



FINANCIAL SECTOR DEVELOPMENT AND POVERTY REDUCTION IN NIGERIA: A VECTOR AUTOREGRESSION ANALYSIS (1980-2010)

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ABSTRACT

This study examines the nexus between financial sector development and poverty reduction in Nigeria using Vector autoregressive (VAR) model. The choice of the study has been motivated by the alleged failure of the financial sector development in bringing about a reduction in the worsening trend in poverty incidence in Nigeria. The evidences from both the VAR and impulse response show that the indirect effect of 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. Furthermore, the relationship between poverty and the financial deepening proxied by broad money supply (M2) 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. The study, however, concludes that credits to private sector, contrary to the general belief, have failed to cause a reduction in the incidence of poverty in Nigeria.

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Keywords: Financial sector development, Poverty, Poverty reduction, Nigeria.

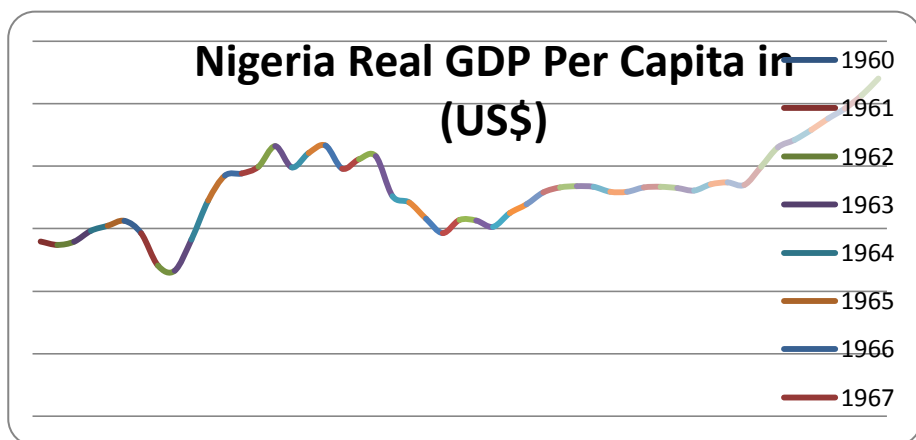
1. INTRODUCTION

Despite numerous measures which have been taken at both macro and micro level to combat poverty, it still remains a burning issue of not only the developing countries but also of the developed world (Ali Khan *et al.*, 2011). Since Nigeria's independence in 1960, the successive governments have introduced several initiatives aimed at poverty reduction. The realization of the intended gains on poverty reduction efforts remains elusive as poverty in Nigeria has assumed an increasing trend. The poverty incidence in Nigeria rose from 46.3 per cent in 1985 to 69.0 per cent in 2010. With a GDP of about \$86 billion in 2010, and a per capita income of about \$540, Nigeria has therefore become one of the poorest countries in the world.

Similarly, Nigeria is far from achieving the Millennium Development Goal on poverty. The International Development Targets (IDTs) agreed in 2000 by the United Nations membership following a series of summit meetings held by the UN and its specialized agencies, committed the international community to achieving sustainable development by the target date of 2015. The IDT for poverty reduction aims to reduce the proportion of people living below a dollar a day from 30 percent to 15 percent of the developing world’s population. Way back in year 2000, Nigeria had the target of halving by the year 2015 its poverty incidence ratio to 32.5 per cent from the then prevailing ratio of about 65 per cent. The actualization of this target has remained a mirage.

The poverty crisis has however been sustained and intensified by the dominant forces. [Kwanashie \(1998\)](#) attributes the rise in Nigeria’s poverty profile to various government policies which have resulted in massive decline in real income of working class and persistent retrenchment. Unemployment is threatening the country’s social cohesion, security and nascent democracy. As at December 2010, 21.1per cent of the labour force was unemployed. This is a large number given that the labour force in Nigeria as at December, 2010 stood at 57.3 million ([Central Bank of Nigeria, 2010](#)). Nigeria has become one of the weakest growing economies in the world on a per capita basis especially for the period 1981-2010. [Tomori et al. \(2005\)](#) confirms that the poverty incidence in Nigeria increased because “the growth rates of the real gross domestic product of Nigeria since the early 1990s have not been encouraging”. In the 1990s, the GDP increased by an average of 3.06 percent (leaving per capita growth rate at 0.6 percent), but the average growth rate for the 2000-2010 period was about 6.35 percent (with a per capita growth rate of 3.76 percent which was lower than the 13.0 per cent per capita growth rate needed to significantly reduce poverty) (See Figure 1.1).

Figure-1.1. Real GDP Per Capita in Nigeria (US \$)



Source: Constructed from World Bank Data

The link between financial sector development and poverty reduction has long received significant attention in the literature. This attention is well-justified, since it would foster a better understanding of how the financial sector contributes to economic growth and invariably poverty

reduction. Within the finance-growth nexus literature, some have argued that financial intermediaries mobilize pool and channel domestic savings into productive capital and by doing so they contribute to economic growth (Ardic and Damar, 2006).

Overall, the Nigerian economy has been characterized by low savings-investment equilibrium (at less than 20%) and low growth trap. With an average annual investment rate of barely 16% of GDP, Nigeria is still far behind the minimum investment rate of about 30% of GDP required to unleash a poverty-reducing growth rate of at least 7-8% per annum. Against the foregoing background, this study examines the relationship between financial sector development and poverty reduction in Nigeria using Vector autoregressive (VAR) model. Following this introduction, section two undertakes a review of relevant literature. Section three describes the theoretical framework and methodology, while section four presents the empirical results and discussions. Section five draws conclusions and offers policy recommendations.

