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Financial Structure and Economic Growth Nexus in Nigeria

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Abstract: This study examines the relationship between financial structure (bank-based and market-based) and economic growth in Nigeria over the period 1981-2013. It explores the relative contribution of banks and stock markets to economic growth within the framework of autoregressive distributed lag (ARDL) model. Further, the study looks into different levels of growth by employing quantile regression analysis (QREG). The results based on ARDL model suggest that the relative impacts of stock market on Nigeria's economic growth is higher than the banking sector. However, the QREG analysis revealed that the banking sector plays a more important role than stock market at both lower and higher levels of economic growth. Although the findings of this study support the theoretical proposition that the bank-based financial system plays a more important role than the stock market at early stages of a country's economic development, in Nigeria, the latter is found to be more important in the long-run. Additionally, the findings highlight the robustness of QREG analysis in explaining marginal effect of economic growth determinants at different levels of growth. The implication of these findings to policymakers is to ensure that bank credits are channelled towards investments for which the economy has comparative advantage and since the growth prospects of the economy is bright, there is also a need to have a stronger capital market that can accommodate large capital requirements in the future.

Keywords: Financial structure, economic growth, ARDL, QREG, Nigeria

JEL Classification: *G1, C1, C2, C5, O4*

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1. Introduction

Economists classify the financial system as either bank-based or market-based and their relevance for economic growth remain one of the focuses of the finance-growth literature. A bank-based system broadly refers to a

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financial system dominated by the banking sector, performing the key growth enhancing functions while a market-based system is characterised by the capital market predominantly stimulating economic growth (Starkey, 2010).

The proponents of bank-based system maintain that banks are better at mobilising savings, identifying good investment, and having corporate control, especially during the early stages of economic development and where the institutional environment is weak. The proponents of market-based system on the other hand emphasise the advantages of stock market in allocating capital, providing risk management tools and mitigating the problems associated with large powerful banks (Levine, 2002).

Bank-based system tends to be more common in developing countries while markets play a leading role in many developed countries. In fact, economic theory that stresses the importance of banks and markets in influencing economic growth predicts that markets will become more important in promoting economic activity as a country develops economically.

The contribution of banks and stock market to economic growth and which contributes the most in explaining economic growth in Nigeria remains a crucial policy issue, especially now that the country has emerged as the largest economy in Africa. A 2014 World Bank report indicates that the Nigerian economy is diversified, with manufacturing (especially food and beverages) and previously undocumented services (including the entertainment industry) as important contributors to the country's growth. This highlights the need to build long term sustainable investments by improving access to finance. There is, therefore, growing concern whether to rely on a particular financial structure that is considered more conducive for growth in Nigeria (Arestis, Luintel, & Luintel, 2004), since it has been established that economic performance of a country is associated with how well-developed its financial system is (Dudley & Hubbard, 2004). In order to promote a sustained and inclusive economic growth in a developing country like Nigeria, financial structure is one dimension that is at least equally important as financial regulation (Lin, 2009).

Despite the relevance of financial structure to economic performance, it is not certain which of the structures is more important in explaining Nigeria's economic growth. It is unclear whether the economy is bank-based or market-based, even though majority of the studies point to the latter (bank-based system). In Nigeria, the size of the stock market (measured as market capitalisation as a percentage of GDP) continues to increase more than the size of the banking sector (measured as credit to private sector as a percentage of GDP), despite the dominance of the latter in terms of the size of its financial assets.

Empirical study to examine the relative ability of the two systems in providing finance for the real economy and how they change with the level of economic growth is important in order to provide concrete evidence on the financial structure that is more suitable for the Nigerian economy. Therefore, this study considers a larger sample size and econometric techniques to examine the relative contribution of banks and stock market to economic growth and how they vary at different levels of growth.

2. Reforms in the Nigerian Banking System

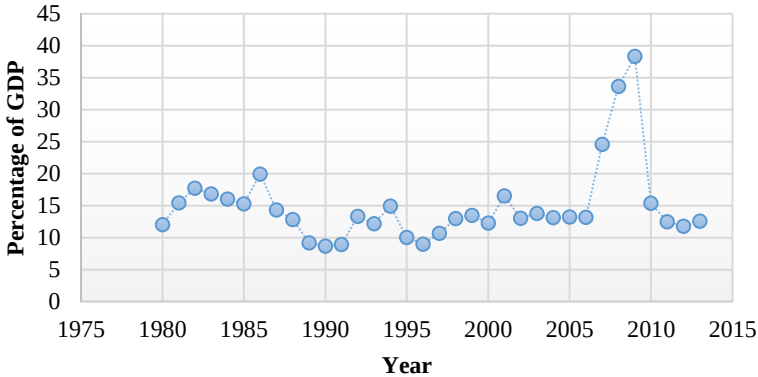
The Nigerian banking sector has witnessed a period of boom-and-bust cycle in the past three decades. In 1986, Nigeria implemented the SAP prescribed by International Monetary Fund (IMF), which comprises currency devaluation, trade and financial liberalisation and privatisation of state-owned enterprises among other structural reforms (Hesse, 2007).

The broad programme of financial liberalisation under SAP led to new entry of banks in the industry, with the number of banks increased from 40 in 1985 to over 100 in 1990 (Hesse, 2007). This upsurge in the number of new entrants is, however, encouraged by the arbitrage opportunities in the foreign exchange market because the government maintained a parallel exchange rate regime (Beck, Cull, & Jerome, 2005), thus, providing a new area of arbitrage and rent seeking for financial institutions. This had privileged access to foreign exchange auctions and could sell the foreign exchange for a high premium because of the spread between the official exchange rate and the interbank rate.

