



Relative Impact of Financial Sub-Sectors on Poverty Level: A Disaggregated Effect of Financial Sector Development in Nigeria

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Abstract

The study examined the relative impact of financial sub-sectors on poverty level in Nigeria within an error correction framework by employing annual time series data spanning the period 1981 to 2014. Unlike previous studies, an index was created through Principal Component Analysis (PCA) as a proxy for poverty reduction from seven frequently used proxies in the literature. The study found an evidence of long run equilibrium relationship among banking sector development, stock market development, central bank development and poverty reduction in Nigeria. The study also found that stock market development and the central bank development contribute significantly to reducing poverty incidence in Nigeria though very minimal. However, banking sector development has a significant negative effect on poverty reduction in the long run. Hence, the study concluded that credits, loans and other advances provided by banking sector were not channeled to the appropriate private sectors to ensure adequate funding of small and medium enterprises (SMEs) from where poor people could benefit.

Keywords: Stock market development, Banking sector development, central bank development, Error Correction Mechanism (ECM), Poverty, Growth

Introduction

The impact of financial sector development on poverty level has been the subject of extensive research over the past few decades. The controversy generated from this debate is far from being settled. Three unique views on this issue can be gleaned from the literature.

Generally, some authors unequivocally advocate financial sector development that it has positive effect on poverty reduction either directly through providing services and employment opportunities for the poor or indirectly through its positive effect on economic growth, and how the gains from

growth are redistributed to the poor. One channel works indirectly through growth, the other works directly through the poor benefiting from accessing financial services (Fowowe and Abidoye, 2012; Zhuang *et al.*, 2009). However, the opinion of second group of authors was that the positive effects of financial sector development on economic growth were eroded by financial instability and income inequality which are frequently associated with development in the financial sector (see Dauda and Makinde, 2014; Saibu, Nwosa and Ajuwon, 2012; Jeanneney and Kpodar, 2008). Meanwhile, few authors hold the third view that the impact of financial sector development is neutral on economic growth and poverty reduction in the long run. In spite of this controversy, the views of the first group of authors dominate in the literature.

Moreover, the financial system in Nigeria became liberalized in the mid-1980s through the introduction of the Structural Adjustment Programme (SAP). Due to this reform, the system had undergone significant changes in terms of the policy environment, number of institutions, ownership structure, depth and breadth of markets, as well as in the regulatory framework. Similarly, the financial sector became more vibrant and constituted a stronghold of growth in Nigeria with the implementation of bank consolidation policy in 2005 (Dauda and Makinde, 2014). Well-developed financial institutions provide funds to businesses as well as play a role as advisory institutions that facilitate economic and industrial growth, and as a result they create employment opportunities in the economy (King and Levine, 1993). On the other hand, poverty reduction is a common objective of all developing countries and achieving some level of economic growth from where poverty reduction could be attained remains an important issue. The growth in the economy of any nation is a clear indication of an

improvement in the socio-economic well-being of her people. Also, a deterioration in the growth rate as shown in most developing countries is thus a manifestation of fall in the standard of living of the people that cumulates into poverty (Ijaiya, Ijaiya, Bello and Ajayi, 2011).

In recent years, attention has been shifted to rapid economic growth as measured by rate of growth in real gross domestic product, per capita national income, price stability and declining unemployment, among others to achieve poverty reduction. In order to achieve economic growth in Nigeria which could in turn ensure poverty reduction, macroeconomic factors such as financial sector development, stable macroeconomic policies, huge investment in agriculture, infrastructural development and good governance are required (Dauda and Makinde, 2014). For the purpose of achieving poverty reduction in Nigeria, there has been an increased interest on the impact of financial sector development through economic growth. More importantly, the relationship between financial sector development and economic growth has surfaced in the limelight of economic debate among development economists in the last two decades, but the relationship between financial development and poverty reduction has not been given similar attention in the literature.

A considerable amount of debate has been generated in the literature over the years as regards the relationship between financial development and poverty reduction without any consensus whatsoever. Although, a growing body of evidence on this relationship looked at financial sector development in its overall sense (*see* Shahbaz and Rehman, 2013; Kolawole 2013; Udoh and Ogbuagu, 2012; Ellahi, 2011; Odhiambo, 2009) without giving much consideration to relative dominance of different sub-sectors of finance in different

countries (*see* Nyasha and Odhiambo, 2015; Khan, Khan, Ahmad and Siraj, 2011; Odhiambo, 2010) which could exert significantly different influence on the real sector in developing countries including Nigeria. In the light of this, Seetanah *et al.* (2010) argues that banking sector, stock market sector and other financial institutions are not substitutes but rather complementary in the process of achieving economic growth and poverty reduction in the economy. That is, bank-based financial development and market-based financial development could exert different impact on economic growth (Nyasha and Odhiambo, 2015), and invariably on poverty reduction objective.

However, efforts have been made to strengthen the financial sector in Nigeria through many reforms ranging from financial liberalization to bank consolidation, merger of banks and re-capitalisation. For this purpose, huge amount of resources have been expended, but whether these reforms and investment in this sector have produced the intended results such as an increase in economic growth, leading to a reduction in the poverty level has constituted an issue of continuous debate among academic scholars and policy makers. Hence, the need for this study.

Thus, the purpose of this study is to examine whether banking sector development, stock market development and central bank development (this is the ability of CBN to deepen financial system by ensuring adequate supply of money into the economy while bearing in mind the rate of inflation that could damage the entire system, and it was measured by the ratio of broad money supply to GDP) exert significantly different impact on poverty reduction in Nigeria over the period of 1981 to 2014. Therefore, this present study adds to the existing literature by providing relative importance of financial sub-

sectors on poverty reduction in Nigeria. The rest of the study is organized as follows: Section 2 presents the literature review; while methodology and data sources for the study were presented in section 3. In section 4, the interpretation of empirical results of the study was presented while conclusion and policy recommendations were presented in section 5.

Review of Relevant Literature

In the existing literature, a number of studies have examined the relationship between financial sector development and poverty level. Also, few studies have examined this relationship by modelling financial development, economic growth and poverty reduction in a single framework for policy purposes, but there are few studies on the impact of disaggregated financial sector on economic growth or poverty level (*see* Nyasha and Odhiambo, 2015; Saibu *et al.*, 2012; Khan *et al.* 2011; and Seetanah *et al.* (2010).

