# FINANCIAL INCLUSION AND ECONOMIC GROWTH IN NIGERIA: A MODIFIED SOLOW GROWTH MODEL.

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**ABSTRACT**

This paper sets out to examine the effect of financial inclusion on macroeconomic growth in Nigeria from 1986 to 2017. Using a modified Solow growth model, it focuses on studying the effect of financial inclusion on growth as it relates to total factor productivity, capital accumulation, natural resource rent and labour services. Employing an Autoregressive distributed lag approach; the results indicate that financial inclusion is highly significant and robust explanatory variable for capital accumulation and labour services while insignificant for total factor productivity and natural resource rent. The study recommends that government should legislate to encourage financial institutions provide long term financial resources to the real sector. Employers of labour should be persuaded to implement welfare incentives and policies that would impact positively on the socio-economic performance of the worker in order to enhance total factor productivity.

***Key Words***: Financial Inclusion. Autoregressive Distributed Lag. Economic Growth. Modified Solow Growth Model.

## INTRODUCTION

Supporting further, the argument put forward by Schumpeter (1911) that the services provided by financial intermediaries are essential drivers of innovation and growth, development economists and members of the development community have endorsed financial inclusion for enhancing rapid economic growth and alleviating extreme poverty especially in poor developing countries. For instance, financial inclusion is mentioned severally under the United Nations Sustainable development Goals [SDGs] (International Monetary Fund, 2015; Global Financial Development Report [GDFR], 2014; United Nations, 2006).

While most available literature on this area of study(Hajilee and Niroomand,2018;Zins and Weill,2016;Iqbal and Sami,2017;Chauvet and Jacolin,2017;Babajide,Adeboye and Omankhanlen,2015;Mbutor and Uba,2013; Hariharan and marktanner,2012;Sarma & Pais,2011;Billmeier & Massa,2009) buttressed what has now become a stylize fact(that financial inclusion does enhance economic growth and helps alleviate extreme poverty resulting in inclusive growth and development) not all researchers are convinced about the importance of the financial system (and by extension financial inclusion) in the growth process(Ang and Mckibbin,2015). Robinson (1952) argued that finance does not exert a causal impact on economic growth, insisting rather that, financial development follows economic growth as a result of higher demand for financial services. Mader

(2017) queried if financial inclusion does really promote economic growth; whether financial inclusion makes good business sense and if the poor do benefit in meaningful ways from using formal financial services.

Despite contrary views, heightened interest in financial inclusion also derives from a growing recognition of the large gaps in financial inclusion (World Bank, 2014). For instance, as at 2015 it was estimated that in developing countries half of the poorest 40% are without savings account and 35% of small firms (EMEs) faced difficulties accessing formal financial services (Staff Development Notes [SDN], 2015).as reported by Dermirguc-kunt and Klapper (2012), this sorry state is more apparent on the African continent, where only 23% of the adult population has a bank account. The Central Bank of Nigeria (CBN, 2012) reported that as at 2011, out of an estimated population of 84.7 million adult Nigerians, 39.2 million representing 46.3% of Nigerian adults were financially excluded with regards to provision of banking and financial services. This is a compelling reason why Nigeria should strive hard to deepen financial inclusion particularly in environments where rural communities are highly under-served. More so, as the 'Maya Declaration of 2011' on financial inclusion for the unbanked highlighted its link to economic growth.

Economic growth is one of the most important indicators of the health of an economy. An important aspect of the long term growth of a country is that it has a positive impact on national income and the level of employment, which increases the standard of living. As the country's GDP is increasing, it is more productive which leads to more people being employed. This increases economic growth, improves its standard of living and reduces poverty (Agarwal, 2017).However, Thorat (2008) observed that formal financial institutions usually avoid or failed to provide sustainable services in rural areas due to high over-head cost and several other reasons. Thus, informal or semi-formal institutions as well as alternative providers like traders or input suppliers have become major suppliers of financial services. However, because these informal providers often lack institutional and managerial capacity and operates in isolation from the financial system, they often charged high interest rates which push the rural dweller (farmer) deeper into the poverty cycle thus stifling economic growth and enhancing insecurity. Thus, at this time when Nigeria's economic growth is slowing down, financial inclusion could not be more important to resolve poverty and several security challenges.

Some major constraints impeding research on the financial inclusion-economic growth nexus has been the lack of sufficient time series data and the absence of a uniform index of measuring financial inclusion especially in developing economies. As such, most empirical research on this area relied on the availability of data sets compiled by the World Bank (Demirguc-kunt and Levine, 2001) and individual central banks of each country. Expectedly, such studies differ only in terms of the time period covered, country chosen, econometrics technique employed, measure of financial inclusion adopted and the control variables used in the estimation. While these studies have made significant contributions to the literature and spurred much research, the critical question remained if there is sufficient evidence for financial inclusion being growth-promoting and poverty alleviating enough, to justify all the attention and resources directed toward it especially in a country with low financial development like Nigeria.