However, despite the contribution of the financial sector to GDP after the deregulation in the industry, the boom was accompanied by financial disintermediation. Domestic credit to private sector provided by banks relative to GDP decreased during the period of 1986-1992. Figure 1 shows that credits to private sector is lower in 1992 than in 1985. The main reason for this was that many of the new banks were not performing their roles of intermediating funds from depositors to borrowers but rather channelled them to arbitrage and other rent seeking activities in order to make quick profits (Beck et al., 2005; Hesse, 2007). This financial bubble burst as stock market prices fell sharply coupled with the huge increase of non-performing loans. Consequently, the government established new prudential guidelines for new licenses, which further distressed the banking system. For instance, in 1992-1993, the Nigeria Deposit Insurance Corporation (NDIC) announced that 24 banks were insolvent and recognised another 26 were in serious trouble. The total of these 50 banks made up two-thirds of total banking assets and three-quarters of deposits in Nigeria's financial system (Lewis & Stein, 1997). Therefore, as shown in Figure 1, the private sector credit

remains very low throughout the 1990s - it was lowest in 1996. As a step towards a more serious clean-up of the financial system by the new government in 1998, 26 bank licenses were revoked, reducing the total number of banks from 115 to 89.

Figure 1: Domestic credit to private sector by banks as a percentage of GDP



Source: Author's configuration

To strengthen the banking industry and improve availability of credit to the private sector, further reforms were implemented in 2004 (Fadare, 2010). Prior to this reform, the banking sector was dominated by small-sized players facing a myriad of challenges, such as low capital base, high non-performing loans, heavy reliance on foreign exchange trading (instead of intermediating funds), over dependence on public sector deposits, poor asset quality and weak corporate governance. These features of the banking sector has led to less confidence among low depositors and thus, could not support the real sector of the economy (Okpara, 2011).

The reforms were aimed at stimulating the growth of banks and position them to play pivotal roles in driving development across all productive sectors of the economy. Consequently, banks were consolidated through mergers and acquisitions, raising the capital base from 2 billion naira to a minimum of 25 billion naira, which reduced the number of banks from 89 to 25 in 2005, and later to 24 (Sanusi, 2012). As a result, the banking sector witnessed a dramatic post-consolidation growth which returned a number of banks to the profit-making path and improved their balance sheets. Hence, the recapitalisation of the industry enabled banks to resume lending to the private sector. As shown in Figure 1, there was a phenomenal sharp rise in credit provided to the private sector by banks relative to GDP between 2006 and 2009. However, as noted by Sanusi (2010), neither the industry nor the

regulators were sufficiently prepared to sustain and monitor the sector's explosive growth which consequently exposed the banking industry to the 2007-2009 financial crisis and subsequent recession. Sanusi (2010) pointed to eight interdependent factors[1] that led to the creation of an extremely fragile financial system that became vulnerable during the crisis. When the crisis hit hard and almost brought the financial system to the brink of collapse, the credit to private sector plummeted dramatically as clearly shown in Figure 1.

To address the problem of non-performing loans and boost the liquidity and soundness of the banking industry, the Asset Management Corporation of Nigeria (AMCON) was established in 2010. Accordingly, AMCON acquired the non-performing risk assets of some banks worth over 1.7 trillion naira. With this intervention, the banking industry ratio of non-performing loans to total credit has reduced significantly from 34.4 percent in November 2010 to 4.95 percent as at December 2011 (Sanusi, 2010) and therefore, banks are gradually resuming lending to the private sector with the additional liquidity of more than 1.7 trillion naira injected into the banking system through the issuance of AMCON bonds, thereby, creating thousands of jobs and contributing to economic growth.

3. Literature Review

3.1 Financial Development and Economic Growth: Endogenous Growth Theory

The new Endogenous Growth theory popularised by Romer (1986) and Lucas (1988) argues that economic growth is generated from within a system as a response to internal processes. This leads to development of efficient production technology which leads to economic growth through the enhancement of human capital.

On the link between financial development and growth, the endogenous growth models have demonstrated the possibility of self-sustaining growth in the absence of exogenous technical progress and the rate of growth is associated with preferences, technology, income distribution and institutional arrangements (Pagano, 1993). There are numerous such endogenous growth models that have been used to provide theoretical analysis of the finance-growth relationship (see for example; Bencivenga & Smith, 1991; Boyd & Smith, 1992; Greenwood & Jovanovic, 1990 among others).

In line with Pagano (1993), we specify a simple 'AK' endogenous growth model to illustrate the role of financial development in the process of economic growth.

The empirical literature on bank-based and market-based financial system mostly focused on the relative importance of banks and stock market in influencing economic growth. Levine (2002) conducts the first, broad cross-country study on the relationship between economic growth and the degree to which countries are either bank-based or market-based, thus, providing empirical evidence on the competing theories of financial structure using the ordinary least square (OLS) regression and dataset that measure the size, activity, and efficiency of various components of the financial system.[2] This include banks, securities markets, and nonbank financial intermediaries for 48 developed and developing countries. The empirical findings provide strong support for the financial services view of financial structure.

Beck & Levine (2002) examined the impact of financial structure on industrial expansion, the creation of new establishments, and the efficiency of capital allocation. Their findings were consistent with those of Levine (2002). This means classifying a country as either bank-based or market-based does not help to explain industrial growth patterns or the efficiency of its capital allocation. The results, therefore, confirmed the financial services and law and finance theories of financial structure. Although these studies provide evidence in support of the financial services view, country-specific studies may yield a different outcome. By adopting time series and dynamic heterogeneous panel methods, and utilising data from developing countries, Arestis et al. (2004), find that financial structure exhibits a significant effect on the level of output for most countries in their sample. Their findings of a significant impact of financial structure on output levels are in sharp contrast to those of Levine (2002) and Beck and Levine (2002), among others. Arestis et al. (2004), utilised only two indicators of each (bank-based and market-based) financial structure[3] and the fully modified OLS (FMOLS) to further check the robustness of the results. They attribute the failure of large cross-country studies to detect the impact of financial structure on growth to their inability to account for cross-country heterogeneity. But their tests also show that the panel parameters do not correspond to country specific estimates. However, using the same estimation technique and variables but data for 11 African countries[4], Solo (2013), provides evidence that support the findings of Levine (2002) and Beck and Levine (2002). In contrast with Solo (2013), Ahmed and Wahid (2011)[5], find that market-based financial system is important for explaining output growth through enhancing efficiency and productivity and that the results supports the view that higher levels of banking system development are positively associated with capital accumulation growth and lead to faster rates of economic growth. Though the findings did not explicitly indicate whether one is better than the other Gambacorta, Yang, and Tsatsaronis, (2014) confirm the findings of Ahmed and Wahid (2011) – that increases in both bank and market activity are associated with higher growth, albeit only up to a certain point.