For instance, Nyasha and Odhiambo (2015) disaggregated financial sector and examine the impact of bank-based financial development and market-based financial development on economic growth and found that there is a positive relationship between bank-based financial development and economic growth, but the study failed to establish any relationship between market-based financial development and economic growth in South Africa. In the study of an empirical analysis of financial development, financial volatility and poverty reduction in Nigeria, with time series data spanning the period of 1986 to 2010 and using both bivariate and multivariate causality tests.

Saibu *et al.*, (2012) categorised variables representing financial sector into two categories; the banking sector as the primary credits market, represented as the ratio of credit to the private sector to gross domestic product (CPS/GDP) and the second category

represents the stock market, proxy as the ratio of trading volume to market capitalization (that is turnover ratio). The study concluded that financial development and financial instability using the banking indices had net positive effect on poverty level. With respect to stock market indices, financial development is observed to have net positive effect while financial instability is observed to have net negative effect.

In a similar way, Khan *et al.* (2011) disaggregated financial sector into banking sector, insurance companies, stock market and bond market for the purpose of estimating effect of financial sector development on poverty for different countries. For banking sector, the following variables are used; central bank assets to GDP (CBA), deposits money banks assets to GDP (DMB), bank deposits (BD), concentration, overhead costs and net interest rate. For insurance company, non-life insurance is used as the variable; to capture the effect of stock market variable, stock market turnover ratio is utilised.

For bond market, both market capitalization to GDP and public bond market capitalization to GDP are used. The study found that the banking sector variables (CBA, DMB and BD) provided a negative relationship between poverty and financial sector development because all the banking sector variables are negatively related to poverty level. Similarly, stock market variables also show negative relationship and they are highly significant while insurance and bond market variables are not significant. The study thus concluded that banking and stock market sector are the only financial sub-sectors that facilitated poverty reduction in the selected countries.

However, Seetanah *et al.* (2010) examined the dynamic relationships among stock market development, banking sector development and economic growth through panel VAR

framework in 27 developing countries over a period of 15 years (1991-2007). The study found that both stock market development and banking sector development contribute positively to economic growth. They also concluded that in developing countries at least, the banking sector's contribution to economic performance is relatively higher than stock market development.

On the relationship between the overall financial sector development and poverty reduction, Jeanneney and Kpodar (2008) investigated how financial development helps to reduce poverty directly through McKinnon conduit effect and indirectly through economic growth. The results obtained with data from a sample of developing countries from 1966 through 2000, using the system GMM estimator, suggest that the poor benefit from the ability of the banking system to facilitate transactions and provide savings opportunities to some extent fail to reap the benefit from greater availability of credit. They also concluded that financial development is accompanied by financial instability which is detrimental to the poor.

Nevertheless, the benefits of financial development for the poor outweigh the cost. Similarly, in their study, Inoue and Hamori (2010) examined empirically whether financial deepening has contributed to poverty reduction for 28 states and union territories in India between 1973 and 2004 using dynamic generalised method of moments (GMM), they found that financial deepening and economic growth alleviate poverty, while international openness and inflation rate have the opposite effect.

In Africa, Odhiambo (2010) empirically analysed the causal relationship between financial development and poverty alleviation in Zambia from 1969 to 2006. She examined the effect of three proxies for financial

development, namely: M_2/GDP , private credit/GDP, and domestic money bank assets; on per capita consumption, a proxy for poverty levels. Using a bivariate causality test based on an Error Correction Model (ECM), she found that financial development seems to cause poverty reduction when private credit and domestic money bank assets are used, while the reverse causality is found when M_2/GDP is used. In a country specific study, Ellahi (2011) examined the co-integration and causality between development of financial sector, indicators of economic growth and poverty reduction in Pakistan during the period of 1975 to 2010 through multivariate Vector Error Correction Model (VECM). The study noted that economic growth is the policy variable to accelerate financial sector development and both could be used as the policy variable to reduce poverty in the economy.

Fowowe and Abidoye (2012) applied the System GMM estimator of Arellano and Bover (1995) and Blundell and Bond (1998) to assess the effect of financial development on poverty and concluded that the level of private credit in the economy, though negatively signed as expected, was not a significant determinant of poverty reduction in Sub-Saharan African countries. This implies that private credit as a measure of financial development does not significantly affect the poor in Sub-Saharan African countries. In the same vein, Dhrifi (2013) assessed the effect of financial development on poverty reduction by building a model of simultaneous equations on a sample composed of 89 countries over the period 1990 to 2011. The findings support that while the indirect effect of financial development on poverty is not robust and ambiguous, the direct effect of financial development, through the channels of insurance, access to credit services and savings, is robust to reducing poverty. It was also found that this effect depends on the

magnitude and sign of the effects of financial development on inequality and growth. The study concluded that it is certainly useful to encourage financial development and create microfinance institutions designed to provide microcredit to poor households since they do not directly benefit from the financial services provided by the formal financial sector in developing countries.

Using vector autoregressive (VAR) model and impulse response analysis, Dauda and Makinde (2014) examined the nexus between financial sector development and poverty reduction in Nigeria using annual time series from 1980 to 2010. The evidences from both the VAR and impulse response showed that the indirect effect on economic growth exerts the strongest influence on poverty reduction in the short run but could be detrimental to the poor in the long run due to the adverse effect of income inequality. The study concluded that the relationship between poverty and the financial deepening proxied by broad money supply (M_2) is negative and significant. Hence, the McKinnon conduit effect is the likely main transmission channel through which the poor benefit from the financial sector development in the long run. Also, credits to private sector, contrary to the general belief, have failed to cause a reduction in the incidence of poverty in Nigeria.

