



## Advancing inclusive growth in Nigeria: the role of financial inclusion in poverty, inequality, household expenditure, and unemployment

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### ABSTRACT

This study employs ARDL bounds testing technique to examine the effect of financial inclusion on inclusive growth in Nigeria, using quarterly data from 2007-2018. The empirical evidence reveals the presence of cointegration between financial inclusion indicators (account ownership, access to bank, ATM and credit, loans to SMEs and internet usage) and inclusive growth (poverty, household expenditure, employment, and per capita income). The results demonstrate that, while increase in account ownership, and access to bank and ATM raise poverty, and access to credit, loans to SMEs and internet usage reduces employment and per capita income in the long-run, it was also discovered that access to credit reduce poverty and increase household consumption, while account ownership and access to bank increases employment and per capita income in the long-run. In the short-run: lag of account ownership, access to ATM and credit, loan to SMEs and internet usage reduces poverty; lag of household expenditure, account ownership, and access to ATM and lag of internet usage increases household expenditure; lags of access to ATM and lags of internet usage (and account ownership and access to the bank) increases employment opportunities (and per capita income), and access to ATM and credit reduces employment and per capita income respectively.

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#### **Memajukan pertumbuhan inklusif di Nigeria: peran inklusi keuangan dalam kemiskinan, ketidaksetaraan, pengeluaran rumah tangga, dan pengangguran.**

Penelitian ini menggunakan teknik ARDL *bounds* untuk menguji pengaruh inklusi keuangan terhadap pertumbuhan inklusif di Nigeria, dengan menggunakan data triwulanan 2007-2018. Bukti empiris menunjukkan adanya kointegrasi antara indikator keuangan inklusif (kepemilikan rekening, akses ke bank, ATM dan kredit, pinjaman kepada UKM dan penggunaan internet) dan pertumbuhan inklusif (kemiskinan, pengeluaran rumah tangga, lapangan kerja, dan pendapatan per kapita). Hasilnya menunjukkan bahwa, meskipun peningkatan kepemilikan rekening, dan akses ke bank dan ATM meningkatkan kemiskinan, serta akses ke kredit, pinjaman kepada UKM, dan penggunaan internet mengurangi lapangan kerja dan pendapatan per kapita dalam jangka panjang, ditemukan juga bahwa Akses kredit mengurangi kemiskinan dan meningkatkan konsumsi rumah tangga, sementara kepemilikan rekening dan akses ke bank meningkatkan lapangan kerja dan pendapatan per kapita dalam jangka panjang. Dalam jangka pendek; kelambanan kepemilikan rekening, akses ke ATM dan kredit, pinjaman untuk UKM dan penggunaan internet mengurangi kemiskinan; keterlambatan pengeluaran rumah tangga, kepemilikan rekening, dan akses ke ATM dan keterlambatan penggunaan internet meningkatkan pengeluaran rumah tangga; kelambanan akses ke ATM dan kelambanan penggunaan internet (dan kepemilikan rekening dan akses ke bank) meningkatkan kesempatan kerja (dan pendapatan per kapita), dan akses ke ATM dan kredit masing-masing mengurangi lapangan kerja dan pendapatan per kapita.

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## 1. Introduction

Overtime, it has been argued that economic growth is a powerful instrument for poverty reduction, and the improvement of the standard of living and quality of life in developing countries (David, Sakanko & Ladan, 2019). However, in recent time, due to the eclipse of robust and remarkable growths by associated high level of poverty, unemployment and inequality rates, among other precarious development indicators, especially in developing countries (Adediran, Oduntan & Matthew, 2017; Zulfiqar, Chaudhary & Aslam, 2016), the principle of inclusive growth – a concept that advances equitable opportunities for economic participants during economic growth, with benefits incurred by every section of society (Ranieri & Ramos, 2013; Anand, Mishra, & Peiris, 2013, 2015) – has assumed greater level of importance as a result of its strategy, which encompasses the key elements of an effective poverty reduction strategy, and more importantly, the expansion of the development agenda, and the equitable distribution of wealth and prosperity, among others (Adamu & Suleiman, 2018; Sethy, 2016).

The concept of inclusive growth combines the participation in the process of growth with the sharing of benefits from the achievements as a result of the growth. Inclusive growth is necessary for ensuring that the benefits of a growing economy extend to all segments of the society (Qazi, 2018). Moreover, since inclusive growth is neither associated with an increase in inequality (Rauniyar & Kanbur, 2010), nor is it associated with a reduction in the income share of the bottom quintile of the income distribution (Balakrishnan, Steinberg & Syed, 2013), it tends to help increase the social welfare function that depends on how the average population have equal access to opportunities, including employment, education, health and basic amenities (Adediran, et al., 2017), as well nurture and bring at par all the weaker sections of the society, including agriculture and small scale industries, with other sections of the society in terms of economic development (Adamu & Suleiman, 2018).