The country-specific studies provide mix results depending on the sample period, variables and choice of econometric technique. Sahoo (2013) examined whether various forms of financial structure had a role in economic development of India. The sample covered the period 1982 to 2012 and the study adopted the ARDL technique and granger causality test.[6] His results showed the existence of a one-way causality running from private sector credit to real GDP. However, there was no evidence of causality between market capitalisation and economic growth. This is perhaps due to the fact that Solo (2013) considered only the market capitalisation of Bombay stock exchange as the only indicator of stock market development in India which seems to affect the empirical findings.

Empirical studies that examined the relationship between financial structure and economic growth in the context of Nigeria include; Olofin and Afangideh (2008); Onwumere, Onudugo and Ibe, (2013); Saibu, Bowale, and Akinlo (2009); Ujunwa, Ekumankama, Umar and Adamu (2012); Ujunwa and Salami (2009), Onwumere, Onudugo, and Ibe (2013).

Some of the studies (Onwumere et. al., 2013; Saibu, Bowale, & Akinlo, 2009) noticed differences in the effect of stock market and bank development on economic growth in Nigeria while findings of Olofin and Afangideh (2008) revealed that both capital market-based and bank-based financial development indicators have similar impact on the real sector of the economy. This seems to dismiss the market-based versus bank-based argument and thereby support the financial services view of financial structure.[7] Unfortunately, a number of these studies employed OLS regression analysis for non-stationary time series data, thereby making their results unreliable.

The empirical literature on the relevance of financial structure and the superiority of bank or stock market in explaining growth produced mixed and inconclusive results. Thus, there is yet to be a consensus on the financial system that is more conducive to growth, especially for developing countries such as Nigeria. Therefore, there is need for more research using new data sets and appropriate econometric techniques.

There are relatively few empirical studies which show that financial structure affects economic growth differently at different stages of development. Demirguc-kunt, Feyen, and Levine, (2012), assessed the changing role of banks and securities markets as economies develop. They used quantile regression to show how the associations between economic development and both bank and securities market development changed during the process of economic development. Thus, quantile regression provides information on the relationship between economic activity and bank development at each percentile of the distribution of economic development. Their findings indicated that bank development decreased relative to economic activity. But as economies grow, the services provided by

securities market become more important in enhancing economic activity. Lee (2011) used Granger-causality test to examine whether the role of banks and stock market changed as the economy became more developed. The test was conducted for earlier sample period for US, UK, Japan and Korea. Lee (2011) found the banking sector played a more important role, but over time, the importance of the stock market had increased relative to that of the banking sector.

Demirguc-kunt et al. (2012) was the first to use quantile regression analysis to assess how the associations between economic activity and both bank and stock market evolved as countries grow economically. We did not find any other study that employed quantile regression to examine this important theoretical prediction. There is supported by Gambacorta et al. (2014). Using a panel of 41 advanced and emerging market economies during the period 1989–2011, they found that financial structure evolved alongside the changing profile of the economy, and the services provided by stock market became more important in during economic growth.

The review of the existing empirical research on the long-run relationship between financial structure and economic growth found: a) the bulk of studies on this issue were based on a cross-country and panel data analysis which has the tendency to mask country-specific influence on the results; b) the empirical evidence of the relative roles of bank and stock market on growth produced by these studies are mixed and inconclusive; c) the few time series studies conducted in Nigeria required further investigation due to methodological issues. Hence, this study aims to complement the existing literature by including larger sample size and adopting more appropriate estimation techniques such- ARDL and QREG analysis. The current study will be distinct from the existing studies in the following aspects: First, this study uses ARDL and QREG models that has rarely been used before in general and, in particular, not used in the case of Nigeria. Second, the current study employs the most recent data set that includes 2013. Third, as the economy of Nigeria emerges as the biggest economy in the African region. The study of financial structure and economic growth nexus warrants adequate attention.

4. Data and Methodology

The annual data for all the variables used in this study covered the period 1981-2013. Although many empirical studies used multiple indicators of bank and stock market development, Levine (2002) argued that many of the individual indicators of financial structure (such as bank credit and total value traded ratios) are robustly linked with growth. However, due to data

availability, and in line with Arestis et al. (2004) and Olofin and Afangideh (2008), the measure of bank and stock market development only consisted of credit to private sector as a percentage of GDP and stock market capitalisation as a percentage of GDP. The natural log of real gross domestic product (RGDP) expressed in constant 2005 local Nigerian currency is used as the proxy for economic growth, and this is consistent with previous studies such as Christopoulos and Tsionas, (2004); Gokmenoglu, Amin and Taspinar (2015); Jenkins and Katircioglu, (2010); Khan, (2008); Saibu et al., (2009). The set of control variables included gross fixed capital formation (GFCF) as a proxy for gross domestic investment, the inflation rate (INF) measured by the consumer price index to account for macroeconomic stability, government expenditure (GOV) computed as the general government final consumption expenditure as a percentage of GDP and trade as a percentage of GDP which is the indicator for trade openness (OPENN). Data for the two indicators of financial structure are obtained from the statistical database of the central bank of Nigeria while all other variables are obtained from World Bank's world development indicators.