In summary, there few studies on the disaggregated effect of financial sector development on poverty level in Nigeria, to the best of our knowledge. The only available study of this nature on Nigerian economy is that of Saibu *et al.* (2012) where they incorporated volatility in the analysis. However, the introduction of financial instability in the model could influence the overall outcome of the study because accounting for volatility in the same model has an inherent ability to undermine the individual effect of financial development

decomposed into banking and stock market indices. Therefore, this present study intends to fill this gap by employing Principal Component Analysis (PCA) to synthesis seven frequently used proxies in the literature for poverty including income-based, consumption-based and other social economic variables, bearing in mind the likely error of aggregation that is peculiar to PCA.

Methodology and Model Specification

The theoretical relationship between finance and poverty explained by Kuznet (1955) has been subjected to further scrutiny. Kuznets (1955) argues that income inequality depends on the sectoral structure of an economy in which financial sector plays a crucial role. An inverted U-shaped relationship between income inequality (an indicator of poverty) and financial sector development proposed by Kuznet(1955) was consequently supported by Greenwood and Jovanovic's (1990) model, with income inequality (poverty) first increasing and then decreasing – before eventually stabilizing, as more people participate in the financial sector (the *inverted u-shaped hypothesis*). Recently, several models had provided contradicting conclusion by suggesting that capital market imperfections might affect income inequality during economic development. One of these models was developed by Clarke, Xu and Zou (2003).

In their alternative model linking income inequality (poverty) and financial sector development, Clarke, Xu and Zou (2003) explained a reduction in poverty (income inequality) as economies develop their financial sector but not necessarily implied U-shaped relationship between income inequality and financial sector development. Thus, the alternative model developed by Clarke, Xu and Zou (2003) is adopted and

modified to explain the relationship between poverty and financial sector development.

$$\ln(GiniCoeff) = \alpha_0 + \alpha_1(FINANCE) + \alpha_2CV + \varepsilon \quad (1)$$

Equation 1 is the original Clarke, Xu and Zou's (2003) alternative model, where Ginicoeff (indicator of poverty level) is dependent on financial sector development (FINANCE) and other control variables (CV). For the purpose of this present study, the functional relationship between poverty and financial sector development is expressed below:

$$POV_t = f(FSD_t, CV_t) \quad (2)$$

Where, POV_t represents poverty index at time t, FSD_t represents financial sector development at time t while CV_t represents other control variables in the model. However, with a view to examining the effect of financial sub-sectors, financial sector development (FSD) is disaggregated into Banking Sector Development (BSD), Stock Market Development (SMD) and Financial Development engineered by Central Bank of Nigeria through its policies and activities (CBD), thus, equation (2) can thus be re-specified as:

$$POV_t = f(BSD_t, SMD_t, CBD_t, CV_t) \quad (3)$$

As regards other control variables (CV), economic growth is fundamental in poverty reduction process. Theoretically, two channels have been identified through which financial sector development transcends to poverty reduction in the literature. Zhuang *et al.* (2009) and Fowowe and Abidoye (2012) explained that the relationship between financial development and poverty could either be direct or indirect. On the indirect link, financial development promotes economic growth (Y) which is beneficial to

the poor. That is, enhanced economic growth (Y) resulting from financial development could culminate in poverty reduction (Saibu *et al.*, 2012). The indirect link shows how financial deepening exerts a positive effect on economic growth, and how the gains from growth are channeled to the poor. One channel works indirectly through growth, the other works directly through the poor benefiting from accessing financial services. Following Honohan (2004), Jeanneney and Kpodar (2005) and Fowowe and Abidoye (2012), financial development helps to reduce poverty directly through McKinnon conduit effect and indirectly through economic growth, and economic growth also depends on financial development. This occurs because an increase in capital stock will lead to an increase in investment level and this will result to an increase in output from where poverty could be reduced. Thus, economic growth (Y) is included in the model.

Moreover, other variables that are central to the analysis of poverty reduction include human development and trade openness. An increase in human capital investment is expected to ensure significant reduction in the level of poverty. Trade openness is included because it is believed that the more open a country to international trade, the more developed is its financial sector. We also include the inflation rate as a control variable conjecturing that monetary instability hurts the poor and the middle class relatively more than the rich, because the latter have better access to financial instruments that allow them to hedge their exposure to inflation. Thus, inflation rate is another significant variable that has a serious effect on the level of economic growth and on the welfare of the poor in a country. In addition to the above control variables, McKinnon (1973) and Shaw (1973) identifies saving rate as a key

determinant of economic growth. They explain that the higher the saving rate, the higher the economic growth will be; and financial sector development will affect the saving rate by at least three ways, namely: lowering the cost of borrowing through providing risk diversification; accommodating liquidity preference and lowering liquidity constraints; and lowering informational costs and increasing operational efficiency (Dauda and Makinde, 2014). This saving rate is however determined by real interest rate on savings. Therefore, real interest rate is included in the model as a control variable. By incorporating these control variables, we have:

$$POV_t = f(Y_t, BSD_t, SMD_t, CBD_t, HD_t, TOP_t, INF_t, R_t) \quad (4)$$

However, considering multicollinearity problem which could occur as a result of incorporating predictors measuring the same construct in the same model, correlation among the independent variables were considered. The correlation matrix of the predictors (see appendix 3) indicated that there was a considerable level of association among the independent variables; thus equation 4 could be estimated without a fear of multicollinearity. POV_t represents poverty reduction at time t, Y_t is the level of economic growth at time t, BSD_t represents banking sector development at time t, SMD_t represents stock market development at time t, CBD_t represents Central Bank development at time t, HD_t is the human development, TOP_t is the trade openness and INF_t is the inflation rate at time t.

In line with the theoretical framework, and in order to establish the relationship among financial sub-sectors, economic growth and poverty reduction, the log-linear form of equation (4) is expressed in the model below:

$$\ln Pov_t = \alpha + \beta \ln Y_t + \vartheta \ln BSD_t + \phi \ln SMD_t + \delta \ln CBD_t + \omega \ln R_t + \pi \ln INF_t + \eta \ln TOP_t + \sigma \ln HD_t + \varepsilon_t \quad (5)$$

Where ε_t is the stochastic error term which is white noise in its characteristics and represents all other factors that affect poverty reduction in the economy.