Considering the growing evidence that financial inclusion – the access to a host of quality financial services and products, including savings, loans, insurance and credit, among others, by members of the public, especially the financially disadvantaged at an affordable cost (Grant & Kagan, 2019) – is capable of tackling poverty and inequality, and improving the welfare and general standard of living of individuals (Odeleye & Olusoji, 2016), it has therefore become an explicit strategy and a key ingredient for accelerated economic growth, and the achievement of inclusive growth (Qazi, 2018). This is largely due to the fact that increased access to financial services, especially those that are well suited for low-income earners, have the ability to expedite efficient allocation of productive resources (Nwafor & Yomi, 2018); boosting effective demand; value creation of small businesses; and the generation of local savings; which in turn induces investment, employment, income generation (Bakari, et al., 2019), enormous capital accumulation, credit creation, thriving of investment and economic activities in an economy (Kama & Adigun, 2013), lower poverty rate, and efficient and equitable distribution of scarce resources, for the improvement of societal wellbeing and human development indicators – health, nutrition and education (Umar, 2013, Bakari, et al., 2019), which ultimately sets the path toward the attainment of inclusive growth and national development (Fadun, 2014; Bruhn & Inessa, 2009).

Even though improvements in the level of financial inclusion might not entirely eradicate poverty, inequality and unemployment, nevertheless, it can clearly play a role in reducing poverty and inequality, and the impacts thereof, by helping people invest in the future, smooth their consumption, boost their welfare and standard of living, and manage financial risks (Demirguc-Kunt, Klapper & Singer, 2017), through the provision of suitable financial services (Mugo & Kilonzo, 2017; Dupas, Karlan, & Ubfal, 2016). Financial inclusion can also create economic

opportunities for the poor, in order to support them overcome the risk associated with poverty, by facilitating investments in their health, education, and businesses, and managing financial emergencies such as job loss or crop failure, that can push families into destitution easily (Demirgüç-Kunt, et. al., 2018). In essence, as access to basic and affordable financial services increases, it tends to result to increase in economic activities and employment opportunities of households, which will cause the disposable income of households to rise, thus leading to more savings and a robust deposit base for the bank, and the multiplier effect resulting in inclusive economic growth and national development (Migap, Okwanya, & Ojeka, 2015; Swamy, 2010).

The realization of the roles of financial inclusion, in the recent past, was arguable, the major impetus for the adoption of policies and measures aimed at growing global financial inclusion (Sakanko, Abu & David, 2019). Notwithstanding this global consensus, achieving pervasive financial inclusion has remained a global challenge, especially in most Sub-Saharan Africa and low-income countries (Kama & Adigun, 2013; Demirgüç-Kunt, et. al., 2018). Although divergent empirical views on the role of financial inclusion on poverty, inequality and household welfare, in relation to inclusive growth, abounds in developing countries (Odeleye & Olusoji, 2016; Van & Linh, 2019; Raichoudhury, 2016; Gul, Usman & Majeed, 2018; Park & Mercado, 2015), however, given the existence of a broad agreement among economists that financial development prompts economic growth and employment (Swamy, 2010; Adediran, et al., 2017), and there exist the presence of a direct correlation between financial exclusion and poverty (World Bank, 2018; Bhandari, 2009), it is indeed irrefutable that considerable part of the differences in long run economic growth with inclusiveness across countries can be elucidated by the disparity in their financial development (Swamy, 2010).

In Nigeria, like most developing economies, although empirical literature presents divergent views on the role of financial inclusion on poverty, inequality, and household welfare, among others, in relation to inclusive growth and national development (see Sakanko et al, 2019; Otiwu, Okere, Uzowuru & Ozuzu, 2018; Okoye, Adetiloye, Erin & Modebe, 2017; Oyewo & Oyewole, 2014; Adeola, 2016), however, it is imperative to state that, despite being the populous country and biggest economy in Africa and having recorded a robust average growth of 7 percent annually in her gross domestic product (GDP) between 2000 and 2014, notwithstanding the fact that oil price volatility continues to influence her growth performance (World Bank, 2019) due to the dependence on oil and gas export (Sakanko, Obilikwu & David, 2019), there is a conspicuous agreement between the abysmal financial exclusion which exists among more than half of Nigeria's adult population (Demirgüç-Kunt, et. al., 2018) and the high level of poverty – Nigeria is now the “world poverty capital” due to the incidence of extreme poverty among more than 91.16 million Nigerians (Vanguard, 2019, Sakanko et al, 2019); coupled with the presence of massive income inequality, unemployment, insecurity, mismanagement of natural resources (Ugoani, 2017, David, et al., 2019; Omojolaibi, 2017), hunger, inability to access basic health care delivery system, electricity, pipe-borne water, and education, and the prevalence of several diseases (Sakanko & David, 2018; United Nation Development Programme [UNDP], 2019; World Bank, 2019; David, 2018), among other precarious development indicators, which abounds and has continued to bedevil the country, despite the huge human, material and natural resources at her disposal (David et al, 2019).