The benchmark model for this study is Demirguc-kunt et al.'s (2012) which is expressed as:

$$LNRGDP = \alpha + \beta_1 BNK_t + \beta_2 MKT_t + \beta_3 LNGFCF_t + \beta_4 LNOPENN_t + \beta_5 LNINF_t + \beta_6 LNGOV_t + U_t \quad (1)$$

where LNRGDP is the natural log of real GDP, BNK is the indicator of banking sector represented by credit to private sector provided by banks as a percent of GDP, MKT is the market capitalisation as a percentage of GDP, which is an indicator for stock market. The LNGFCF is the natural log of gross fixed capital formation, LNOPENN is trade as a percent of GDP in natural log, inflation represented by LNINF, and LNGOV is the natural log of government expenditure.

The study employed the ARDL and QREG techniques to examine the relative impacts of bank and market-based financial structure; and how their effects vary at different levels of economic growth in Nigeria. The choice of ARDL is due to its obvious advantages in studies with small sample size and the possibility of being applied to models that have a mixture of $I(0)$ and $I(1)$ variables. The quantile regression analysis on the other hand, models the relationship between log real GDP and the indicators of financial structure as well as the control variables. The procedure is able to yield a different estimated coefficient of credit to private sector and market capitalisation for

each percentile (or quantile) of RGDP. It will thus show how the effects of banks and stock market vary at different levels of economic growth.

4.2 Cointegration Test: ARDL Model

The first stage in the bounds testing procedure is to establish the existence of long-run relationship using the *F* test. The approach, therefore, involves estimating an error correction version of the ARDL model for economic growth, financial structure variables and other growth determinants. Equation (1) is thus modified as:

$$\Delta\, LN\, RGDP_t = \gamma_0 + \sum_{i=1}^{p} \alpha_i\ \Delta\, LN\, RGDP_{t-i} + \sum_{i=0}^{p} \beta_i\ \Delta\, BNK_{t-i} + \sum_{i=0}^{p} \emptyset_i\, \Delta MKT_{\ t-i} + \sum_{i=0}^{p} \psi_i\, \Delta\, LNGFCF_{t-i} + \sum_{i=0}^{p} \varphi_i\, \Delta\, LNOPENN_{t-i} + \sum_{i=0}^{p} \xi_i \Delta\, LNINF_{t-i} + \sum_{i=0}^{p} \eta_i\, \Delta\, LNGOV_{t-i} + \delta_1 LNGDP_{t-1} + \delta_2 BNK_{t-1} + \delta_3 MKT_{t-1} + \delta_4 LNGFCF_{t-1} + \delta_5 LNOPENN_{t-1} + \delta_6 LNINF_{t-1} + \delta_7 LNGOV_{t-1} + U_t \quad (2)$$

Where all the variables are as previously defined, Δ is the first-difference operator and *p* is the optimal lag length. The terms with the summation sign represent the short-run dynamics while the coefficients with represent the long-run relationship. When the long-run relationship is established, the *F*-test indicates which variable should be normalised. The null hypothesis of no cointegration in the long-run relationship defined by *H0: δ1= δ2= δ3= δ4= δ5= δ6= δ7 = 0* is tested against the alternative hypothesis *H1*: At least one of the coefficients is different from 0. The F-test has a nonstandard distribution which depends on: (i) the number of regressors (ii) whether variables include in the ARDL model are *I(*0*)* or *I(*1*)*, and (iii) whether the ARDL model contains an intercept and/or a trend. The null hypothesis of no cointegration cannot be rejected if the F-statistic is below the upper critical value. If the statistic is higher than the upper bound of the critical values then we can conclude there is evidence of cointegration.

Having established the evidence of long-run relationship, in the second stage, the long-run model is estimated by first selecting the orders of lags of the ARDL model based on the AIC or SBC criterion and using OLS to estimate the selected model. In order to capture the short-run dynamics and the model's speed of adjustment to equilibrium, the following ECM of the ARDL specification is derived based on the below:

$$\Delta\, LNRGDP_t = \gamma_0 + \sum_{i=1}^{p} \alpha_i\, \Delta\, LNRGDP_{t-i} + \sum_{i=0}^{p} \beta_i\, \Delta\, BNK_{t-i} + \sum_{i=0}^{p} \emptyset_i\, \Delta MKT_{\,t-i} + \sum_{i=0}^{p} \psi_i\, \Delta\, LNGFCF_{t-i} + \sum_{i=0}^{p} \varphi_i\, \Delta\, LNOPENN_{t-i} + \sum_{i=0}^{p} \xi_i \Delta\, LNINF_{t-i} + \sum_{i=0}^{p} \eta_i\, \Delta\, LNGOV_{t-i} + \lambda ECM_{t-1} + U_t \quad (3)$$

where ECM_{t-1} is the error correction term, defined as:

$$ECM_t = LNRGDP_t - \alpha_1 - \sum_{i=0}^{p} \beta_{1i}\, LNRGDP_{t-i} - \sum_{i=0}^{p} \beta_{2i}\, BNK_{t-i} - \sum_{i=0}^{p} \beta_{3i}\, MKT_{\,t-i} - \sum_{i=0}^{p} \beta_{4i}\, LNGFCF_{t-i} - \sum_{i=0}^{p} \beta_{5i}\, LNOPENN_{t-i} - \sum_{i=0}^{p} \beta_{6i}\, LNINF_{t-i} - \sum_{i=0}^{p} \beta_{7i}\, LNGOV_{t-i} \quad (4)$$

The coefficients of the lagged variables provide the short-run dynamics of the model's convergence to equilibrium and the error correction coefficient λ (which is expected to be negative) represents the speed of adjustment.