2. LITERATURE REVIEW

2.1. Financial Sector Development, Growth and Poverty Reduction: The Nexus

The theory on financial sector development as emphasized today, in developing countries, goes back to Schumpeter (1934) when he stresses the role of banking sector as a financier of productive investments and in that way as an accelerator of economic growth. Modern growth theory however identifies two specific channels through which the financial sector might affect long-run growth: through its impact on capital accumulation (including human as well as physical capital) and through its impact on the rate of technological progress (De Gregorio, 1996). These effects arise from the intermediation role provided by financial institutions which enable the financial sector to: mobilise savings for investment; facilitate and encourage inflows of foreign capital (including FDI, portfolio investment and bonds, and remittances); and optimise the allocation of capital between competing uses, ensuring that capital goes to its most productive use (Bencivenga and Smith, 1991).

Patrick (1966) formulates a hypothesis on two possible causal relationships between financial development and economic growth. The first - called 'demand following' approach where financial sector development arises as the economy develops. He views the demand for financial services as dependent upon the growth of real output and upon the commercialization and modernization of agriculture and other subsistence sectors. According to Patrick (1966), the second causal relationship between financial development and economic growth is termed 'supply leading' phenomenon where the widespread expansion of financial sector leads to economic growth. By implication, the establishment of financial institutions encourages the demand for financial services by the entrepreneurs in the modern, growth-inducing sectors.

On the other hand, the nexus between financial sector development and poverty reduction has been widely a subject of discussion in theoretical and empirical literature. It is widely believed that the poor in developing countries often do not have access to formal financial services, and are

forced to rely instead on a narrow range of often expensive and more risky informal services. This hinders them from participating fully in markets and contributing to economic growth.

The channels (credit or money) through which poor people benefit from formal financial intermediation has been linked to the pioneer work of Keynes (1937) on the “motive of finance” for money demand. This was later revisited by McKinnon (1973) when he presented the “conduit effect.” This comes with the assumption that the poor who self finance investment offer profitable financial opportunities for savings in spite of the fact that financial institutions do not provide credit to them.

The duo of McKinnon (1973) and Shaw (1973) resuscitated the discussion on the influence of financial sector on the economy. Although their assumptions about the nature of money in the models differ, both theories have similar implications for financial sector development. Their financial liberalization theory holds that financial repression (i.e. distortion of financial prices such as: interest rates reduces the real size of the financial system relative to non-financial , which leads to slow real rate of economic growth McKinnon (1973) and Shaw (1973). Their basic proposition is that the relationship between interest rates and economic growth is positive and low interest rates tend to limit growth. At initial repressed stage, the nominal interest rate is administratively fixed and thus the real rate is kept below its equilibrium.

McKinnon (1973) and Shaw (1973) specifically argue that financial deepening increases the rate of domestic savings, and this lowers the cost of borrowing and thus stimulating investment. This argument is based on the fact that developing countries do experience financial repression. It asserts that the liberation of these countries from their repressive conditions would engender savings, investment and growth. This is in contrast to the neoclassical theory which posits that investment is positively related to the real rate of interest.

McKinnon (1973) proposition is based on two premises. First, that all economic agents are independent and capable of self-financing and secondly that each undertaken investment has indivisibilities of considerable value. The implications of these assumptions are that an investor must accumulate money balances before embarking on investment venture. This process of accumulation is enhanced if there is a positive real deposit interest rate. A positive real interest rate lowers the opportunity cost of accumulating balances and encourages individuals to deposit their money in banks. This makes loanable funds from which investors can borrow to accumulate. The indivisibilities of investment imply that the larger the demand for money, the greater the share of investment in total expenditures. Hence, money and capital are complementary in this theory. This is often described as the complementarity hypothesis. Without implying direction of causality, one can say that increased intermediation in this model leads to increased investment which is capable of bringing about increase in total output and causing economic growth.(Adebiyi, 2005).

Shaw (1973) model’s submission is that money is backed by productive investment loans to the private sector. When the private sector credit is large relative to the level of economic activity (i.e private sector credit /GDP), the level of intermediation between savers and investors is also larger. Thus, this theory explicitly emphasizes the importance of financial intermediation. Hence,

the reform of a repressed financial sector through the removal of interest rate ceilings and other form of controls engenders the higher real rates of deposit. This deepens financial intermediation process and leads to financial development by providing incentives to savers. Similar to [McKinnon \(1973\)](#) and [Shaw \(1973\)](#) position, endogenous growth theory which holds that the higher the saving rate, the higher the economic growth, to the extent that the financial sector development can affect saving rate by at least three ways namely: lowering the cost of borrowing through providing risk diversification, accommodating liquidity preference and lowering liquidity constraints, lowering informational costs and increasing operational efficiency ([Tsuru, 2000](#)).

For their elaboration on the channels (credit or money)- the "conduit effect"- through which poor people benefit from formal financial intermediation, the McKinnon-Shaw hypothesis is, therefore, regarded as the foundation for poverty reduction through the instrumentality of financial sector deepening. The conclusions reached by [McKinnon \(1973\)](#) and [Shaw \(1973\)](#) were however faulted by [Wijnbergen \(1983\)](#) model. According to him, raising interest rate in the short run does not raise investment and production nor decrease inflation. Similarly, the framework developed by [Giovannini \(1983\)](#) raises doubt as to the positive interest elasticity of savings because interest rate elasticity is difficult to assess in developing countries. Models emanated from the later empirical works [Sikorsky \(1996\)](#) and further challenge the validity of [McKinnon \(1973\)](#) and [Shaw \(1973\)](#) submission on the ground that it does not explain the workings of the banking systems in many developing countries and how liberalization can address the questions of fragmentation, bank distress and financial rationing.