However, there is an evolution in the economic behaviour of countries over time, and a dynamic model is therefore required to explain the relationship among finance, growth and poverty (Ellahi, 2011). Thus, an Autoregressive Distributed Lag (ARDL) model is developed to explore the impacts of financial sub-sectors on poverty reduction. Pesaran, Shin, and Smith (1997, 1999, 2001) have developed a new Autoregressive Distributed Lag (ARDL) model which have more advantages than the Johansen cointegration approach and other previous approaches. First of all, the ARDL approach can be applied irrespective of whether the regressors are purely I(1) or purely I(0) or the combination of I(1) and I(0). Second, while the Johansen cointegration techniques require

large data samples for validity, the ARDL procedure provides statistically valid result in small samples (Pesaran and Shin, 1997; 1999; Narayan, 2005; Udoh and Ogbuagu, 2012). That means it avoids the problem of biasness that arise from small sample size. Third, the ARDL procedure provides unbiased and valid estimates of the long run model even when some of the regressors are endogenous (Harris and Sollis, 2003; Pesaran and Shin, 1999; Ang, 2007). Furthermore, in using the ARDL Approach, a dummy variable can be included in the co-integration test process, which is not permitted in Johansen's method (Rahimi and Shahabadi, 2011). Therefore, based on the above mentioned advantages, this study employed the ARDL method of co-integration to investigate the relationship among financial sub-sector development, economic growth and poverty reduction. Based on this, the autoregressive distributed lag model from equation 5 was expressed as :

$$\begin{aligned} \Delta \ln Pov_t = & \alpha + \sum_{j=1}^p \theta_j \Delta \ln Pov_{t-j} + \sum_{j=0}^p \beta_j \Delta \ln Y_{t-j} + \sum_{j=0}^p \vartheta_j \Delta BSD_{t-j} + \sum_{j=0}^p \phi_j \Delta SMD_{t-j} + \sum_{j=0}^p \delta_j \Delta CBD_{t-j} \\ & + \sum_{j=0}^p \omega_j \Delta R_{t-j} + \sum_{j=0}^p \pi_j \Delta INF_{t-j} + \sum_{j=0}^p \eta_j \Delta TOP_{t-j} + \sum_{j=0}^p \sigma_j \Delta \ln HD_{t-j} + \lambda_1 \ln Pov_{t-1} + \lambda_2 \ln Y_{t-1} \\ & + \lambda_3 BSD_{t-1} + \lambda_4 SMD_{t-1} + \lambda_5 CBD_{t-1} + \lambda_6 R_{t-1} + \lambda_7 INF_{t-1} + \lambda_8 TOP_{t-1} + \lambda_9 \ln HD_{t-1} + \varepsilon_t \end{aligned} \quad (6)$$

In order to give detailed analysis of the short and long run impact of financial sub-sector development and economic growth on poverty reduction, and to explain the speed of adjustment of poverty to changes in financial

development and economic growth in the long run, the ECM form is specified by reparametising equation (6) to arrive at a reduced form of equation specified as:

$$\begin{aligned} \Delta \ln Pov_t = & \alpha + \sum_{j=1}^p \theta_j \Delta \ln Pov_{t-j} + \sum_{j=0}^p \beta_j \Delta \ln Y_{t-j} + \sum_{j=0}^p \vartheta_j \Delta BSD_{t-j} + \sum_{j=0}^p \phi_j \Delta SMD_{t-j} + \sum_{j=0}^p \delta_j \Delta CBD_{t-j} \\ & + \sum_{j=0}^p \omega_j \Delta R_{t-j} + \sum_{j=0}^p \pi_j \Delta INF_{t-j} + \sum_{j=0}^p \eta_j \Delta TOP_{t-j} + \sum_{j=0}^p \sigma_j \Delta \ln HD_{t-j} + \rho ECM_{t-1} + \varepsilon_t \end{aligned} \quad (7)$$

$$ECM_{t-1} = \ln Pov_{t-1} + \rho_2 \ln Y_{t-1} + \rho_3 BSD_{t-1} + \rho_4 SMD_{t-1} + \rho_5 CBD_{t-1} + \rho_6 R_{t-1} + \rho_7 INF_{t-1} \\ + \rho_8 TOP_{t-1} + \rho_9 \ln HD_{t-1}$$

$$\rho = \lambda_1 - 1$$

$$\rho_2 = \frac{\beta + \lambda_2}{1 - \lambda_1}, \quad \rho_3 = \frac{\vartheta + \lambda_3}{1 - \lambda_1}, \quad \rho_4 = \frac{\phi + \lambda_4}{1 - \lambda_1}, \quad \rho_5 = \frac{\delta + \lambda_5}{1 - \lambda_1}, \quad \rho_6 = \frac{\omega + \lambda_6}{1 - \lambda_1}, \quad \rho_7 = \frac{\pi + \lambda_7}{1 - \lambda_1}, \quad \rho_8 = \frac{\eta + \lambda_8}{1 - \lambda_1}, \\ \rho_9 = \frac{\sigma + \lambda_9}{1 - \lambda_1}$$

ρ measures the speed of adjustment and $\rho_2 \dots \rho_9$ are the long run parameters.

Here, the short run dynamic coefficients of the model's convergence to equilibrium are θ , β , ϑ , ϕ , δ , ω , π , η and σ while ρ is the speed of adjustment. The above ECM could be viewed as comprising the short run transitory effects and the long run impacts.

Technique of Analysis and Sources of Data

It is essential to determine the order of integration of each of the variable series in order to avoid spurious regression; and to employ autoregressive distributed lag (ARDL) method. Although, the ARDL test does not necessarily require the pretesting of variables but the unit root test provides guidance as to whether ARDL is applicable or not because it is only applicable to the analysis of variables that are integrated of order zero [I(0)] or order one [I(1)] or combination of both, but not applicable when higher order of integration such as I(2) variable is involved (Nyasha and Odhiambo, 2014). Thus, the Augmented Dickey-Fuller (ADF) of Dickey and Fuller (1981) and Phillip-Perron techniques are used to investigate the stationarity of the variables. To achieve the objective of the study, equation (7) is estimated. The short run impact of financial sub-sectors development and economic growth on poverty reduction are

analysed by estimating the short run coefficients (θ , β , ϑ , ϕ , δ , ω , π , η and σ), with focus on the significance of β , ϑ , ϕ and δ respectively using t-statistic for comparison. ρ is the speed of adjustment of poverty to shocks in the financial development, economic growth and other independent variables. However, the estimate of ρ must be negative and statistically significant to ensure convergence to the long run equilibrium. Furthermore, Poverty Reduction Index (POV) is obtained from the combination of seven frequently used variables for poverty reduction in the literature through principal component analysis (PCA) (see Appendix 1). This is done to cater for multidimensional nature and depth of poverty in Nigeria which makes it inappropriate for a single variable to reflect its true picture in the country.