Based on the foregoing, the main objective of this study is to observe the effect of financial inclusion on inclusive growth in Nigeria, by examining the role of financial inclusion in poverty, economic inequality and household welfare. The remainder of this paper is organised as follows: the second section includes the review of previous studies on financial inclusion and inclusive growth; section three describes the theoretical framework and the model; section four provides the

data and econometric techniques; results are discussed in section five; and the conclusion and recommendations are provided in the last section – section five.

### Review of Previous Studies on Financial Inclusion and Inclusive Growth

Both within and outside Nigeria, several scholars have attempted to examine the effect of financial inclusion on inclusive growth from different perspectives. Due to the absence of an ideal measure and data, most studies resulted to the use of growth in national output (real GDP and real GDP per capita), among others as the metrics for inclusive growth, and indicators of financial deepening (Money supply and credit to private sector) as measure of financial inclusion (see [Odeleye & Olusoji, 2016](#); [Sharma, 2016](#); [Adediran, et al., 2017](#); [Okoye, et al. 2017](#); [Afolabi, 2020](#); [Balele, 2019](#)). Interestingly, empirical result of most of the analyses suggest that national output is been induced by financial inclusion indicators during the period.

Nevertheless, certain studies have also examined the effect of financial inclusion on inclusive growth from the perspective of poverty, inequality, household consumption expenditure and human development in relation to inclusive growth. For example, [Zia and Prasetyo \(2018\)](#) employed the analysis methods of Index Inclusion and regression-correlation of panel data to investigate the relationship between financial inclusion and poverty alleviation in 33 provinces Indonesia from 2014 to 2016. The results suggest the existence of a negative relationship between financial inclusion and poverty. In addition, the empirical evidence indicates an insignificant positive relationship between financial inclusion and income inequality. In India, [Swamy \(2010\)](#) used Ordinary Least Square (OLS) estimation technique to examine the impact of financial inclusion on inclusive growth from 1975 to 2007. The results show that financial inclusion indicators (domestic savings and credit) has a significant negative effect on inclusive growth (measured by poverty). [Park and Mercado \(2015\)](#) investigated the impact of financial inclusion on poverty and income inequality in 37 developing economies in Asia. The results confirm the presence of a significant negative impact of financial inclusion on poverty and income inequality.

In Africa, [Nyarko \(2018\)](#) examined the relationship between financial inclusion, financial literacy and inclusive growth in Africa. By using the system-generalized Methods of Moments (S-GMM), OLS, and the causal step and bootstrap estimation techniques, the author submitted that there is evidence which suggest that access dimension (ATM, bank branches and mobile account) of financial inclusion has a significant positive impact on employment, and an insignificant negative impact on poverty. In addition, the empirical evidence confirms the presence of a significant positive relationship between financial literacy and employment. [Bakari, et al. \(2019\)](#) employed a static panel data model to assess the impact of financial inclusion on poverty reduction in 49 Sub-Saharan African countries from 1980 to 2017. The authors confirm that savings, among other indicators of financial inclusion, plays a vital role in poverty reduction.

[Agyemang-Badu, Agyei and Duah \(2018\)](#) investigated the relationship between financial inclusion, poverty and income inequality in 48 African countries using fixed effect panel regression model. The empirical results show that financial inclusion impact poverty significantly and negatively, and inequality positively and insignificantly. [Adamu and Suleiman \(2018\)](#) empirically examined the relationship between financial inclusion and inclusive growth in 15 West and East African countries by using the non-stationary heterogeneous panel model. The results illustrate that domestic savings and credit (indicators of financial inclusion) both impact inclusive growth, measured by per capita household consumption expenditure, negatively.