4.3 Quantile Regression Analysis (QREG)

Following Demirguc-kunt et al. (2012), we employ the QREG technique to examine the changing influence of banks and stock market development on economic growth in Nigeria. Unlike the OLS regression that estimates the average change of the dependent variable (in our case real GDP), the QREG shows the effects of the regressors (financial structure indicators) at different quantiles of the dependent variable. The technique was introduced by Koenker and Basset (1978) as an extension of the classical least squares estimation of conditional mean models to conditional quantile functions - that is an approach allowing us to estimate the conditional quantiles of the distribution of a response variable *Y* in function of a set of predictor variables *X* (Davino, Furno, & Vistocco, 2014). The quantile regression thus, estimates the marginal effects at different points in the distribution of the dependent variable by minimising a loss function rather than minimising the sum of squared residuals (Hilmer & Hilmer, 2014). The QREG model can be formulated as:

$$y_i = x_i\beta_\theta + u_{\theta i} \quad \text{With } Quant_\theta(y_i/x_i) = x_i\beta_\theta$$

where $0 < \theta < 1$, denotes the θth conditional quantile of *y* given *x*, and the subscript $i = 1 \ldots N$ indexes the number of samples.

The parameter estimates in QREG linear models have the same interpretation with other linear models - as rates of change. Therefore, in a similar way to the OLS model, the $\beta_i(\theta)$ coefficient of the QREG model can

be interpreted as the rate of change of the θth quantile of the dependent variable distribution per unit change in the value of the ith regressor:

$$\beta_i(\theta) = \frac{\partial Quant_\theta(y_i/x_i)}{\partial xi}$$

5. Empirical Results

Although the ARDL approach to cointegration does not require pre-testing of variables, a stationarity test is conducted for the order of integration of the variables using the Augmented Dickey-Fuller (ADF) and Philips-Peron (PP) unit root test with trend and intercept. The ADF test reveals that LNGOV and LNINF are stationary at level while LNRGDP, LNGFCF, LNOPENN, BNK and MKT become stationary at first difference. But PP test shows that all variables are stationary at first difference. The results of the ADF and PP tests in Table 1 suggest that there is a mixture of *I*(0) and *I*(1) variables and none is *I*(2). Therefore, we can proceed with the ARDL estimation.

Table 1: Results of unit root tests

Variables	ADF Test Statistics (With Trend and Intercept)		PP Test Statistics (With Trend and Intercept)		Order of Integration
	Level	First Difference	Level	First Difference	
LNRGDP	-1.78	-4.91*	-1.77	-4.87*	I(1)
LNGFCF	-2.04	-5.54*	-2.06	-5.64*	I(1)
LNGOV	-4.94*	-6.19*	-2.57	-6.20*	I(0)
LNINF	-3.97**	-5.48*	-2.96	-9.80*	I(0)
LNOPENN	-0.10	-5.34*	-1.92	-7.33*	I(1)
BNK	-2.62	-5.60*	-2.49	-9.87*	I(1)
MKT	-2.73	-5.70*	-2.81	-6.53*	I(1)

Note: *, ** and *** denote statistical significance at 1%, 5% and 10%

5.1 Cointegration test results

The first step in the ARDL framework is to test for the existence of long-run relationship among the variables by comparing the *F*-statistics with the critical values. We follow the suggestion by Pesaran and Shin (1999) as cited in Narayan (2004) to choose a maximum of 2 lags for annual data and rely on the Schwarz-Bayesian Criteria (SBC) to determine the optimal number of

lags. The *F*-statistics and the critical values for restricted intercept are shown in Table 2. The calculated *F*-statistics (3.858) is greater than the upper bound critical value at the 5 percent level of significance (3.28). Therefore, we reject the null hypothesis of no cointegration and conclude that there is cointegrating relationship among the variables.

Table 2: Bounds testing for cointegration

Test Statistic		**Critical Values (Restricted Intercept)**		**Significance level**
F-statistic	**3.858**	*I (0)*	*I (1)*	
		2.88	3.99	1%
		2.27	**3.28**	**5%**
		1.99	2.94	10%

5.2 The relative impact of banks and stock market on economic growth

The long-run estimates of the model are presented in Table 3. Technically, the results suggest that for every 1 percent increase in MKT, the RGDP increases by about 0.02 percent, while the latter decrease by about 0.015 percent when BNK increases by 1 percent. The coefficients of GOV and OPENN appear to be the only statistically significant variable among the control variables but they both have a negative sign.

The stock market indicator, MKT, has a long-run positive and statistically significant impact on economic growth while the coefficient of banking sector is negative and insignificant in promoting growth. This suggests that the effect of banks and stock market on Nigeria's economic growth is different. The insignificant effects of bank on growth could partly be explained by the failure of bank credits to be channelled to productive sectors of the economy.

Consistent with the findings of Lewis and Stein (1997), the negative sign is an indication of the growing disintermediation activities within the banking system in the 1980s and 1990s (which account for 2/3rd of our sample). The results of the error correction representation of the model are presented in Panel B-Table 3. We find that the short-run coefficients of both BNK and MKT are positive but statistically insignificant in the short-run, except for lag difference of MKT, which is negatively significant, suggesting that the stock market may be underdeveloped in the short-run. The positive sign of the BNK coefficient in the short-run and negative in the long-run is indicative of the declining impact of the bank lending to private sector in financing productive investment.

Table 3: Estimated outputs of long-run model and error correction representation

Dependent Variable	Independent Variables					
LNRGDP	LNGFCF	LNGOV	LNINF	LNOPENN	BNK	MKT
	0.140	-0.237**	0.008	-0.291**	-0.015	0.020*
	(1.415)	(-2.217)	(0.206)	(-2.815)	(1.490)	(3.122)

Panel B: Error Correction Model

Dependent variable: ΔLNGDP		
Constant	14.862	(3.290)
ΔLNGFCF	-0.042*	(-0.643)
ΔLNGOV	-0.020	(-0.523)
ΔLNINF	-0.026	(-1.360)
ΔLNOPENN	-0.138**	(-2.591)
ΔBNK	0.007	(-1.505)
ΔMKT	0.002	(1.095)
ΔMKT1	-0.005**	(-2.246)
ECM_{t-1}	-0.473*	(-3.168)
R^2 = 0.68613	F = 4.1291*	DW-statistic= 2.4178

Diagnostic Tests

A: Serial Correlation CHSQ (1)	3.174
B: Functional Form CHSQ (1)	0.168
C: Normality CHSQ (2)	1.182
D: Heteroscedasticity CHSQ (1)	0.490

Notes: *, ** and *** denote significance level at 1%, 5% and 10%. The *t*-statistics are in parenthesis.