Annual data on credit to private sector as a percentage of GDP (a proxy for banking sector development), broad money supply (M2) as a percentage of GDP (a proxy for financial development engineered by Central Bank of Nigeria), total volume of stock traded as a share of stock market capitalization (a proxy for stock market development), government capital expenditure on social and community services (a proxy for human development) and real gross domestic product (economic growth) are sourced from the Publication of Central Bank of Nigeria's (CBN) Statistical Bulletin, 2014 edition while

Per capita consumption, agriculture value added per worker, life expectancy at birth, per capital real gross domestic product, primary school enrolment, total survival rate, maternal mortality rate, inflation rate, real interest rate and trade openness are sourced from World Development Indicator (WDI), 2015.

Results and Discussion

Unit Root Test

The results of the unit root test for the variables used in the study are as shown in Table 1. The table shows the Augmented

Dickey-Fuller (ADF) and Phillips-Perron (PP) tests results. The results of the unit root tests in Table 1 shows that poverty index, banking sector development, central bank development and stock market development, log of real gross domestic product, log of government capital expenditure on health and education (HD) and inflation rate are all stationary at first difference in both Augmented Dickey-Fuller and Phillips-Perron tests. Meanwhile, real interest rate and trade openness are stationary at level in both Augmented Dickey-Fuller and Phillips-Perron tests.

Table 1: Unit Root Test Results

Augmented Dickey – Fuller (ADF)				Philip Perron (PP)		
Variable	Levels	First Diff	Order of Integration	Levels	First Diff	Order of Integration
POV	1.0197 (0.9958)	-4.9236 (0.0004)**	I (1)	0.7560 (0.9916)	-4.9799 (0.0003)**	I (1)
BSD	-1.9036 0.3267	-5.7577 (0.0000)**	I (1)	-1.8100 (0.3693)	-8.8647 (0.0000)**	I (1)
CBD	-2.0401 (0.2691)	-5.3232 (0.0001)**	I (1)	-2.0606 (0.2611)	-5.8094 (0.0000)**	I (1)
SMD	-2.6385 (0.0957)	-8.4642 (0.0000)**	I (1)	-2.5154 (0.1211)	-10.3842 (0.0000)**	I (1)
Y	1.7605 (0.9995)	-4.2478 (0.0022)**	I (1)	1.7605 (0.9995)	-4.2328 (0.0023)**	I (1)
LHD	-0.1080 (0.9404)	-8.3018 (0.0000)**	I (1)	0.4291 (0.9813)	-91299 (0.0000)**	I (1)
TOP	-4.8295 (0.0004)**		I (0)	-4.8388 (0.0004)**		I (0)
RR	-5.8469 (0.0000)**		I (0)	-5.8471 (0.0000)**		I (0)
INF	-2.7079 (0.0834)	-5.2629 (0.0001)**	I (1)	-2.6199 (0.0992)	-8.2817 (0.0000)**	I (1)

Source: Author's Computation, 2016.

Note: The values in the parenthesis () are the probability values; (**) indicates significance at 5% level; POV, LRGDP, LHD, TOP, RR, INF, BSD, CBD and SMD represent poverty index, natural logarithm of real gross domestic product, natural logarithm of human development proxied by government capital expenditure on social and community services, trade openness, real interest rate, inflation rate, Banking Sector Development, Central Bank Development and Stock Market Development respectively.

Hence, the ARDL model is applicable because of its flexibility in the order of integration. This result provides a reasonable

justification for the application of ARDL bound testing approach to cointegration which is flexible and advantageous in the

order of integration as opposed to Engle-Granger approach to cointegration, Johansen approach to cointegration, etc. Engle-Granger approach and Johansen approach to cointegration require all variables to be stationary at first difference, but this is not the case as far as variables of this study are concerned.

Diagnostic Tests

Testing for serial correlation, heteroskedasticity and stability of the model has become necessary in time series analysis to avoid making spurious inferences. Autocorrelation, simply put, explains a situation where a variable is influenced by its lagged values while heteroskedasticity has to do with the circumstance in which the variability of a dependent variable is unequal across the range of values of an independent variable that predicts it.

Table 2 shows that the probability values (0.1583 and 0.1471) are greater than 0.05 levels of significance which imply that the null hypothesis of no serial correlation cannot be rejected. Thus, this necessitates the acceptance of null hypothesis and therefore concludes that the model has no serial correlation problem.

Table 3 shows that the probability values (0.4035, 0.3549 and 0.9719) are greater than 0.05 level of significance, and this implies that the null hypothesis of homoscedasticity cannot be rejected. Thus, this necessitates the acceptance of null hypothesis and therefore concludes that the model has equal variance (homoscedastic).

Stability Test

The stability of the model is tested via Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares

of Recursive Residuals (CUSUMSQ) tests. In figure 1 and 2, the blue line is between the upper and lower limits (the two red lines) in both Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) respectively. This implies that the model is stable when estimated at lag 1.

Lag Selection Criteria

In order to test the relationship among financial sub-sectors through the application of the ARDL bound testing approach, it is important to identify an appropriate lag length. Table 4 presents the maximum lag length selected by Information Criteria. Schwarz Information Criterion (SIC) and LR test statistic (LR) selected maximum lag length of 1 while Final Prediction Error (FPE), Akaike Information Criterion (AIC) and Hannan-Quinn (HQ) selected maximum lag length of 2.