Therefore, this study is interested in showing the direct effect of financial inclusion on economic

growth in Nigeria using a modified Solow growth model. Thus, apart from its contribution to existing literature, the study is significant in that it utilizes the proximate factors of growth while employing the appropriate econometric technique for its analysis.

**Literature review**

The evolution of the concept of financial inclusion dates back to 2003, when United Nation's (UN) Secretary General Kofi Annam emphasized on building an inclusive financial sector for providing access to sustainable financial services including savings, credit and insurance to the poor and regarded financial inclusion as a precondition to inclusive growth (United Nation, 2006).A review of literature reveals that there is no universally accepted definition of financial inclusion. The definitional emphasis of financial inclusion varies across countries and geographies, depending on the level of social, economic and financial development of that place and priorities of social concerns. The World Bank (2008) defines financial inclusion as absence of price or non-price barriers in the use of financial services. It does not, however, mean that all households and firms should be able to borrow unlimited amounts or transmit funds across the world for some fee. It makes the point that creditworthiness of the customer is critical in providing financial services. The report also stressed the distinction between access to, and use of financial services as it has implications for policy makers. Access essentially refers to the supply of services, whereas use is determined by demand as well as supply. Accordingly, the bank outlined three dimensions of financial inclusion as: i).the penetration dimension/index: as the total number of bank accounts in an economy over total adult population; ii).service dimension/index: as total bank branches over total population, plus ATMs over total population; iii).usage dimension/index: as domestic credit plus deposit liabilities over GDP. This paper nevertheless adopts the definition by Burjorjee and Scola (2015) which defines financial inclusion as a state where both individuals and businesses have opportunities to access, and the ability to use a diverse range of appropriate financial services that are responsibly and sustainably provided by formal financial institutions.

**Financial inclusion in Nigeria**

Financial inclusion has been an integral part of Nigeria's financial industry reforms for over 30 years. From the rural banking program in 1977 to the establishment of community and microfinance banks in the 1990s and early 2000s, the government and monetary authorities have delivered policies aimed at increasing financial inclusion. Progress made with these policies includes: the establishment of over 300 bank branches in the rural areas in the 1970s and 1980s;the provision of N300 million($80 million) to small and medium scale businesses between 1988 and 1994;a significant increase in borrowing rates thanks to community banks and the government-run People's Bank; and additional initiatives since 2005 such as the National microfinance policy, Non-interest banking, A financial literacy campaign, Electronic banking and the cashless policy that saw financial inclusion rise from 23.6% in 2008 to 48.6% in 2014(Kama and Adigun,2013;Financial derivatives Company[FDCBimonth],2016).

The Nigerian National Financial Inclusion Strategy(NFIS) was launched by the Nigerian financial sector on October 23,2012 in order to reduce the percentage of adult Nigerians who do not have access to any formal or informal financial services from 46.3% in 2010 to 20% by 2020.Additionally,70% of the adult Nigerian

population should have access to formal financial services by 2020 in accordance with its commitment to the Maya Declaration(The Maya declaration is a statement of common principles and commitment regarding the development of financial inclusion policy made by a group of developing nation's regulatory institutions in 2011 in Mexico. Nigeria is a signatory to the declaration), CBN (2016, 2012).

Reports from NFIS shows that while progress was made on several indicators between 2015 and 2016, many indictor values stayed far behind the defined targets as at 2016.One key issue which adversely affected financial inclusion developments in 2016 was the economic recession which the country was facing; some financial institutions had to closed shop or down-size cutting down on personnel and operational costs due to financial difficulties and a harsh macroeconomic environment. While oil price declined from its already low level in 2015, the naira depreciated significantly and overall gross domestic product declined by 1.51% relative to the previous year. This negatively affected the ability of the low income population to save, the likelihood of borrowers to pay back outstanding loans as well as the overall business performance of financial institutions.

There are various definitions of economic growth: Acemoglu (2009) defines economic growth as increase in output produces in an economy. On the other hand, Guha (1981) defines economic growth as increase in per capita income and individual welfare. The importance of economic growth as a basis for improvements in human welfare cannot be overstated and is confirmed by numerous empirical studies (Dollar and kray, 2002).Even small inter-country differences in growth rates per capita income, if sustained over long periods of time, lead to significant differences in relative living standards between nations. There is no better demonstration of this fact than the impact on living standards of the growth experiences of the 'miracle' East Asian economies compared with those of sub-Saharan African economies since 1960 by which time the decolonization process was well under way (Snowdon and Vane, 2005).