The error correction term, ECM_{t-1} is negative and highly significant statistically. The ECM_{t-1} measures the speed at which economic growth adjusts to changes in the explanatory variables before converging to its equilibrium level. The error correction coefficient of -0.47 suggests that a deviation from the long-run equilibrium level of economic growth is corrected by about 47 percent in one year.

A number of diagnostic tests have been conducted including tests of autocorrelation, normality and heteroskedasticity in the error term, as well as stability and accuracy of the model as shown in Panel B of Table 3, in order to confirm the reliability of the error correction model. The results reveal no evidence of serial correlation and heteroskedasticity. The Jarque-Bera

normality test and Ramsey's RESET test suggest that the errors are normally distributed and the model is correctly specified. We also applied the CUSUM and CUSUMSQ tests to examine the stability of the coefficients. As shown in Figure 1 (Appendix ii), the CUSUM and CUSUMSQ statistics are well within critical bounds, implying that all the coefficients in the error correction model are stable during the sample period.

5.3 Banks and stock market at different levels of economic growth

The QREG analysis assesses how the role of banks and stock market differs at different levels of economic growth. The dependent variable LNRGDP is divided into three quantiles - 25th, 50th, and 75th respectively. In the first specification, we regress the three quantiles of LNRGDP against the financial structure indicators and the control variables. The second specification only includes the indicators of financial structure. Thus, the estimated coefficients would capture the sensitivity of economic growth associated with a change in private sector credit and market capitalisation at different percentile of real gross domestic output.

Table 4: Estimated outputs of quantile regression models

Variables	**OLS**	**Panel A: with all variables Quantile regression**		
LNRGDP		**.25 Quantile**	**.50 Quantile**	**.75 Quantile**
INTERCEPT	30.905*	29.824*	30.184*	29.644*
BNK	0.035	0.025*	0.011*φ	0.064* φ
MKT	0.013**	0.008*	0.026*φ	0.021* φ
LNGFCF	-0.041	-0.095	-0.062	-0.077
LNGOV	-0.215	0.022φ	-0.032	-0.119φ
LNINF	-0.041	-0.044	-0.029	0.005
LNOPENN	0.022	0.210φ	0.135**	0.208φ
Panel B: without control variables				
INTERCEPT	30.328*	30.232*	30.419*	30.162*
BNK	0.030*	0.028*	0.008	0.051*
MKT	0.016*	0.011*	0.032*	0.025*

Notes: * and ** significant level at 1% and 5%. φ denote significantly different quantile regression coefficients from OLS at 1% level of significance, when quantile regression coefficient is outside the confidence interval of the OLS coefficient.

Table 4 shows the estimates of OLS and QREG for the first specification that includes all variables. The variables of interest- BNK and MKT - are statistically significant at 1 percent level of significance. The coefficients are

also significantly different from the OLS estimates at the 50th and 75th percentiles of LNRGDP. Most of the QREG coefficients of the control variables are not significantly different from the OLS, except LNGOV and LNOPENN, both at 50th and 75th percentiles. These different effects of OLS and QREG are shown in Figure 2 in Appendix III. The graphs shows how the QREG estimates differ from those of OLS depending on the location of the QREG coefficients within or outside the confidence interval of the OLS. The OLS coefficient is plotted as the horizontal dotted line with the confidence interval as two horizontal lines around the coefficient line while the QREG coefficients are plotted as lines varying across quantiles with confidence intervals around them. It is easy to see that the OLS coefficients don't vary with quantiles. So, if the quantile coefficient is outside the OLS confidence intervals, then we can conclude there is a significant difference between quantile and OLS coefficients which is indicated by φ in Table 4. As shown in Figure 2, the quantile coefficients of LNINF and LNGFCF are not significantly different from that of OLS while LNGOV and LNOPENN are significantly different at lower and higher quantiles of LNRGDP. The BNK and MKT are also significantly different at 50th and 75th percentiles respectively.

A one percent increase in BNK results in the LNRGDP increase by about 0.025 percent at a lower level of LNRGDP (25th percentile), but only about 0.011 percent at the median (50th percentile) when all other variables are held constant. At a higher level of LNRGDP (75th percentile) however, the change in real output accounted for by BNK is about 0.064 percent. The marginal effect of MKT at the 25th percentile (0.008%) and 75th (0.021%) is much smaller than that of BNK, but higher at the median quantile (0.026%). This clearly suggests that the effects of BNK and MKT on LNRGDP is different across the three quantiles of the distribution of LNRGDP. Again, it can be noticed that the influence of MKT on LNRGDP only surpasses BNK at the median level of LNRGDP. There is an explanation for this outcome in the section on findings.

The second specification was estimated without the control variables to assess the independent effects of the financial system indicators on economic growth as shown in Table 4- Panel B. The results are not significantly different from those in Panel A, which means that even in the absence of control variables, the effects of BNK and MKT on LNRGDP remain almost the same.

Overall, the findings suggest that the relative impacts of BNK and MKT on LNRGDP vary significantly across different levels of real output, with BNK having a much larger effect at lower (25th percentile) and higher levels

(75th percentile) of LNRGDP while MKT has a higher marginal effect at the median level. These results are: (a) consistent with the findings of Demirguc-kunt et al. (2012) which support the view that financial institutions provide different financial services from those provided by financial markets (b) in contrast with the theoretical prediction , also supported by Demirguc-kunt et al., (2012); Gambacorta et al.(2014); Lee (2012), that as a country grows economically, the services provided by stock markets become more important for promoting economic activity than those provided by banks. Based on the relatively small sample size, it is found that banks play greater roles in Nigeria when real output level is high. This outcome is not surprising because cross-country variation in private sector credit as in Demirguc-kunt et al. (2012) for instance, may mask country–specific effects.