The [DFID \(2004\)](#) upholds that the provision of savings facilities enables the poor to accumulate funds in a secure place over time in order to finance a relatively large, anticipated future investment, and can sometimes provide a return on their savings. According to [Jalilian and Kirkpatrick \(2007\)](#), the increased access to financial services by the poor will increase their income growth, thus having a direct impact on poverty reduction. The availability of credit can strengthen the productive assets of the poor by enabling them to invest in productivity-enhancing new 'technologies' such as new and better tools, equipment, fertilizers etc., or to invest in education and health which could provide for a higher income in future.

[Deaton \(1991\)](#) argues that access to credit and other financial services is likely to decrease the proportion of low-risk, low-return assets held by poor households for precautionary purposes (such as jewellery), and enable them to invest in potentially higher risk but higher return assets, (such as education, or a rickshaw), with overall long-term income enhancing impacts. [Eswaran and Kotwal \(1990\)](#) submit that just the knowledge that credit will be available to cushion consumption against income shocks if a potentially profitable but risky investment should turn out badly, can make the household more willing to adopt more risky technologies. The behaviour will increase the use of modern technologies with productivity-increasing, and hence income enhancing benefits. In the same vein, insurance can offer protection against certain types of shocks. These facilities can reduce the vulnerability of the poor and minimize the negative impacts that shocks can sometimes have on long-run income prospects (e.g. if income-generating assets are sold at low prices out of

necessity during a household crisis). Thus the value of financial services in helping the poorest to cope with risks can be as or more important than the expected financial return (DFID, 2004).

2.2. Empirical Review

A number of empirical studies examine a more direct relationship between financial sector development and poverty reduction. Evidences abound in literature showing the poverty reduction effect of financial sector development. Li *et al.* (1998), based on data for 49 developed and developing countries over 1947 to 1994 reveal that financial depth (measured as the ratio of broad money supply [M2] to GDP) is associated with lower inequality and also higher income of the lower 80% of the population (i.e., the poor majority). The regression results tend to suggest that a one standard deviation increase in financial depth would result in an increase of US\$3,000 in the incomes of the poor but only an increase of US\$1,600 in the incomes of the rich.

Honohan (2004) confirms the position of Li *et al.* (1998). He shows a robust effect of financial depth (measured as the ratio of private credit to GDP) on headcount poverty incidence (based on both the \$1- and \$2-a-day poverty lines). The regression results suggest that a 10 percentage-point increase in the ratio of private credit to GDP would lead to a 2.5 - 3.0 percentage-point reduction in poverty incidence. While controlling for per capita GDP, the study indicates that there is a direct relationship between financial development and poverty reduction. However, this relationship exists independent of the indirect effect through growth.

Similarly, using data for 58 developing countries over 1980 to 2000, Beck *et al.* (2004) suggest that financial development alleviates poverty beyond its effect on aggregate growth. They posit that countries with better-developed financial intermediaries (measured as the ratio of private credit to GDP) experience faster declines in both poverty and income inequality by disproportionately boosting the incomes of the poor.

In country specific studies, Jeanneney and Kpodar (2008) investigate how financial development helps to reduce poverty directly through the McKinnon conduit effect and indirectly through economic growth using data for a sample of developing countries from 1966 through 2000. Their results suggest that the poor benefit from having access to financial intermediary services. The poor are able to save but fail to reap the gains from greater availability of credit because of financial instability. In spite of this, the gains of financial development for the poor outweigh the cost.

In a State-wise Assessment in India on whether access to banking services is capable of reducing poverty, Bhandari (2009) investigates the drive to financial inclusion in the form of the growth in bank accounts of scheduled commercial banks and the changes in below poverty line population. The study reveals that the growth in bank accounts is not significantly associated with the reduction in below poverty line population across states. The author concludes on the ground that providing banking services to maximum number of people is unsuccessful as a poverty reduction strategy.

Contrary to findings in the previous literature, [Ardic and Damar \(2006\)](#) in analyzing the effects of financial sector deepening on economic growth using a province-level data set for 1996-2001 on Turkey. The results indicate find a strong negative relationship between financial deepening both public and private and economic growth. This reason was not far-fetched as it was a period associated with a weakly regulated and relatively unsupervised expansion of the banking sector which led to the 2001 financial crisis. This is not unexpected because during the study period, the banking sector provides funds for the Turkish Treasury which the government uses for rent distribution purposes.

African countries have financial structures that are somewhat different from industrialized countries. In these countries, the value of assets available to private agents is very limited. Despite the series of financial reforms embarked upon, financial markets in these countries are still grossly underdeveloped.

[Fowowe and Abidoye \(2011\)](#) examine the effect of financial development as measured by private credit on the growth of poverty and inequality in Sub-Saharan African countries. Their findings show that private credit has no significant influence on poverty in these countries. However, empirical results show that macroeconomic variables such as low inflation and trade openness engender reduction of poverty. In Ethiopia, for instance, [Geda et al. \(2006\)](#) use the rich household panel data of urban and rural Ethiopia that covers the period from 1994 to 2000, the authors attempted to establish the link between finance and poverty in Ethiopia. Their results show that access to finance is an important factor in consumption smoothing and hence poverty reduction.

[Odhiambo \(2009\)](#) examines the inter-temporal causal relationship between financial development and poverty reduction in Kenya during the period 1968-2006. The study attempts to answer whether financial development in Kenya is a spur to poverty reduction. The study which employs a trivariate causality model based on co-integration and error-correction mechanism which incorporates the savings rate as an intermittent variable finds a distinct causal flow from financial development to poverty reduction in Kenya. It also establishes a uni-directional causality from financial development to savings and a bi-directional causality between savings and poverty reduction.

In his study of the relationship between financial development, savings mobilization, and poverty reduction in Ghana, [Quartey \(2008\)](#) finds that financial sector development has a positive impact on poverty reduction, although the impact is insignificant in view of the fact that financial intermediaries have not adequately channeled savings to the pro-poor sectors of the economy—mainly due to government deficit financing, high default rate, lack of collateral, and lack of proper business proposals.