In analyzing developments in growth theory it is useful to distinguish between proximate and fundamental caused of growth. The proximate causes relate to the accumulation of factor inputs such as capital and labour, and also to variables which influence the productivity of these inputs, such as scale economies and technological change (Rodrik, 2003).The fundamental or deep sources of growth relate to those variables that have an important influence on a country's ability and capacity to accumulate factors of production and invest in the production of knowledge. For example, Temple (1999) considers the following 'wider' influences on growth: population growth, the influence of the financial sector, the general macroeconomic environment, trade regimes, the size of government, income distribution and the political and social environment.

In the historical survey of economic growth analysis, Rostow (1990) put forward a central proposition that from the eighteenth century to the present, growth theories have been based on one formulation or another, of a universal equation or production function. As formulated by Adelman(1958),this can be expressed as: $Y_t = f(K_t,N_t,L_t,A_t,S_t)\ldots$ (2.1)

Where $K_t$,$N_t$ and $L_t$ represent the services flowing from the capital stock, natural resources(geography) and labour resources respectively, $A_t$ denotes an economy's stock of applied knowledge, and $S_t$ represents the 'socio-cultural milieu', or 'social capability' within which

the economy functions.

**Theoretical review**

Several theories are applicable to the financial inclusion-economic growth nexus. **Gurley and Shaw's theory of financial intermediation** (1960) is based on the theory of information asymmetry and the agency theory. The theory builds on the notion that financial intermediaries serve to reduce transactions costs and informational asymmetries. In principle, the existence of financial intermediaries is explained by the existence of the following categories of factors: high cost of transaction, lack of complete information in useful time and the method of regulation (Andries and Cuza, 2009; Scholtens and Wensveen, 2003).**The Reputation effects theory of financial exclusion** applies where SME owners are prevented by their experiences or others' experiences from applying for debt finance. This produces a discouraged borrower effect (Fraser, 2005; Kon and Storey, 2003).That is, some small business owners may not access finance because at some stage they were discouraged from applying. Entrepreneurs may not seek finance if there are perceived issues. This could be either that they think they will be unsuccessful so there is little point in applying or a perception that they will not have the information and good credit history that it is perceived that banks require. This results in the financial sector becoming less inclusive (Deakins, Ishaq, Smallbone, Whittan and Wyper, 2005).**Solow growth model** (1956) highlights the impact on growth and technological progress in a closed economy setting without a government sector. The model is built around the neoclassical aggregate production function and focuses on the proximate causes of growth: $Y = A_t f(K,L)$… (2.2)

Where: Y = real output. K = capital. L = labour input. $A_t$ = measure of technology (that is, the way that inputs to the production function can be transformed into output) which is exogenous and taken simply to depend on time. Sometimes $A_t$ is called 'total factor productivity'.

**Empirical review**

Several studies established a positive link between financial inclusion (and other indicators of financial development) with growth or several other macroeconomic indicators related to growth. Hajilee and Niroomand (2018) found that financial inclusion has significant effect on trade openness in majority of emerging economies studied. Dalis and Abimiku (2016) established that financial deepening has reduced the effect of urban and rural poverty in Nigeria. Evidence from a study on financial inclusion and firms' performance by Chauvet and Jacolin (2015) concluded that financial inclusion has positive effects on firms' growth. However, Chiwira, Bakwena, Mupimpila and Tlhalefang (2016) found that financial inclusion has both positive and negative impact on economic growth. Rana and Barua (2015) argued that financial development has no influential role in significantly promoting economic growth in developing countries of the South Asian region. Onaolapo (2015) indicated that financial inclusion does not significantly influenced poverty reduction in Nigeria, but determines economic growth only marginally. Meanwhile, Babajide, Adeboye and Omankhanlem (2015) provided evidence from their study to indicate that financial inclusion is a significant determinant of total factor productivity and capital per worker which invariably determines the level of growth in the Nigerian economy. With a similar outcome, Migap, Okwanya and Ojeka (2015) argued that financial inclusion is necessary for economic growth in Nigeria. With a contrary outcome to most studies on financial inclusion and growth in

Nigeria, Nkwede (2015) revealed that financial inclusion has a significantly negative impact on the growth of the Nigerian economy over the years. Maduka and Onwuka (2013) also argued that financial market structure has a significant and negative effect on Nigeria's economic growth, Hariharan and Marktanner (2012) used average figures on relevant variables from World Bank indicator database to conclude that financial inclusion has the potential to enhance economic growth and development. Using historical design, Khan (2012) stressed that the concept of financial inclusion has a special and positive significance for a growing economy like India. Eggoh (2010) in his study ascertained that the relationship between financial development and growth is non-linear, depending rather on economic development variables and financial development indicators.

Thus, the prevailing trend in these empirics indicates that there is no consensus on the existence of a significant and positive finance-growth relationship in most countries with less developed financial sectors.

**Methodology**

In analyzing the effect of financial inclusion on economic growth, this study is based on the universal production function formulated by Adelman(1958) and Rodrick(2003),in which output($Y_t$) depends on the proximate factors of growth(capital stock($K_t$), total factor productivity($A_t$), natural resource rent ($NRR_t$),labour resource($L_t$) and economic institution($Ei_t$)).