6. Discussion of Findings

The results of the ARDL model indicate an insignificant and negative coefficient of BNK, while for MKT is positive and statistically significant. This finding corresponds with the coefficients of median regression which is the 50th percentile in the QREG analysis. Thus, the results obtained from the two estimation techniques are not contradictory. However, the discussion is focused on the QREG coefficients because the QREG analysis appears to explain the data more than the ARDL model, and, therefore, plays a better role in capturing the effects of BNK and MKT at different distributions of real domestic output.

The main finding suggests that the banking sector is significantly more important to output growth than MKT at both lower and higher levels of economic growth. This result is logically plausible given the boom–and-burst circle that occurred in the sector during the sample period. There are several reasons that may explain these outcomes.

First, the 25th percentile of the sample constitutes the period before and after the structural adjustment programme which saw the deregulation of the financial system among other reforms. The deregulation of the sector attracted entry of new banks at a time when the stock market was not yet fully developed.

Second, the upsurge in the number of new entrants after the deregulation was surprisingly accompanied by financial disintermediation causing a huge decline in private sector credits in the 1990s (the 50th percentile of our sample). Beck et al. (2005) noted that while the number of banks increased during this period, financial intermediation in terms of deposits and credits

to private sector decreased because many of the new entrants were engaged in arbitrage and rent seeking activities rather than intermediation of funds. The banking system soon became volatile which brought it to a near state of collapse and its contribution to GDP decreased dramatically (Lewis & Stein, 1997). Thus, it is not surprising that the impact of the stock market on real output was larger than the banking sector during this period.

Third, the various banking reforms in the 2000s which (75th percentile of this study's sample) has placed the banking sector on a sound footing, enabling it to perform the primary role of lending to the private sector effectively. However, the strength of the sector was a direct result of the merger and acquisition within the industry and the raising of capital from the stock market (Oteh, 2010).

Fourth, the 2008 financial crisis has impacted negatively on the Nigerian stock market. The market capitalisation which peaked at a record high in 2008 had declined significantly in 2009 (Nwude, 2012). As shown in Table 4-Panel B, the coefficient of MKT at the 75th percentile (0.021) is lower than that of the median (0.026).

In sum, the results support the view that a bank-based system is better for a country at early stages of development while in the long-run when the economy grows bigger and financial needs increase, the stock market is able to play a leading role in financing investments (Gambacorta et al., 2014). As highlighted by Lin (2009), in early stages of economic development, most firms are small and so is their capital requirement. In this situation, the banks are most efficient in allocating financial resources and enhancing corporate governance. He argued that for a developing country, the core of the financial system should be small and local banks that are compatible with the level of maturity of the firms. The results are also consistent with some of the previous studies conducted in Nigeria such as Onwumere et al., (2013), Saibu et al. (2009) and Ujunwa et al. (2012).

7. Conclusion and Implications

The results based on the ARDL model suggest that the relative impact of stock market on Nigeria's economic growth is higher than the banking sector. However, the QREG analysis reveals that the banking sector plays a more important role at both lower and higher levels of economic growth. At a first glance, the two techniques may appear to have produced contradictory results, but both statistical and factual evidence show the results are consistent. The ARDL uses OLS to estimate the long-run model which

reveals average effects and because both the mean and median are measures of central tendency, the long-run coefficients almost correspond with the median coefficients of QREG. We thus, argue that the QREG analysis provides a better explanation of data and has effectively addressed the second objective of this study - the different influence of banks and stock market in terms of economic growth.

There is a substantial body of theory which predicts that as the economy of a country grows, the financial system becomes more market-based and the marginal effect of stock market on economic growth increases while that of banks decreases. In Nigeria however, at higher levels of growth, banks play a bigger role than the market. But on a long-run average, the theoretical prediction holds true, at least for relatively small sample size used in this study. This study suggests that the banking sector outperforms the market at higher levels of growth due to financial sector reforms since the early 2000s which are invariably skewed to the banking industry. Although at the lower level of growth, the banks' marginal effect was higher, it can be noted that the stock market was underdeveloped during that period.

Thus, Nigeria should pursue policies that are conducive for the stability and development of its banking sector. The banking industry should be encouraged to fund the private sector to boost production. Put differently, financial resources should be allocated to the most competitive and viable firms. Lin (2009), suggested that funds should be channelled towards investments for which the economy has comparative advantage. In addition, the share of total bank credits that goes to agriculture and services sector may be increased since they have significant contribution to GDP (Waheed, 2009). The outcome of the banking reforms which began in 2004 is clear: the industry now has fewer but much stronger banks. However, industry regulators must initiate policies to guard against external shocks such as the one witnessed during the financial crisis of 2008.

The findings of this study support the view that bank-based financial system is a better option for Nigeria at early stages of development. However, as the economy becomes more developed, existing firms grow bigger and new firms emerge which mean capital requirement also becomes larger and it would be risky for banks to provide such large capital financing. To diversify risk and develop alternative means of financing investment, there is a need for Nigeria to have a strong stock market. This is especially important now as Nigeria is the biggest in Africa and the growth prospects of the real sector becomes much brighter due to the confidence on the economy after a successful general election in April, 2015.