3. THEORETICAL FRAMEWORK AND METHODOLOGY

3.1. Analytical Framework and Model Specification

The link between financial sector development and poverty can be either direct or indirect. In this section, we propose a poverty growth model that captures the dynamic behavior of poverty on the level of financial development and other control variables. Jeanneney and Kpodar (2008), summarizes the channels through which theoretically financial development is likely to affect the well-being of the poor. First, on the assumption, that financial development has a positive impact on economic growth that is beneficial to the poor. Second, using the McKinnon conduit effect assumption, the financial sector development has a direct and positive effect on the income of the poor.

There is a general consensus on the basic premise that economic growth is central to the achievement of the objective of poverty reduction. Ravallion and Chen (1997), Deininger and Squire (1998) and Birdsall and Londono (1997) among other, reported that growth has a positive impact on reducing income poverty. Nafziger (2006), in his analysis of poverty alleviation and income distribution upholds that “Economic growth is the most important factor contributing to poverty reduction”. Hence, we assume that the poverty level for a given country i at a given period t depends on the economic growth (indirect impact):

$$Pov_{it} = f(y, \varepsilon) \quad (1)$$

Where y is the economic growth, ε represents other factors influencing poverty other than economic growth. From eq. (1), holding error term (ε) constant, it then holds that all variables that influence economic growth are likely to have influence on poverty level, Hence,

$$Pov_{it} = f(y) \quad (2)$$

Following the economic growth strategy of the analytical framework underpinning poverty reduction which holds that economic growth is a necessary but not a sufficient condition for poverty reduction Nemedi (2001), Obadan (2001) and DFID (2004). Thus, equation (1) above is modified as follows:

$$Pov_{it} = f(y, O, \varepsilon) \quad (3)$$

Where O represents other variables required to complement economic growth in modeling poverty.

As regards other independent variables aside economic growth, our primary variable of interest is the financial sector development. To measure financial development, a data that captures the development of the formal and informal financial system would have been appropriate for measuring the impact on poverty. Many indicators have been employed in studies examining the impact of finance on poverty reduction. The commonly used indicators of financial development which are available for most developing countries over a long period time are the ratio to GDP of the liquid assets of the financial system, or M2 (currency plus demand and interest-bearing liabilities of banks and non banks), and the ratio to GDP of the value of credits granted by financial intermediaries to private sectors. These two indicators are used by Levine *et al.* (2000) in their analysis of the relationship between financial intermediation and growth.

According to Jeanneney and Kpodar (2008), these two indicators have different meanings. The first is related to the ability of financial systems to provide transactions services and saving opportunities and it is therefore relevant for testing the McKinnon conduit effect, while the second, by excluding credit to the public sector, has the advantage of measuring more accurately the role of financial intermediaries in channeling funds to productive agents and possibly to the poor.

This study uses two indicators. Hence, equation (3) is reinstated as follows:

$$\ln \text{Pov}_{it} = \alpha_0 + \alpha_1 \ln \text{GDP}_{it} + \alpha_2 \ln \text{M2}_{it} + \alpha_3 \ln \text{PRIVCRE}_{it} \quad (4)$$

We further assume that Gross Investment is of the following form

$$I_t = K_{t+1} - (1-\delta) K_t \quad (5)^1$$

Where I_t = gross investment and δ = the rate at which capital depreciates per period.

In an open economy where the budget is in balance, in equilibrium, savings-investment gap is equal to trade deficit

Thus,

$$S_t - I_t = X_t - M_t = -K_{ft} \quad (6)$$

Where S_t = gross domestic savings in period t, I_t = Investment in period t, X_t = exports in period t, M_t = imports in period t and K_{ft} = net inflows of capital.

Assuming that some leakage $(1-\theta)$ out of the flow of domestic savings take place during the process of financial intermediation, we write as follows:

$$\theta S_t + K_{ft} = I_t \quad (7)$$

where $s = S_t/Y_t$ and $\phi = K_{ft}/Y_t$

Following Chakraborty (2010), the behaviour of the savings ratio (s) is assumed to be influenced by inflation (INFL). There seems to be an agreement in the literature on the negative effects of inflation on poverty. Easterly and Fischer (2001) use data from an international poll of 31,869 respondents in 38 countries to find that inflation tends to lower both the share of the bottom quintile of the income distribution and the real minimum wage; it also tends to increase poverty. Following Easterly and Fischer (2001) inflation rate is introduced into the model.

Athukorala and Sen (2004) uphold that the behaviour of the savings ratio (s) is also influenced by trade openness (TOT) which is measured as the sum of exports and imports as a share of GDP. Hence, the behavior of s is partly expressed as follows:

$$s = f(\text{INFL}, \text{TOT}) \quad (8)$$

Substitute the function in equation (8) into equation 4, we derive the following:

$$\ln \text{Pov}_{it} = \alpha_0 + \alpha_1 \ln \text{GDP}_{it} + \alpha_2 \ln \text{M2}_{it} + \alpha_3 \ln \text{PRIVCRE}_{it} + \alpha_4 \ln \text{INFL}_{it} + \alpha_5 \ln \text{TOT}_{it} + \varepsilon_{it} \quad (9)$$

where;

Pov_{it} is an indicator of poverty measured by head count ratio. It is the ratio of the number of the poor to total population. It is also represented by the proportion of the population with income below the national poverty line.

¹See Chakraborty, I., 2010. for details.

GDP is the per capita GDP. It measures the income per head in a given year and represented by the Gross Domestic Product per capita at 1990 constant price;

M2 is currency plus demand and interest-bearing liabilities of banks and non banks) as a ratio of GDP;

PRIVCRE stands for the ratio to GDP of the value of credits granted by financial intermediaries to private sectors;

INFLdenotes inflation rate;

TOT denotes the level of trade openness and

ε the error term.