Employing a Solow growth model, the study adapted the models of Hariharan and Marktanner (2012) and Babajide et al (20150 with major modifications. The growth potential associated with financial inclusion using the Solow growth equation is given by:

$$y_t = AK_t^{\alpha} \quad (3.1)$$

***Where:***

*$y_t$ = income (output) per worker (i.e. Y/L= y).* $A_t$ = total factor productivity

$K_t$ = capital per worker. $\alpha$ = production elasticity of capital per labour.

Given the estimates for $K_t$ and $A_t$, and using ARDL technique, the equation is extended to include all the variables in the universal production function.

$$LA_t = \beta_0 + \beta_1 LUI_t + \sum \beta_j controls + u_t \quad (3.2)$$

$$LK_t = \gamma_0 + \gamma_1 LUI_t + \sum \gamma_j controls + u_t \quad (3.3)$$

$$LNRR_t = \theta_0 + \theta_1 LUI_t + \sum \theta_j controls + u_t (3.4)$$

$$LELF_t = \varphi_0 + \varphi_1 LUI_t + \sum \varphi_j controls + u_t (3.5)$$

The coefficients

The coefficients $\beta_1$ $\gamma_1$ $\theta_1$ and $\varphi_1$ are then the estimated financial inclusion elasticities of total factor productivity, capital stock, natural resources rent and labour services, respectively. The variables are double logged and the long run and short run dynamics with maximum lag of 1 is specified as follows:

**Model i**: **Estimating Total Factor Productivity ($A_t$)**

$$\Delta LA_t = \beta_0 + \beta_1 LUI_{t-1} + \beta_2 LBB_{t-1} + \beta_3 IR_{t-1} + \beta_4 LWRT_{t-1} + \beta_5 LDTO_{t-1} + \beta_6 LEI_{t-1} + \beta_7 LA_{t-1} + \sigma_1 \Delta LUI_{t-1} + \sigma_2 \Delta LBB_{t-1} + \sigma_3 \Delta IR_{t-1} + \sigma_4 \Delta LWRT_{t-1} + \sigma_5 \Delta LDTO_{t-1} + + \sigma_6 \Delta LEI_{t-1} + \sigma_7 \Delta LA_{t-1} - \pi \hat{\mu}_{t-1} + LAt$$

**Model ii**: **Estimating Capital Accumulation (Capital per worker, [$K_t$])**

$$\Delta LK_t = \gamma_0 + \gamma_1 LUI_{t-1} + \gamma_2 LBB_{t-1} + \gamma_3 IR_{t-1} + \gamma_4 LWRT_{t-1} + \gamma_5 LDTO_{t-1} + \gamma_6 LEI_{t-1} + \gamma_7 LK_{t-1} + \rho_1 \Delta LUI_{t-1} + \rho_2 \Delta LBB_{t-1} + \rho_3 \Delta IR_{t-1} + \rho_4 \Delta LWRT_{t-1} + + \rho_5 \Delta LDTO_{t-1} + \rho_6 \Delta LEI_{t-1} + \rho_7 \Delta LK_{t-1} - \pi \hat{\mu}_{t-1} + LKt$$

**Model iii**: **Estimating Natural resource rent (Natural resource rent, [$Nrr_t$])**

$$\Delta LNrr_t = \theta_0 + \theta_1 LUI_{t-1} + \theta_2 LBB_{t-1} + \theta_3 IR_{t-1} + \theta_4 LWRT_{t-1} + \theta_5 LDTO_{t-1} + \theta_6 LEI_{t-1} + \theta_7 LNrr_{t-1} + \vartheta_1 \Delta LUI_{t-1} + \vartheta_2 \Delta LBB_{t-1} + \vartheta_3 \Delta IR_{t-1} + \vartheta_4 \Delta LWRT_{t-1} + \vartheta_5 \Delta LDTO_{t-1} + \vartheta_6 \Delta LEI_{t-1} + \vartheta_7 \Delta LNrr_{t-1} - \pi\hat{\mu}_{t-1} + LNrr_t$$

**Model iv**: **Estimating Labour services (No. of persons employed, [$L_t$])**

$$\Delta LELF_t = \varphi_0 + \varphi_1 LUI_{t-1} + \varphi_2 LBB_{t-1} + \varphi_3 IR_{t-1} + \varphi_4 LWRT_{t-1} + \varphi_5 LEI_{t-1} + \varphi_6 LDTO_{t-1} + \varphi_7 LELF_{t-1} + \mu_1 \Delta LUI_{t-1} + \mu_2 \Delta LBB_{t-1} + \mu_3 \Delta IR_{t-1} + \mu_4 \Delta LWRT_{t-1} + \mu_5 \Delta LEI_{t-1} + \mu_6 \Delta LDTO_{t-1} + \mu_7 \Delta LELF_{t-1} - \pi\hat{\mu}_{t-1} + LELF_t$$

The analysis in this study uses time series data from 1986 to 2017.the descriptions and definitions of variables, including the sources are given in Table 3.1.

