	Prob.
EG	10.225	2	0.006
MG	5.1086	2	0.0777
PG	6.02825	2	0.0491
All	17.0595	6	0.0091
Panel 3: Dependent variable: MG			
Exclude	Chi-sq	df	Prob.
EG	0.03063	2	0.9848
GFCF	1.32201	2	0.5163
PG	5.15083	2	0.0761
All	6.76744	6	0.3429
Panel 4: Dependent variable: PG			
Exclude	Chi-sq	df	Prob.
EG	19.0038	2	0.0001
GFCF	17.8552	2	0.0001
MG	11.487	2	0.0032
All	27.1482	6	0.0001

Note: Sample (1970-2010), 38 observations were included

An examination of the residuals based on the LM test for serial correlation signifies the absence of autocorrelation in our model when the maximum lag length of 2 was used. The estimated Toda Yamamoto model is dynamically stable as indicated by the inverse root of the AR characteristic polynomial as no root lies outside the unit circle, thus the VAR on the basis of which the Toda-Yomamoto test is conducted satisfies the stationarity condition.



6. Concluding Remarks

The objective of the study was to probe the relationship between financial development and economic growth in Nigeria, utilizing the UECM-Bounds test proposed by Pesaran *et al*.(2001) and the Toda and Yamamoto (1995) causality test between 1970 and 2010. Our empirical results showed that economic growth, financial development, population growth and gross fixed capital formation are cointegrated. This result is reinforced by the Toda Yamamoto causality test which showed that financial development leads to growth. The major implication of all these for our study is that although financial development is expected to spur growth in the long run and as such long term financial regulatory measures should be put in place in a bid to maintain the growth trajectory induced by financial development of the longer term.

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Appendices

A 1: Descriptive Statistics of Variables used in Estimations

	EG	PG	MG	LNGFCF
Mean	12.88675	0.927781	3.075042	11.04568
Median	12.49706	0.911898	3.06355	10.59966
Maximum	17.18988	1.115878	3.641259	15.2045
Minimum	8.57189	0.844226	2.231823	7.693708
Std. Dev.	2.715755	0.071301	0.328756	2.157461
Skewness	0.129641	1.282972	-0.200904	0.339181
Kurtosis	1.64994	3.926112	2.583293	1.902937
Jarque-Bera	3.228558	12.71298	0.572452	2.842193
Probability	0.199034	0.001735	0.751093	0.241449
Sum	528.3566	38.03902	126.0767	452.8729
Sum Sq. Dev.	295.0131	0.203354	4.323233	186.1856
Observations	41	41	41	41

A 2: Pairwise Correlation Matrix of Variables used for Estimations

	EG	PG	MG	GFCF
EG	1	0.988705	0.249822	-0.44177
PG	0.988705	1	0.271241	-0.37007
MG	0.249822	0.271241	1	0.078995
GFCF	-0.44177	-0.37007	0.078995	1

A3: Augmented Dickey Fuller Test Results

Variables	Level			First Difference		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
EG	-2.6580***	-4.5731**	-1.6563***	-4.1646**	-4.0844**	-4.2263*
PG	-1.5051	-1.8243	0.1599	-5.6429*	-3.7733**	-5.7133*
MG	-1.3208	-1.4948	0.4720	-5.9831*	-5.9314*	-5.9361*
LNGFCF	0.7774	-2.1749	5.6226	-2.8576***	-2.5483	-0.4035

Note: The Null Hypothesis is the presence of Unit Root. Maximum lag length of 9 was automatically selected based on Schwarz Information Criteria (SIC) except for the first difference of LNGFCF where a Hannan-Quin criterion was used. Figures with *, ** and *** indicate the level of significance at 1%, 5%, and 10% respectively. In model 1, trend was included in the test equation while in model 2 trend and intercept were included. For model 3, the former and latter were dropped. That is, intercept and trend and intercept were excluded from the test equation.

A4: Philips-Perron Test Results

Variables	Level			First Difference		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
EG	-6.0374*	-6.3247*	-4.6515*	-15.837*	-16.1347*	-16.1002*
PG	-1.9831	-2.4626	0.0902	-2.3069	-2.2797	-2.3234**
MG	-1.5345	-1.7093	0.4020	-5.9828*	-5.9447*	-5.9502*
LNGFCF	0.5582	-1.3662	4.7856	-4.4382*	-4.5301**	-3.0253**

Note: The Null Hypothesis is the presence of Unit Root. The bandwidth was automatically chosen using Newey-West method with Bartlett Kernel spectral estimation. Figures with *, ** and *** asterisks indicate the level of significance at 1%, 5%, and 10% respectively. Model 1, 2 and 3 are as earlier defined.