It is expected that *a priori* that economic growth (GDP), money supply (m2), credit to private sector (PRIVCRE) and trade openness (TOT) to benefit the poor by giving them better access to goods and services and enhancing their well-being. Expectedly, the relationship between these explanatory variables and poverty is negative, while inflation is detrimental to the well-being of the poor, thus, the expected a priori is positive.

Thus, we have:

$$\alpha_1, \alpha_2, \alpha_3, \alpha_5 < 0, \text{ while } \alpha_4 > 0$$

3.2. Estimation Techniques

This study adopts a two-step procedure of estimation technique, vector autoregression (VAR) estimate and impulse-response analysis. However, in order to ensure stationarity of the data, the study first employed the Augmented Dickey-Fuller (ADF) unit root test.

(i) The Augmented Dickey-Fuller (ADF) Unit Root Test

The unit root studies have also shown that using classical estimation methods, such as the Ordinary Least Squares (OLS), to estimate relationships with unit root variables gives misleading inferences. In the presence of non-stationary variables, there might be what [Granger and Newbold \(1974\)](#) call *a spurious regression*. A spurious regression typically has a high R-squared, and t-statistics that appear to be significant, but the results are without any economic meaning.

To ensure stationarity of the data, the group unit root test of the individual root-Augmented Dickey-Fuller (ADF) Unit Root Test is employed. The test is carried out to detect the order of integration of the variables before estimation.

To illustrate the use of Dickey-Fuller tests, we consider first an autoregression, AR(1) process:

$$y_t = u + py_{t-1} + e_t. \quad (10)$$

Where u and p are parameters and e is assumed to be white noise. y is a stationary series if $-1 < p < 1$. If $p=1$, y is a non-stationary series (a random walk with drift); if the process is started at some point, the variance of y increases steadily with time and goes to infinity. If the absolute value of p is greater than one, the series is explosive. Therefore, the hypothesis of a stationary series can be evaluated by testing whether the absolute value of p is strictly less than one. The ADF test takes

the unit root as the null hypothesis $H_0: \rho = 1$. Since explosive series do not make much economic sense, this null hypothesis is tested against the one-sided alternative $H_1: \rho < 1$.

The test is carried out by estimating an equation with y_{t-1} subtracted from both sides of the equation:

$$Dy_t = u + ry_{t-1} + e_t. \quad (11)$$

where $r = \rho - 1$ and the null and alternative hypotheses are

$$H_0: r = 0, \quad H_1: r < 1$$

While it may appear that the test can be carried out by performing a t-test on the estimated r , the t-statistic under the null hypothesis of a unit root does not have the conventional t-distribution. [Dickey and Fuller \(1979\)](#) showed that the distribution under the null hypothesis is nonstandard, and simulated the critical values for selected sample sizes.

The simple unit root test described above is valid only if the series is an AR(1) process. If the series is correlated at higher order lags, the assumption of white noise disturbances is violated. The ADF test makes a parametric correction for higher-order correlation by assuming that the y series follows an AR(p) process and adjusting the test method.

(ii) Vector Auto Regression (VAR) Estimate

The study employs a vector autoregression estimate using Iterative Weighted Least Squares simultaneous regression method (including a constant term) which is run over a 31-year sample period (1980-2010). The lag length of one is chosen based on the Akaike information. The dynamic relationships among variables are modeled empirically as a VAR, while a simple linear model based on economic theory is used to model the contemporaneous relationships.

VAR is simply an overfit reduced form of some simultaneous equations model ([Hamilton, 1994](#)). Another major attraction of VAR lies in its ability to aid decision as to what contemporaneous variables are exogenous; it has only lagged variables on the right-hand side, and all variables are endogenous. The variables under consideration are poverty (Pov), gross domestic product per capita (GDP), broad money supply (M2), credit to private sector (PRIVCRE), inflation (INF) and terms of trade (TOT).

The data set for this study consists of annual time series data (1980-2010) obtained from the several editions of CBN Statistical Bulletin and the World Bank databank (www.worldbankdatabank.org).

Following the theoretical background of this study and using autoregressive framework developed by [Sims \(1980\)](#) we specify a VAR model of order p .

The general form of a VAR model is given by the following unrestricted form:

$$Z_t = \alpha_0 + \sum_{i=1}^p \beta_i Z_{t-i} + u_t \quad (16)$$

Equation (16) above specifies a VAR (P) process, where Z_t is a vector of stationary endogenous variables, α is an $n \times 1$ vector of constants, β is an $(n \times n)$ matrix of co-efficients, p is the number of lag, u_t is an $(n \times 1)$ vector of error term. In addition, u is independently and identically distributed with zero mean, i.e $E(u_t) = 0$ and $E(u_{tk}, u_{sk}) = 0$ for $t \neq s$. the disturbance term u_t also has a covariance matrix. The $(n \times 1)$ vector Z_t contains n variable in the system, which is the list of vector of endogenous variables that includes. The vector Z_t contains poverty (Pov), gross domestic product per capita (GDP), broad money supply (M2), credit to private sector (PRIVCRE), inflation (INF) and terms of trade (TOT). α_0 is the vector that contains the constant terms. The model VAR is specified as follows:

$$Pov_t = \alpha_t + \sum_{j=1}^n \beta_j Pov_{t-j} + \sum_{j=1}^n \delta_j GDP_{t-j} + \sum_{j=1}^n \gamma_j M2_{t-j} + \sum_{j=1}^n \Omega_j PRIVCRE_{t-j} + \sum_{j=1}^n \pi_j INF_{t-j} + \sum_{j=1}^n \varphi_j TOT_{t-j} + u_{1,t} \tag{17}$$