**Table 1.Nature and Sources of Variables**

| Variables | Description | Sources | Expected sign of Variables. |
|---|---|---|---|
| Usage index(Ui) | It is an interactive variable and shows usage of financial services by the populace. Indicative of the extent of inclusion (it serves as the dependent variable in this study) | CBN:Statistics Bulletin 1986-2017 | Dependent |
| Number of Commercial Banks Branches (BB). | Used as proxy for financial inclusion. Shows accessibility of financial services to all segments of the society (rural & urban). | CBN:Statistics Bulletin 1986-2017 | + |
| Capital per Worker(k) | Calculated as ratio of total capital formation to capital growth rate | World Development Index(WDI,2017) | + |
| Total Factor Productivity[TFP] (A) | Measures the amount of output that can be generated with a given level of factor inputs | PENN World Table 2016 | + |
| Interest Rate(IR) | It is expressed in percent. The Deposit Rate is used as proxy for interest paid by banks on savings and deposit accounts. Determining savings and investment propensities. | CBN:Statistics Bulletin 1986-2017 | + |
| Wholesale and Retail Trade(WR) | Measures the financial transactions of SMEs engage in wholesale and retail activities as a percentage of GDP. Most Nigerians are engaged in this sector, due to several socio-economic factors. | CBN:Statistics Bulletin 1986-2017 | + |
| Natural Resource Rent(NRR) | Measures the total sum of oil rents, natural gas rents, coal rents(hard & soft),mineral rents and forest rents as a percentage of GDP | World Development Index(WDI) | - |
| Degree of Trade Openness(DTO) | Measured by trade shares(i.e. exports plus imports divided by GDP) | World Bank 2017 | + |
| Economic Institutions (Ei). | Measures the performance of economic institutions in terms of enforcement of patent rights and other contractual obligations. | Freedom House 2017 | + |
| Employed labour force(ELF) | Measures the number of persons employed in the Labour force | WDI | + |

## Empirical findings

The descriptive statistics are computed and presented in Table 2

**Table 4.1.Descriptive statistics.**

| Statistic | Ui | BB | k | IR | WR | NRR | DTO | A | Ei | ELF |
|---|---|---|---|---|---|---|---|---|---|---|
| Mean | 0.1819 | 3403.75 | 1727009 | 12.21 | 10346 | 34.77 | 52.36 | 0.84 | 0.79 | 35.61 |
| Median | 0.0831 | 2708.50 | 947136.4 | 11.33 | 539.88 | 37.52 | 56.77 | 0.81 | 0.78 | 35.49 |
| Max | 0.6855 | 5809.00 | 8557079 | 23.99 | 1.16E+08 | 73.50 | 81.81 | 1.00 | 0.93 | 40.29 |
| Min | 0.0033 | 1367.00 | 24149.01 | 4.71 | 0.1267 | 4.71 | 21.12 | 0.66 | 0.61 | 27.96 |
| Std.Dev. | 0.2208 | 1551.53 | 2306828 | 5.23 | 23753 | 15.76 | 16.64 | 0.12 | 0.10 | 3.52 |
| Skewness | 1.1565 | 0.4407 | 1.7648 | 0.73 | 3.30 | -0.12 | -0.37 | 0.05 | 0.04 | -0.362 |
| Kurtosis | 2.9669 | 1.5590 | 4.7960 | 2.70 | 14.15 | 3.03 | 2.20 | 1.41 | 1.67 | 2.099 |
| Jarque- | 7.1345 | 3.8043 | 20.9117 | 13.53 | 223.77 | 0.078 | 1.59 | 3.40 | 2.38 | 1.782 |
| Bera | 0.0282 | 0.1492 | 0.000029 | 0.23 | 0.00000 | 0.9617 | 0.45 | 0.18 | 0.30 | 0.410 |
| Prob | 5.8210 | 108920 | 5526430 | 390.73 | 3.31E+08 | 1112.47 | 1676 | 26.72 | 25.11 | 1139.6 |
| Sum | 1.15113 | 746247 | 552643 | 848.95 | 1.75E+16 | 7700.74 | 8581 | 0.45 | 0.33 | 383.37 |
| Sum | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| sq.Dev. | | | | | | | | | | |
| Obser. | | | | | | | | | | |

Table 2 indicates that the **Usage index (Ui)** of financial inclusion in the Nigerian economy has a mean value of 0.18 out of 100,000 adult users; with maximum and minimum values of 0.69 and 0.003.The standard deviation is 0.22 showing that the series is not widely dispersed from its mean. The skewness shows the index is skewed to the right (+1), and the kurtosis value of approximately 3 shows the distribution is normally peaked. The Jarque-Bera statistic indicates however, that the series is not normally distributed. Other variables could be similarly interpreted.