Long Run Equilibrium Relationship

The null hypothesis to be tested here is $H_0: \lambda_j = 0$, (where $j = 1, 2, \dots, 9$) in equation (6). This implies no long run relationship among the variables, against the alternate hypothesis, $H_1: \lambda_j \neq 0$, which implies the existence of long run relationship among the variables. The ARDL (1, 0, 1, 1, 0, 0, 1, 0, 0) was estimated with SIC. (see appendix 2). The bound test result is presented in table 5. The autoregressive distributed lag (ARDL) model is with unrestricted intercept and no trend.

Table 5 shows the result of bound test and critical values provided by Pesaran *et al.* (2001). Here, the F-statistic is compared with the critical bounds at 5% level of significance with unrestricted intercept and no trend (Upper bound is 3.39 and Lower bound is

2.22). However, the F-statistic of 4.070137 is greater than the upper bound (3.39) and this necessitates the rejection of null hypothesis of no long run relationship among the variables. Hence, the alternate hypothesis is accepted. That is, there is a long run equilibrium relationship among financial sub-sector development (banking sector development, Central bank development and stock market development), economic growth and poverty, and other variables such as real interest rate, human development, inflation rate and trade openness. This finding shows that there is long run relationship among financial sub-sector development, economic growth and poverty over the study period in

Nigeria. The implication of this result is that any policy implemented towards improving financial sector and the level of economic performance will not only affect poverty level in the short run but also in the long run. This finding is in contrast to the result reported by Aye (2013) in Nigeria. However, the finding is in line with the result obtained for the Indian economy by Pradhan (2010), Uddin *et al.* (2013) in Bangladesh, Ellahi (2011); Shahbaz and Rehman (2013) in Pakistan in which they found out that long run equilibrium relationship exists among financial development, economic growth and poverty.

Autocorrelation Test

Table 2: Breusch-Godfrey Serial Correlation LM Test

F-statistic	2.045675	Prob. F(2,18)	0.1583
Obs*R-squared	6.111648	Prob. Chi-Square(2)	0.1471

Source: Author's Computation, 2016.

Heteroskedasticity Test

Table 3: Breusch-Pagan-Godfrey Heteroskedasticity Test

F-statistic	1.110721	Prob. F(12,20)	0.4035
Obs*R-squared	13.19722	Prob. Chi-Square(12)	0.3549
Scaled explained SS	4.529292	Prob. Chi-Square(12)	0.9719

Source: Author's Computation, 2016.

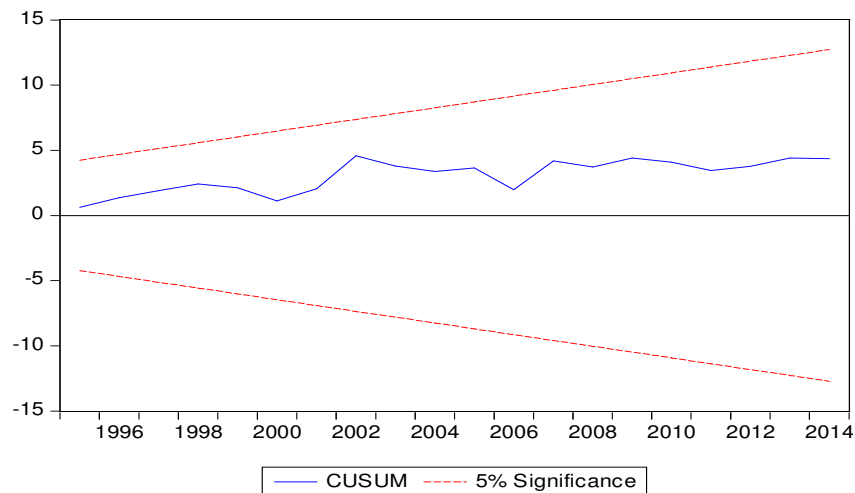


Figure 1: CUSUM test for stability

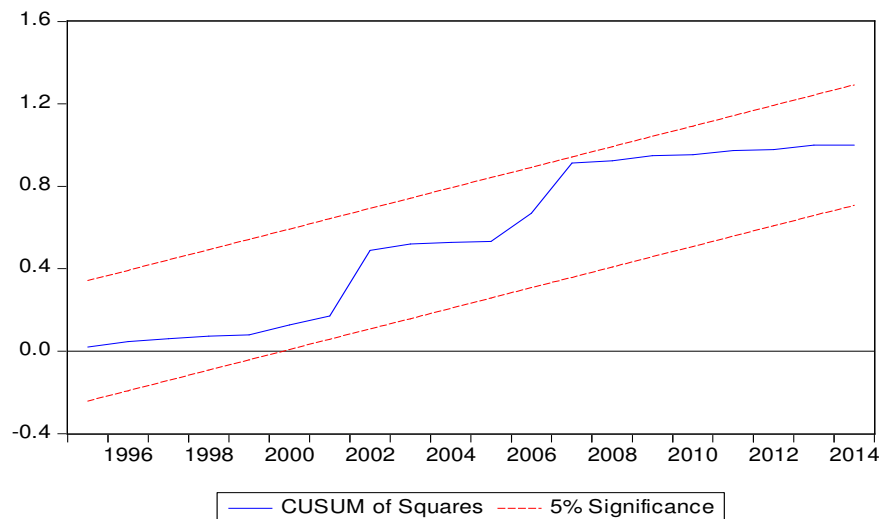


Figure 2: CUSUM of Square test for stability

Table 4: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SIC	HQ
0	-306.5377	NA	0.002969	19.72111	20.13334	19.85775
1	-94.42058	291.6610*	9.96e-07	11.52629	15.64867*	12.89274
2	18.20382	91.50733	5.71e-07*	9.549761*	17.38229	12.14602*

Source: Author's computation from Eview 9 Package

*Note: * indicates lag order selected by the criterion; LR, FPE, AIC, SIC and HQ indicate sequential modified LR test statistic, Final Prediction Error, Akaike Information Criterion, Schwarz Information Criterion and Hannan-Quinn respectively.*

Table 5: The Results of Bound Test

Bound Test			Critical Values		
Test Statistic	Value	K	Significance	Lower Bounds I (0)	Upper Bounds I (1)
F-statistic	4.070137	8	10%	1.95	3.06
			5%	2.22	3.39
			2.50%	2.24	3.7
			1%	2.79	4.1

Source: Author's Computation, 2016 and Pesaran et al. (2001) Critical Bound Table.