$$GDP_t = \alpha_t + \sum_{j=1}^n \beta_j Pov_{t-j} + \sum_{j=1}^n \delta_j GDP_{t-j} + \sum_{j=1}^n \gamma_j M2_{t-j} + \sum_{j=1}^n \Omega_j PRIVCRE_{t-j} + \sum_{j=1}^n \pi_j INF_{t-j} + \sum_{j=1}^n \varphi_j TOT_{t-j} + u_{1,t} \tag{18}$$

$$M2_t = \alpha_t + \sum_{j=1}^n \beta_j Pov_{t-j} + \sum_{j=1}^n \delta_j GDP_{t-j} + \sum_{j=1}^n \gamma_j M2_{t-j} + \sum_{j=1}^n \Omega_j PRIVCRE_{t-j} + \sum_{j=1}^n \pi_j INF_{t-j} + \sum_{j=1}^n \varphi_j TOT_{t-j} + u_{1,t} \tag{19}$$

$$PRIVCRE_t = \alpha_t + \sum_{j=1}^n \beta_j Pov_{t-j} + \sum_{j=1}^n \delta_j GDP_{t-j} + \sum_{j=1}^n \gamma_j M2_{t-j} + \sum_{j=1}^n \Omega_j PRIVCRE_{t-j} + \sum_{j=1}^n \pi_j INF_{t-j} + \sum_{j=1}^n \varphi_j TOT_{t-j} + u_{1,t} \tag{20}$$

$$INF_t = \alpha_t + \sum_{j=1}^n \beta_j Pov_{t-j} + \sum_{j=1}^n \delta_j GDP_{t-j} + \sum_{j=1}^n \gamma_j M2_{t-j} + \sum_{j=1}^n \Omega_j PRIVCRE_{t-j} + \sum_{j=1}^n \pi_j INF_{t-j} + \sum_{j=1}^n \varphi_j TOT_{t-j} + u_{1,t} \tag{21}$$

$$TOT_t = \alpha_t + \sum_{j=1}^n \beta_j Pov_{t-j} + \sum_{j=1}^n \delta_j GDP_{t-j} + \sum_{j=1}^n \gamma_j M2_{t-j} + \sum_{j=1}^n \Omega_j PRIVCRE_{t-j} + \sum_{j=1}^n \pi_j INF_{t-j} + \sum_{j=1}^n \varphi_j TOT_{t-j} + u_{1,t} \tag{22}$$

Where α , β , δ , γ , Ω , π and φ are the unknown parameters, α is the intercept, u is the error term, n is the number of lags and POV , GDP , $M2$, $PRIVCRE$, INF and TOT are as previously defined. Specifically, the equation of interest is equation (17).

(iii) Impulse - Response Analysis

VAR models are routinely used to perform impulse-response analysis which enables the measurement of the various period impact of the Z_{t-1} on Z_t . Impulse-response functions are devices to display the dynamics of the variables tracing out the reaction of each variable to a particular shock at a time ‘t’. It also requires a Vector Moving Average (VMA) representation of a VAR. The VMA allows us to trace out the time path of the various shocks on the variables of the VAR system. We capture the impulse response function (IRF) in the model which also incorporates the above direct and indirect linkages.

4. EMPIRICAL RESULTS AND DISCUSSION OF FINDINGS

4.1. ADF-Fisher Unit Root Test Statistics

Below is the summary of results obtained from the ADF-Fisher unit root test statistics:

Table-4.1. Summary of Results of Unit Root Tests (ADF-Fisher)

Exogenous variables: Individual effects, individual Linear Trends					
Automatic selection of lags based on SIC:0 to 1					
Total (Balanced) observations: 180					
Cross-sections included: 6					
Method				Statistic	Prob.*
ADF - Fisher Chi-square				71.5585	0.0000
ADF - Choi- Z-stat				4.47340	
** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality					
Series	Prob.	OOI	ADF T-Stat	Max Lag	Observation
D(POV)	0.0009	I(2)	-5.390712	1	27
D(LOGGDP)	0.0078	I(1)	-4.415495	1	29
D(MS)	0.0005	I(1)	-5.595358	1	29
D(PRIVCRE)	0.0073	I(1)	-4.448208	1	29
D(INF)	0.0009	I(1)	-5.338641	1	28
D(TOT)	0.0001	I(1)	-6.423394	1	29
Test Critical values			1% level	-4.323979	
			5% level	-3.580623	
			10% level	-3.225334	

Note: OOI Order of Integration

The findings in the Table 4.1 show that there is an existence of unit root. This implies that all the series are non stationary at levels. Therefore, the null hypothesis ($\rho=1$) is accepted at levels. From the results, with the exception of POV which was integrated at the order two, I(2) the ADF-Choi Z-test statistic (4.47340) and various probabilities values show that other variables: GDP, MS, PRIVCRE, INF and TOT were all integrated at order one, that is I(1). This implies that all the variables except POV were statistically significant at 1%, 5% and 10% critical values at first difference. POV however was found to be statistically significant at 1%, 5% and 10% critical values at second difference. These are Mackinnon critical values for the rejection of hypothesis of a unit root.

4.2. Vector Autoregression (Var) Estimates

Below are the results obtained from the Vector Autoregression estimates:

Table-4.2.