### Unit root test

This is a pre-estimation test peculiar to time series data; it determines the estimation technique to be adopted to avoid arriving at spurious regression results. The variables are tested for unit root using the augmented Dickey-Fuller (ADF) test, to determine the maximum order of integration. Table 3 shows all variables are integrated at the same level of integration i.e. I (1)

**Table 3 .Showing results of unit root test using augmented Dickey-Fuller (ADF)**

**Augmented Dickey-Fuller(ADF)Unit Root Test**

| Variables | Level | First Diff. | (d) | Variables | Level | First Diff. | (d). |
|---|---|---|---|---|---|---|---|
| LnUi | -1.219665 | -4.397184*** | **I(1)** | LnWR | -0.754591 | -5.607862*** | **I(1)** |
| | (-2.960411) | (-2.963972) | | | (-2.960411) | (-2.963972) | |
| LnBB | -1.279255 | -4.313255*** | **I(1)** | LnNRR | -1.520420 | -6.251302*** | **I I(1)** |
| | (-2.960411) | (-2.963972) | | | (-3.562882) | (-3.574244) | |
| | | | | LnDTO | 2.013657 | -3.782485** | **I(1)** |
| | | | | | (-3.612199) | (-3.612199) | |
| Lnk | -2.022055 | -5.536043*** | **I(1)** | LnA | -1.344566 | -3.522119** | **I(1)** |
| | (-2.960411) | (-2.963972) | | | (-2.967797) | (-2.963972) | |
| IR | -1.906056 | -3.953628*** | **I(1)** | LnEi | -0.120037 | -4.686320*** | **I(1)** |
| | (-2.960411) | (-2.998064) | | | (-2.960411) | (-2.963972) | |
| LnELF | -1.937859 | -6.170474*** | **I(1)** | | | | |
| | (-2.957110) | (-2.960411) | | | | | |

*denotes rejection of the null hypothesis at the 10% level. Critical values at 0.05 are in parenthesis.
**denotes rejection of the null hypothesis at the 5% level. Critical values at 0.05 are in parenthesis.
*** denotes rejection of the null hypothesis at the 1% level.

**Estimation of total factor productivity**

Having established cointegration among the variables specified by examining the error correction term (ECT), using ADF test statistic at 5% critical level, results of the cointegrating and long run form of the model and the speed of adjustment is presented in Table 4.3.

**Table 4 ARDL Cointegrating and Long Run Form. ARDL (1, 0, 1, 0, 1, 0, 1) .DV: LA**

| Variable | D(LUI) | D(LBB) | D(IR) | D(LWR) | D(DTO) | D(LEI) | cointEq(-1) |
|---|---|---|---|---|---|---|---|
| Coefficient | -0.012197 | 0.351187*** | 0.000501 | 0.006240 | 0.031028 | 0.015739 | -0.553688*** |
| Std.Error | 0.017349 | 0.088598 | 0.001848 | 0.004262 | 0.018840 | 0.268434 | 0.137330 |
| LONG RUN COEFFICIENTS | | | | | | | |
| Variable | LUI | LBB | IR | LWR | LDTO | LEI | C |
| Coefficient | -0.022028 | 0.457456*** | 0.000906 | -0.016034 | 0.056039 | 0.782831 *** | -3.838794 |
| Std.Error | 0.027957 | 0.103623 | 0.003290 | 0.009433 | 0.037211 | 0.196793 | 0.832527 |

Source: Author's Eviews 9,computation.

*MacKinnon (1996) one-sided p-values.

***;**;*; denotes statistical significance at 1%, 5% and 10% respectively

The results presented in the upper portion of Table 4 denotes the short run dynamics between total factor productivity (A) and various macroeconomic variables specified in the model . The result indicates that all the variables except bank branches have an insignificant relationship with productivity in the short run. The result shows a positive and significant relationship with increases in bank branches in both the long run and short run. It revealed that a percentage increase in number of bank branches increases productivity by 0.46%(long run) as a result of easy accessibility to financial services such as credit facilities for new machineries and technology, thereby increasing the marginal productivity in order to cover the total cost of production. The result also showed that because the full effect of credit facility is not immediately felt in the short run, increases in bank branches increases current productivity by just 0.35%, in line with findings by Iqbal and Sami (2015). Highlighting the impact of economic institutions on productivity especially in the long run, the result revealed that a percentage increase in the level of economic institutions increase long run productivity by 0.78%.This is because economic institutions enhances investors confidence as it provides legal protection for invested funds, entrepreneurship and innovations(Billmeier & Massa, 2009).