Note: K is the number of observations minus 1

The Relative Impact of Financial Sub-sectors (Banking Sector, Stock Market Sector and Central Bank) on Poverty Reduction in Nigeria

The short and long run impact of financial sub-sector development and economic growth on poverty reduction was examined by estimating the Error Correction Model in equation (7) since we have ascertained cointegration among the variables. Also, the speed of adjustment of poverty to changes in financial development and economic growth in the long run is equally determined. Since the presence of long run equilibrium relationship (co-integration) has been established in section 5.4, the ECM is estimated to determine the short and long run impact of financial sub-sector development, economic growth on poverty.

Moreover, parsimonious regression was done automatically based on the optimum lag length selected by Schwarz Information Criterion (SIC). However, before arriving at lag 1 as selected by Schwarz Information Criterion (SIC), the stability of the model at lag 1 and at lag 2 (as suggested by other information criteria) was tested via cumulative sum and cumulative sum of square tests and it was discovered that the model was stable at lag 1 (see figure 1 and 2). Moreover, SIC is preferred because it imposes more restrictions on the variables.

Thus, the ECM form of ARDL (1, 0, 1, 1, 0, 0, 1, 0, 0) (see appendix 2) may be seen as comprising the short run transitory effects and the long run relationships. The result of the ECM is presented in the Table 6.

Table 6 revealed the impact of financial sub-sector development and economic growth in both short and long run respectively. In the short run, the results showed that only economic growth and human development were significant at 5% level of significance ($p < 0.05$) while stock market development proxied by turnover ratio has a significant positive impact on poverty reduction at 10% level ($p < 0.1$). Specifically, a 1% increase in economic growth, other things being equal, increases poverty reduction by 4.714824% and a 1% increase in human development, other things being equal, increases poverty reduction by 93.88487%. Similarly, the result also indicated that a 1% increase in stock market development, other things being equal, brings about 0.019344% increase in poverty reduction in the short run. This implies that the more active the stock market through an increase in total volume of trade activity, the more reduced the incidence of poverty in Nigeria.

In the long run, banking sector development, central bank development, stock market development, and real GDP lead to poverty reduction. Similar to the short run impact, stock market development, proxied by turnover ratio, has positive impact on poverty

reduction at 10% level of significance. An increase in the turnover ratio of 1% increases poverty reduction by 0.025501% in the long

run. Also, Central Bank development, real GDP and human development exert positive effects on poverty reduction in the long run.

Table 6: Results of the Error Correction Model (ECM)

Dependent Variable: POV

Short Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Y)	4.714824	0.532747	8.850018	0.0000**
D(BSD)	-0.01157	0.018833	-0.61451	0.5458
D(CBD)	-0.00017	0.021238	-0.00783	0.9938
D(SMD)	0.019344	0.010975	1.762582	0.0932*
D(LHD)	93.88487	16.25824	5.774603	0.0000**
D(RR)	0.004609	0.003412	1.350948	0.1918
D(TOP)	-0.36844	0.38606	-0.95436	0.3513
D(INF)	-0.00056	0.002137	-0.2597	0.7978
ECT(-1)	-0.75854	0.112512	-6.74187	0.0000**

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Y	6.215649	0.483912	12.84458	0.0000**
BSD	-0.06274	0.029805	-2.10515	0.0481**
CBD	0.079984	0.03017	2.651134	0.0153**
SMD	0.025501	0.014699	1.734858	0.0982*
LHD	123.7703	8.759735	14.12946	0.0000**
RR	0.001456	0.005326	0.273347	0.7874
TOP	-0.48572	0.538469	-0.90204	0.3778
INF	-0.00073	0.002781	-0.2631	0.7952
C	-103.511	5.438582	-19.0327	0.0000**

Source: Author's Computation, 2016.

*Note: ** and * indicates significant at 5% and 10% level respectively; POV, LRGDP, LHD, TOP, RR, INF, BSD, CBD and SMD represent poverty index, natural logarithm of real gross domestic product, natural logarithm of human development proxied by government capital expenditure on social and community services, trade openness, real interest rate, inflation rate, Banking Sector Development, Central Bank Development and Stock Market Development respectively.*

A 1% increase in Central bank development proxied by liquidity ratio, other things being equal, brings about 0.079984% increase in poverty reduction in the long run. The implication of this result is that the activities of Central Bank of Nigeria such as interventions, merger of banks, bank re-capitalisation and bank consolidation, *etc.* reduce poverty incidence in Nigeria. However, banking sector development, proxied by credit

ratio, has significant negative impact on poverty reduction in the long run. Thus, contrary to a priori expectation, financial development from banking sector (BSD) is the only financial sub-sector that has undesirable impact on the poverty reduction in Nigeria in the long run. The negative relationship between banking sector development and poverty reduction could be attributed to some reasons. First, it serves as an evidence of

dominance of informal financial institutions such as thrifts, local money lending etc. where poor people often transact directly. This is because Nigerian financial sector activities are dominated by banking sector as a result of the fact that Nigerian financial sector is bank based and not market based, but the credits, loans and other advances provided by these institutions were not channelled to appropriate private sectors. Secondly, small and medium enterprises (SMEs) were not given required priority through adequate funding from commercial and merchant banks where poor people could benefit. On the other hand, the significant effects of stock market development proxied by turnover ratio confirmed the ability of government huge investment in Treasury bill and bonds to stimulate both financial and real sector in the economy.

The coefficient of the Error Correction Term (ECT_{t-1}) is the speed of adjustment of poverty level to shocks in exogenous variables in the model. The negative coefficient value of ECT_{t-1} indicates that the above long run relationship is stable and any disequilibrium formed in the short run will be temporary and get corrected over a period of time. The negative and statistically significant coefficient value of ECT_{t-1} indicates a stable process of adjustment to the long run equilibrium. The system corrects its preceding period's disequilibrium by 76% yearly.