Estimation Method: Vector Autoregression Estimates

Total system (balanced) observations 180				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.852575	0.108549	7.854252	0.0000
C(2)	99.60906	62.16655	1.602294	0.1227
C(3)	-12.21208	7.714390	-1.583026	0.1271
C(4)	-0.160724	0.491996	-0.326677	0.7469
C(5)	0.487465	0.434692	1.121405	0.2737
C(6)	-0.014328	0.076677	-0.186866	0.8534
C(7)	0.056784	0.103710	0.547525	0.5893
Determinant residual covariance		27.03929		
Equation: $POV = C(1)*POV(-1) + C(2) + C(3)*LOGGDP + C(4)*MS + C(5)*PRIVCRE + C(6)*INF + C(7)*TOT$				
Observations: 30				
R-squared	0.850104	Mean dependent var	55.46667	
Adjusted R-squared	0.811001	S.D. dependent var	13.66042	
S.E. of regression	5.938740	Sum squared resid	811.1786	
Durbin-Watson stat	1.431052			

Source: Author's Computation

In table 4.2 above, we use VAR estimate and adopt a one lag VAR model. The scrutiny of these results indicates that the past value of endogenous variable, poverty (POV) has the expected sign and it is significant in determining its own current value (0.853%). This indicates that growth in the poverty incidence of the previous period has been adjusting well to the current level.

Similarly, the coefficient of the past value of GDP per capita of (12.2%) is estimated to have a significant negative effect on poverty ratio. This implies that economic growth as proxied by GDP per capita has been effective in not only increasing the country's average income but also the income of the poor within the country. If this holds, why has the economic growth failed to reduce the persistent high increase in the incidence of poverty (that is, from 28 per cent in 1980 to about 70 by 2010) in Nigeria? The reason is that our finding has only confirmed the widely-held view that economic growth is a necessary but not a sufficient condition for achieving poverty reduction [Nemedi \(2001\)](#), [Obadan \(2001\)](#) and [DFID \(2004\)](#). This implies that the negative effect of economic growth in poverty reduction would need to be combined with negative effects from other relevant explanatory variables. Had the country not witnessed increases in the per capita GDP, the incidence of poverty would have been more devastating? Hence, our findings indicate that economic growth actually helps to alleviate poverty. This is consistent with [Ravallion and Datt \(1999\)](#) and [Fields \(2001\)](#) findings which explain that growth effect accounts for the largest part of observed changes in poverty.

Financial deepening (M2) (0.16%) has a statistically significant negative effect on current level of poverty ratio in Nigeria. This implies that a marginal increase in the available pro-poor financial services and saving opportunities would lead to a reduction of about 16 per cent in poverty level.

The financial deepening, measured by M2 as a percentage of GDP, indicates that the transactions services and saving opportunities-the McKinnon conduit effect- aspect of financial sector development has been beneficial to the poor in Nigeria. Our findings are generally in line

with those of previous studies including: [Honohan \(2004\)](#), [Beck et al. \(2007\)](#) and [Jeanneney and Kpodar \(2008\)](#), however with different samples and methodology.

The credit to the private sector (PRIVCRE) bears a positive sign, but it is significant at the 5 per cent level (0.48%). This implies that the credit to the private sector is rather exacerbating the incidence of poverty. The explanations for this result are not far-fetched. In Nigeria, deposit money banks have penchants for short-term lending. They also avoid financing long-term projects of the real sectors due to the perceived risks associated with such lending. Hence, while the operations of firms in the manufacturing and agro-allied sectors are paralyzed due to paucity of needed long term fund, the majority of active but economically poor individuals operating in the informal sector had to borrow from unregistered money lenders albeit at exorbitant interest rates as a survival strategy.

Table-4.2. Sectoral Allocation of Credits by Deposit Money Banks (2000-2010)

Year	Agric	Manufacturing	Mining	Others	Total
2000	10	33	8	49	100
2001	8	31	11	50	100
2002	8	32	10	50	100
2003	7	33	11	49	100
2004	6	31	12	51	100
2005	4	31	15	50	100
2006	3	30	17	50	100
2007	7	22	22	49	100
2008	2	20	18	60	100
2009	2	17	17	64	100
2010	2	15	20	63	100

Source: Computed from the [Central Bank of Nigeria \(2010\)](#)

The persistent decline in the share of Deposit Money Banks' credit to agricultural, manufacturing and mining sectors over the years attests to the need for an urgent policy consideration. Hence, the present credit allocation arrangement is not capable of causing the needed poverty reduction. Table 4.3.2 below depicts the trend in credit allocation to the selected key sectors of Nigerian economy from 2000 to 2010.

The unexpected negative relationship between the lagged values of inflation INF (-0.01%) and poverty incidence means that inflation has not aggravated the problem of poverty in Nigeria.

The degree of openness of the economy, contrary to a priori expectation and evidence from [Dollar and Kraay \(2002\)](#) that changes in trade volume have a strong positive relationships with growth rate for roughly 100 countries, has a positive sign with (0.06%) at 5 per cent level. [Milanovic \(2005\)](#) finds that at very low national income levels it is the rich who benefit from trade openness, but as income levels rise, the income of the poor and the middle class rise proportionately more than the incomes of the rich. Partly consistent with [Milanovic \(2005\)](#), our result indicates that trade openness may hurt the poor, thus implying that the current call for economic globalization by the developed countries will cause poverty "elevation" rather than

alleviation in Nigeria in view of the uncompetitive nature of its local industries, lack of infrastructure, lack of technical know-how among other factors with attendant mass retrenchment owing to low capacity utilization and loss of domestic market to foreign firms. This would further increase the population of the poor in the country. Another implication is the over reliance of the economy on imported goods with its concomitant rise in Nigeria's balance of payments problem over the years, whereby export earnings no longer cover the payments for imports. Consequently, a substantial portion of the imports are acquired on credit. This implies that with appropriate policy measures to control imports, export earnings that would have been used to pay imports can be channeled to pro-poor schemes.

The result shows that past level of GDP per capita and money supply seem to have the highest impacts. Despite its non-a priori conformity status, the credit to private sector was found to be significant while inflation and trade openness are of no significant impacts, given the co-efficient of determination (R^2) of (85%). The Durbin-Watson (DW) test statistic (d^*) shows the presence of a relatively weak positive serial correlation between the error terms in the model.