Estimation of capital accumulation (capital per worker,(K))

Table 5 contains the ARDL long run form of the model specified for capital accumulation to estimate the dynamics between the relevant variables in the model as well as ascertain the speed at which the system adjusts back to equilibrium after a shock

**Table 5 ARDL Cointegrating and Long Run Form. ARDL (1, 1, 0, 1, 0, 1, 0) .DV: LK**

| Variable | D(LUI) | D(LBB) | D(IR) | D(LWR) | D(DTO) | D(LEI) | cointEq(-1) |
|---|---|---|---|---|---|---|---|
| Coefficient | -0.106202 | 0.313144 | 0.023081 | 0.006188 | -0.068999 | -2.596158*** | -0.417263*** |
| Std.Error | 0.226758 | 0.590116 | 0.017084 | 0.032201 | 0.224750 | 0.906985 | 0.109746 |
| LONG RUN COEFFICIENTS | | | | | | | |
| Variable | LUI | LBB | IR | LWR | LDTO | LEI | C |
| Coefficient | 0.781248*** | 0.750473 | -0.023822 | 0.014831 | -.970867*** | -6.221881** | 12.481318 |
| Std.Error | 0.310479 | 1.489177 | 0.049488 | 0.076748 | 0.416292 | 2.344035 | 11.956332 |

Source: Author's Eviews 9,computation.

*MacKinnon (1996) one-sided p-values.

***;**;*; denotes statistical significance at 1%, 5% and 10% respectively

The upper portion of Table 5 reveals the short run dynamics between capital accumulation proxy for capital per worker (k) in the Nigerian economy and various macroeconomic variables of interest specified in the model. The result indicates that capital accumulation has an insignificant and negative relationship with financial inclusion and trade openness. It further indicates an insignificant but positive relationship with bank branches,

interest rate and wholesale and retail trade. However, the result revealed the presence of a significant and negative relationship with economic institutions. It implied that a percentage increase in economic institution decreases capital accumulation by more than 2.59%. These are contrary to the findings by Temple (1999) which considers these variables as having wider influences on growth.

The lower portion of Table 5 revealed the long run dynamics between capital accumulation and the variables as contained in the model. The result shows the existence of a positive and significant relationship between capital accumulation and financial inclusion in terms of usage. This is expected as capital accumulation is associated with improved levels of financial inclusion (Khan, 2012). The result further indicates the existence of a negative and significant relationship (at 5% level) between trade openness and capital accumulation. The result shows that a percentage change in trade openness decreases long run capital accumulation by 0.97%. This is an unexpected outcome as Nigeria is an import dependent country and relies on foreign capital(equipment and financial)which depends on the level of international trade between countries. With a similar outcome to the short run dynamics, economic institutions also have a significant and negative relationship with capital accumulation. It signifies that a percentage change in economic institution decreases capital accumulation in the long run by 6.22%. This does not conform to economic expectations, as a priori expectation is expected to be significant and positive with capital accumulation. This can be associated with lag effects, poor ease of conducting business, insufficient power infrastructures, structural imbalances and the absence of effective economic institutions in general

However, the error correction term (ECT2) is correctly signed and significant with a value of -0.417, implying that about 42 per cent of dislocations within the system would be corrected annually. Thus implying that, whatever short run shocks is imposed on the system by any of the variables, the effect is not long lasting and the system will revert back to equilibrium within two years.

**Estimation of Natural resource rent (NRR)**

The ARDL analysis of the effect of financial inclusion on natural resource rent is presented in Table 6.

**Table 6 ARDL Cointegrating and Long Run Form. ARDL (1, 0, 0, 0, 0, 0, 0) .DV: LNRR**

| Variable | D(LUI) | D(LBB) | D(IR) | D(LWR) | D(DTO) | D(LEI) | cointEq(-1) |
|---|---|---|---|---|---|---|---|
| Coefficient | -0.152560 | 0.380220 | 0.003679 | -0.002395 | 0.699454*** | -0.714989 | -0.53886*** |
| Std.Error | 0.112900 | 0.489164 | 0.015233 | 0.030108 | 0.202284 | 0.756701 | 0.151285 |
| LONG RUN COEFFICIENTS | | | | | | | |
| Variable | LUI | LBB | IR | LWR | LDTO | LEI | C |
| Coefficient | -0.293112 | 0.705592 | -0.006827 | -0.004444 | 1.298008&&& | -1.326838 | -8.563344 |
| Std.Error | 0.193806 | 0.857967 | 0.028598 | 0.055809 | 0.282131 | 1.274610 | 7.090691 |

Source: Author's Eviews 9,computation.
*MacKinnon (1996) one-sided p-values.
***;**;*; denotes statistical significance at 1%, 5% and 10% respectively

The upper portion of Table 6 reveals the short run dynamics between the variables specified in the model. The result indicates that only trade openness is significant in the short run. It highlights the positive effect of trade openness on capital accumulation, by implying that a percentage change in trade openness changes natural resource rent by 0.7%. Other macroeconomic variables specified in the model are returned as insignificant with financial inclusion even showing a negative relationship.