Conclusions and Policy Recommendation

First and foremost, based on the unit root tests conducted, this study concludes that ARDL bound test approach to cointegration is an appropriate method given its flexibility in order of integration. This approach is considered appropriate since all variables employed in this study are not stationary at first difference. Fortunately, to overcome the

problem of different order of integration and small sample biases, Pesaran and Shin (1997, 1999, 2001) have developed a new Autoregressive Distributed Lag (ARDL) model which have more advantages than the Eagle-Granger and Johansen approaches to cointegration. Moreover, based on the co-integration test through ARDL bounds test, in which the results confirmed that variables are cointegrated for long run relationship; thus, the study then concludes that any policy shock to financial sector as well as the real sector will have effects on the poverty level both in the short run and long run as far as Nigeria is concerned. The study concludes further that stock market development and the central bank development contribute significantly to reducing poverty incidence in Nigeria while banking sector development has a significant negative effect on poverty reduction in the long run.

The findings from this study have a number of policy implications on monetary as well as fiscal policy. In line with the findings of this study, the following recommendations were made: First, policymakers should give more attention to the development of banking sector as the only financial sub-sector where a large percentage of the populace participate.

The magnitude of effect of banking sector indicated that it represents the most important sub-sector which needs to be focused so that it can have desirable impact on the level of poverty in Nigeria. Hence, both monetary and fiscal authorities should improve policies that would stimulate banks to grant more credits and advances to the appropriate private sectors as well as small and medium scale enterprises (SMEs) from where huge investments could be made that would ensure employment opportunities, improved financial intermediation and timely services which would benefit the poor in the long run.

Secondly, there should be a deliberate attempt by Government and monetary authorities to curb the increasing rate of poverty incidence through financial sector reforms to increase investors' confidence that would put stock market in the limelight of development so that people in the rural areas, mostly the poor, can participate in the activities of this valuable sector with an assurance that their investments in this market would not vanish overnight as may be the case in most developing countries so that the gains from this sub-sector would be more felt by the poor.

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Appendix 1:

Principal Component Analysis (PCA): Poverty Reduction Index

```
. pca logleb logavaw logpcc logpcrgdp logpse logtsr logmmr
```

Principal components/correlation	Number of obs	=	34
	Number of comp.	=	6
	Trace	=	7
Rotation: (unrotated = principal)	Rho	=	1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5.17696	3.84479	0.7396	0.7396
Comp2	1.33217	1.03355	0.1903	0.9299
Comp3	.298618	.137621	0.0427	0.9725
Comp4	.160997	.134863	0.0230	0.9955
Comp5	.0261343	.021017	0.0037	0.9993
Comp6	.00511727	.00511403	0.0007	1.0000
Comp7	3.23647e-06	.	0.0000	1.0000

Appendix 2

The Result of ARDL (1, 0, 1, 1, 0, 0, 1, 0, 0)

Scoring coefficients

sum of squares(column-loading) = 1

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6
logleb	0.4299	-0.0774	0.0464	0.3197	0.8255	-0.1519
logavaw	0.4124	-0.1741	-0.4914	-0.1660	-0.0052	0.7284
logpcc	0.3277	0.5049	0.2055	-0.7528	0.1389	-0.0968
logpcrgdp	0.4228	0.1449	0.3148	0.3008	-0.3149	0.0717
logpse	-0.1254	0.7877	-0.4938	0.3446	0.0344	0.0049
logtsr	0.4224	0.1496	0.3135	0.2969	-0.3371	0.0758
logmmr	-0.4060	0.2119	0.5224	0.0779	0.2919	0.6528

Dependent Variable: POV

Method: ARDL

Date: 09/14/16 Time: 13:10

Sample (adjusted): 1982 2014

Included observations: 33 after adjustments

Maximum dependent lags: 1 (Automatic selection)

Model selection method: Schwarz criterion (SIC)

Dynamic regressors (1 lag, automatic): Y BSD CBD SMD LOGHD RR

TOP INF

Fixed regressors: C

Number of models evaluated: 256

Selected Model: ARDL(1, 0, 1, 1, 0, 0, 1, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
POV(-1)	0.241459	0.112512	2.146074	0.0443
Y	4.714824	0.532747	8.850018	0
BSD	-0.01157	0.018833	-0.614506	0.5458
BSD(-1)	-0.03602	0.018961	-1.89972	0.072
CBD	-0.00017	0.021238	-0.007825	0.9938
CBD(-1)	0.060838	0.023672	2.569991	0.0183
SMD	0.019344	0.010975	1.762582	0.0932
LOGHD	93.88487	16.25824	5.774603	0
RR	0.004609	0.003412	1.350948	0.1918
RR(-1)	-0.00351	0.001812	-1.93447	0.0673
TOP	-0.36844	0.38606	-0.954358	0.3513
INF	-0.00056	0.002137	-0.259695	0.7978
C	-78.5171	12.40519	-6.329374	0
R-squared	0.997587	Mean dependent var		0.029838
Adjusted R-squared	0.996139	S.D. dependent var		2.303807
S.E. of regression	0.143156	Akaike info criterion		-0.76266
Sum squared resid	0.409872	Schwarz criterion		-0.17313
Log likelihood	25.58393	Hannan-Quinn criter.		-0.5643
F-statistic	688.959	Durbin-Watson stat		2.167634
Prob(F-statistic)	0			

*Note: p-values and any subsequent tests do not account for model selection.

Appendix 3 Correlation Matrix

	Y	BSD	SMD	CBD	HD	TOP	INF	RR
Y	1	0.6811	0.5301	0.5502	0.6689	0.1101	-0.3126	0.2490
BSD	0.6811	1	0.6660	0.5287	0.6102	0.2186	-0.3045	0.2952
SMD	0.5302	0.6660	1	0.4247	0.5050	0.1864	-0.4046	0.2959
CBD	0.5503	0.5287	0.4247	1	0.5350	0.2584	-0.3269	0.3181
HD	0.6689	0.6102	0.5050	0.5350	1	0.1100	-0.3155	0.2350
TOP	0.1101	0.2186	0.1864	0.2584	0.1100	1	-0.3116	0.0798
INF	-0.3126	-0.3045	-0.4046	-0.3269	-0.3155	-0.3116	1	-0.4762
RR	0.2490	0.2952	0.2959	0.3181	0.2350	0.0798	-0.4762	1