4.3 Impulse Response Function (IRF)

The estimated co-efficients of the VAR and contemporaneous model indicate the direct effects of explanatory variables on the explained variable- measure of poverty. However, the study is more particular about total effects (that is, both direct and indirect effects) that the explanatory variables have on poverty. An IRF traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables. Thus, in table 4.3 below, we present the results from the impulse response for the level of poverty. The actual impulse response function is based on the vector autoregression (VAR) earlier estimated.

Table-4.3. Impulse Response of Poverty to Structural one S.D. innovations

Impulse Response of Poverty to Structural one S.D. innovations						
Period	POV	LOGGDP	MS	PRIVCRE	INF	TOT
1	5.675804	0	0	0	0	0
2	4.424449	-1.08703	0.349943	1.835968	0.191284	0.942129
3	3.327218	-1.48372	0.66877	2.824848	0.255595	1.618695
4	2.394483	-1.40643	0.826632	3.260288	0.250781	2.00301
5	1.635999	-1.03514	0.822127	3.327185	0.256655	2.147238
6	1.045731	-0.52659	0.708392	3.164875	0.305799	2.147132
7	0.605564	4.08E-05	0.540403	2.881755	0.393397	2.08881
8	0.292334	0.468513	0.356617	2.556443	0.501177	2.026682
9	0.082509	0.839462	0.179525	2.240032	0.611982	1.985725
10	-0.04572	1.099937	0.021174	1.961347	0.714201	1.971969

Cholesky Ordering: POV LOG GDP MS, PRIVCRE INF TOT

Source: Author's Computation

The IRF results in the above table describe how poverty reacts over time to past poverty levels and exogenous impulses' (shocks) of its determinant variables. The results show that current poverty level is affected contemporaneously by the shocks from its past and other variables (columns two to seven). The response also depicts graphically, with horizon (period) on the horizontal axis and response on the vertical axis (see Appendix II). The second column is the response of the current poverty level to past poverty level. The third column to the seventh column show the responses of the current poverty level to GDP per capita, Money supply, credit to private sector, inflation and trade openness respectively. The results show that past level of poverty is significant in explaining current level of poverty. That is, poverty is affected contemporaneously by the shock to its past.

The gross domestic product per capita explains relatively significant proportions of poverty reduction in the short run but leads to increase in poverty incidence in the long run. The implication is that the "trickle down" effect of economic growth effect is only attainable in the short run. Whereas, in the long run, the problem of inequalities in income distribution would cause a reversal in the poverty reduction trend, unless the poor are properly empowered to fully participate in the opportunities unleashed and to contribute to that growth.

Poverty's response to structural one innovation is positive in credit to private sector in the short run. The shock however turns to poverty reduction in the long run period. This shows that effective formulation and implementation of appropriate pro-poor credit policy play an important role in poverty reduction in the long run.

The poverty shock to financial deepening as measured by M2 as a percentage of GDP is also significant and positive in the short run. The positive impact however turns negative in the long run. The financial deepening has consistently maintained a high proportion of 35% in the variation of poverty level after the eight year horizon. This has further lent credence to the relevance of McKinnon conduit effect of transmission channel of poverty reduction. Poverty response to structural one innovation appears relatively insensitive to the shocks orchestrated by inflation. It impacts positively on poverty incidence in both the short and long run. In both the periods, the impacts are insignificant. The current poverty level response to the trade openness shock is positive and significant in the short run but remains unchanged and still significant in the long run.

5. SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

This study has examined the relationship between financial sector development and poverty reduction in Nigeria using annual time series from 1980 to 2010. In the study, empirical relationships among the variables are examined using Vector autoregressive (VAR) model and impulse response analysis. The relationship between poverty and the financial deepening proxied by broad money supply (M2) 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. Another interesting finding is that the credit to private sector, contrary to the general belief that it causes poverty reduction, significantly increases the incidence of

poverty. This is attributed to the wrong attitude of financial intermediaries in Nigeria that have not adequately channeled savings to the pro-poor sectors of the economy. Finally, the study finds no significance and economic relevance in the presence of inflation variable in the model but concludes by warning that the degree of openness of the economy is capable of further impoverishing the Nigerian citizens. Stemming from the above findings, the study recommends the following key issues for policy consideration:

i.) To reinforce the dominant effect of financial deepening, there must be a deliberate attempt to improve on savings accumulation. In this direction, the monetary authorities should tackle financial repression by further liberalizing the financial sector and allowing nominal interest rates to rise to market-clearing levels. This would cause real interest rates to rise to positive levels; thus removing the explicit interest-rate subsidy accorded to preferred borrowers and drastically reducing the wide gap between the lending and borrowing rates. The higher real interest rates would generate more domestic saving and investment. More importantly, saving accumulation will later improve access to credit and make some borrowers to shift from informal to formal credit market.

ii.) To make credit available to the pro-poor sectors, both monetary and fiscal authorities should introduce a set of policies that would stimulate banks to grant credit facilities to the hitherto neglected key sectors of the economy.

iii.) To avoid crowding out the real sector, government should minimize its borrowing activities most especially from domestic financial market. This would make more loanable fund available to financial intermediaries for on-lending to the pro-poor sector of the economy as against the present huge investment expenditure locked up in government securities such as: treasury bills and government bonds.

Nevertheless, our poverty function specification could be found wanting when non-financial qualitative factors are introduced into the model. To this extent, our results illustrate only the financial quantitative determinants that exert influence on poverty using general-to-specific framework. Hence, a further empirical work incorporating the effect of non-financial qualitative factors would expand the knowledge frontier in this area.

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Appendix-I. Response to Cholesky One S.D Innov

Response to Cholesky One S.D. Innovations ± 2 S.E.