The lower portion of Table 6 revealed the long run dynamics, and it also revealed that only trade openness is significant in the long run. The result suggests that trade openness increases natural resource rent by approximately 1.3% in the long term. The evidence on trade openness suggest that

through liberalization process it will help to facilitate the exploitation of natural resources by allowing domestic firms to have greater access to foreign funds from the international markets. Other variables in the model such as financial inclusion, wholesale & retail trade and interest rate indicates insignificant and negative effects on natural resource rent in the long run.

The error correction term (ECT) is correctly signed and significant with a value of -0.539, implying that about 54 per cent of dislocations within the system would be corrected annually. Thus implying that, whatever short run shocks is imposed on the system by any of the variables, the effect is not long lasting and the system will revert back to equilibrium slightly after a year.

**Estimation labour services (ELF)**

The ARDL model tailored toward assessing the effect of financial inclusion on labour services (proxy by employed labour force [ELF]) it is presented in Table 7.

**Table 7 ARDL Cointegrating and Long Run Form. ARDL (1, 0, 1, 1, 1, 0, 1) .DV: LELF**

| Variable | D(LUI) | D(LBB) | D(IR) | D(LWR) | D(DTO) | D(LEI) | cointEq(-1) |
|---|---|---|---|---|---|---|---|
| Coefficient | -0.020415 | 0.446739** | -0.008144** | 0.005008 | 0.001394 | 0.518432 | -1.049877*** |
| Std.Error | -0.849429 | 2.723748 | -2.430401 | 0.711598 | 0.040748 | 1.408554 | -5.208721 |
| LONG RUN COEFFICIENTS | | | | | | | |
| Variable | LUI | LBB | IR | LWR | LDTO | LEI | C |
| Coefficient | -0.019445 | 0.295520** | -0.014003** | -0.011322 | 0.001328 | 0.064529 | 1.402080 |
| Std.Error | 0.022812 | 0.126853 | 0.004579 | 0.008421 | 0.032587 | 0.169566 | 0.998895 |

Source: Author's Eviews 9,computation.
*MacKinnon (1996) one-sided p-values.

***;**;*; denotes statistical significance at 1%, 5% and 10% respectively

The results presented in the upper portion of Table 7 denotes the short run dynamics between labour services (ELF) and various macroeconomic variables specified in the model. The result indicates that increases in bank branches has a positive and significant relationship with employed labour force, with a percentage increase in bank branches increasing the number of employed persons per labour force at 0.45%.this outcome is not unexpected as new staff has to be employed and adequate facilities provided for, thereby having a positive impact on labour services. The result also indicated that interest rate has a significant and negative relationship with employed labour force. A percentage increase in inertest rate is shown to decrease employed labour force by an infinitesimal figure of 0.008%.This outcome is informed by the fact that businesses hardly utilized credit financial instruments for employment purposes. All other variables such as wholesale & retail, trade openness and economic institutions are returned as positive but insignificant..

The long run result in Table 7 also revealed a significant long run positive relationship number of employed labour force and increase in bank branches. It indicated a long term magnitude of about 0.29% increase in employed labour force due to a percentage increase in bank branches. This is an encouraging outcome in a densely populated country like Nigeria with its high rates on unemployment. While the magnitude of the negative relationship between employed labour force and interest rate due to a percentage increase in the latter decreases the former to 0.01%.,in the long run.

Significantly, however, with a value of -1.04 for the cointegration equation (ECT), indicates that whatever dislocations occur in the short term it will be corrected within a year with a 4% lag spilled into the next year for the system to revert back to equilibrium.

**Conclusion**

The objective of this study is to analyse the direct transmission effect of financial inclusion on economic growth in Nigeria (as it affects the proximate factors of growth: capital accumulation, total factor productivity, natural resource rent and

labour services), using a Solow growth function. Thus, considering the signs, size and significance of financial inclusion elasticities within the four sub-models specified to assess this objective, the study establishes that financial inclusion enhances economic growth by increasing only capital accumulation, and has no significant effect on enhanced productivity, natural resource rent and labour services within Nigeria. Hence, financial inclusion explains only an infinitesimal portion of macroeconomic growth in Nigeria. This implied that the benefits of financial inclusion with regards to growth are not being effectively utilized. It is therefore not surprising that the Nigerian economy has been growing at an average rate of 1.2 per annum (ERGP, 2017).

The study recommends that with high levels of financial inclusion, foreign financial capital could be substituted with local capital to satisfy the financial needs of firms that exploit our natural resources thereby reducing our over reliance on trade openness which is usually detrimental in times of international conflicts. This has the capacity to enhance economic growth, which will forestall the emerging insecurity challenges bedeviling Nigeria.

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