Notes

1. 1) Macro-economic instability caused by large and sudden capital inflows, 2) Major failures in corporate governance at banks, 3) Lack of investor and consumer sophistication, 4) Inadequate disclosure and transparency about financial position of banks, 5) Critical gaps in regulatory framework and regulations, 6) Uneven supervision and enforcement, 7) Unstructured governance & management processes at the CBN/Weaknesses within the CBN, 8) Weaknesses in the business environment
2. 1) total value traded ratio, 2) bank credit ratio, 3) market capitalization ratio, 4) bank credit ratio, 5) overhead costs
3. Bank Lending Ratio and market Capitalization Ratios
4. Nigeria is not included in his sample
5. They employed Granger causality test and fully modified OLS as well as VECM, and their sample included seven African developing countries including Nigeria.
6. He used private sector credit to GDP as the indicator of bank-based financial development and the ratio of market capitalization to GDP as the market-based financial development indicator.
7. The financial services view of financial structure emphasises the importance of the overall level and quality of financial services rather than the institutional arrangements through which the services are provided (Dolar & Meh, 2002). Hence, the issue is not about bank versus market but the creation of a conducive environment for both banks and market to perform their growth enhancing roles.

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Appendix I

Consider the simplest AK model in which aggregate output is proportional to the aggregate capital stock

$$Y_t = AK_t \tag{1}$$

where Y_t is aggregate output in period t produced by capital, K is the stock of capital and A is a positive constant symbolising the level of technology or capital productivity. The AK model assumes that the economy produces one type of good with capital as the only factor input. Assume further, there is no population growth and capital depreciates at a constant rate of δ per period such that:

$$K_{t+1} = I_t + (1 - \delta)K_t \tag{2}$$

Where K_{t+1} is the capital stock in period t+1, I_t is gross investment and δ is the rate of depreciation. It is also assumed that when the economy is in autarky, the equilibrium condition in the capital market requires that gross savings S_t equal gross investment I_t. Because a proportion of savings 1-φ is lost in the process of financial intermediation, the saving-investment relationship is described as:

$$\varphi\, S_t = I_t \tag{3}$$

Where S_t is gross savings and φ is the share of savings available for investment. If we denote the gross, savings rate $\frac{S}{Y}$ as s so that:

$$s = \frac{S_t}{Y_t} = \frac{S_t}{AK_t} \tag{4}$$

Then the steady-state growth rate, g is expressed as:

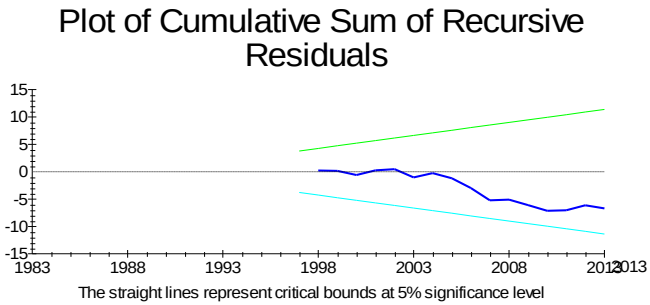
$$g = \frac{K_{t+1} - K_t}{K_t} = \frac{I_t + (1-\delta)K_t - K_t}{K_t} = \frac{\varphi\, S_t}{K_t} - \delta$$

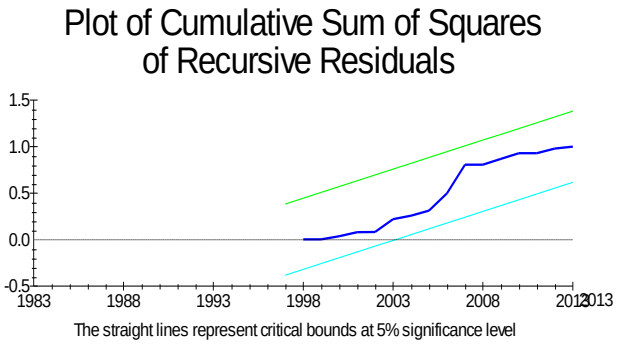
$$g = A\, \varphi\, s - \delta \tag{5}$$

Equation (5) reveals three possibilities in which financial development can affect growth: i) It may increase the productivity of capital, A; ii) it can improve the private savings rate s; and iii) it can raise the proportion of saving, φ channelled to investment.

Appendix II

Figure 1: CUSUM and CUSUMSQ test for stability





Appendix III

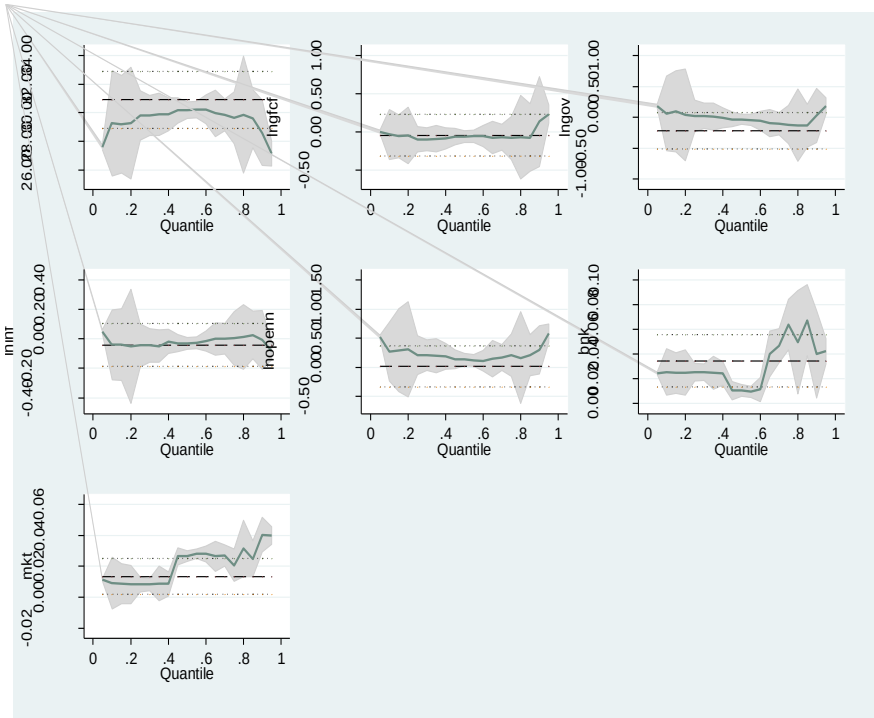



Figure 2: QREG graphs for all variables