In Nigeria, researchers have also made effort to ascertain the effect of financial inclusion on inclusive growth, from the perspective of poverty, income inequality, economic growth and human



development. For instance, [Sakanko, Abu and David \(2019\)](#) employed the ARDL bounds testing approach to investigate the impact of financial inclusion on national development in Nigeria between 1980 and 2018. The authors submitted that financial inclusion indicators (access to bank and ATM, and credit) has a significant and positive effect on national development in the short and long term. In addition, the authors also discovered the presence of a bi-directional causal relationship between financial inclusion and national development. [Okoye, et al., \(2017\)](#) employed Ordinary Least Square (OLS) estimation technique to investigate the effect of financial inclusion on economic growth and development in Nigeria between 1986 and 2015. The empirical evidence indicates that financial inclusion (proxy by number of bank branches, demand deposit from the rural areas and loan to rural areas) is positively and significantly related to income inequality.

Explicitly, a survey of literatures indicates that there is dearth of study on the effect of financial inclusion on inclusive growth in Nigeria. Thus, this study contributes to literature by examining the effect of financial inclusion on inclusive growth in Nigeria, from the perspective of the benefit and participation dimension of inclusive growth, vis-à-vis poverty, inequality, household consumption expenditure, and employment (unemployment) in Nigeria, using the ARDL bound testing approach, and conducting important diagnostics, which most studies on financial inclusion ignored.

The framework for this study is based on the finance-growth theories ([Schumpeter, 1912](#); [Shaw, 1973](#); [King & Levine, 1993](#); [Levine, 1997](#)). The finance-growth theories are hinged on the assumption/argument that financial development creates enabling conditions for inclusive growth through either a “supply-leading” direction, in which financial development spurs growth, by channelling limited resources from surplus units to deficit units; or through a “demand-following” direction, where high economic growth creates or generates demand for financial instruments, products and arrangements which invariably lead to changes (growth) in financial system ([Adediran, et al., 2017](#); [Odeleye & Olusoji, 2016](#)).

From the forgoing, it is therefore acknowledgeable that, financial development, if well developed, have the capacity to accelerate growth ([Sharma, 2016](#); [Swamy, 2010](#)), because of its potential influence on capital accumulation, technological innovation, resource allocation and productivity growth, through the mobilisation of funds from surplus units to productive investments ([Adediran, et al., 2017](#)). In essence, based on the supply-leading hypothesis, financial development (or narrowly, financial inclusion), which tend to result to increased access to a safe, easy and affordable source of finance, is a pre-condition for quickening growth and sustainable equitable growth ([Sakanko, 2020](#)). Thus, a model in which inclusive growth (*IncG*) is dependent on financial inclusion (*FInc*) is specified as follows:

$$IncG_t = f(FInc_t, \varepsilon_t) \dots\dots\dots (1)$$

In order to examine the empirical relationship between financial inclusion and inclusive growth, financial inclusion will be decomposed into the three core dimensions of financial inclusion as follows: financial penetration (number of deposit bank account holders per 1,000 population); access or availability of financial services (number of bank outlets per 100,000 populations, ATM per 100,000 people, and/or access to internet for financial services); usage of financial services (outstanding credit to private sector relative to the GDP); as in literatures (see [Sharma, 2016](#); [Sarma & Pais, 2011](#); [Sethy, 2016](#); [Qazi, 2018](#); [Nyarko, 2018](#)). Similarly, inclusive growth will also be decomposed into participation dimension (employment) and benefit dimensions (poverty, inequality and household consumption expenditure), as in [Nyarko \(2018\)](#). In essence, *IncG* is therefore made up of employment (*EMPL*), poverty (*POV*), income inequality (*INQ*) and household consumption expenditure (*HCE*).

If re-written in an explicit form, equation (1) is specified as:

$$IncG_t = a_0 + b_1 FInc_t + \varepsilon_t \dots\dots\dots (2)$$

**2. Research Method**

The data used in this study are quarterly data from 2007 to 2018. Specifically, data on household consumption expenditure (measured by annual percentage growth of households final consumption expenditure); employment (measured by the proportion of the population that is employed); per capita income (due to the absence of annual data on inequality – measured by annual GDP per capita growth); financial penetration (measured by depositors with commercial banks per 1,000 adults); and access and availability of financial services (measured by commercial bank branches per 100,000 adults, ATM per 100,000 adults, and proportion of the population using the Internet) were collected from the World Development Indicators (WDI). Data on usage of financial services (measured by domestic credit to private sector by banks relative to GDP) and loans to SMEs (measured by loans to SMEs as a % of total credit to private sector) were obtained from the Central Bank of Nigeria (CBN) annual statistical bulletin. Similarly, the data on poverty (measured by poverty headcount ratio at \$1.90 per day) was collected from the National Bureau of Statistics (NBS).

It is imperative to state that, data on poverty, per capita income, household consumption expenditure, credit to the private sector, and access to bank with a considerable number of years or observations (i.e. 30 or above), others (employment, access to ATM, loans to SMEs, depositors in commercial bank and internet usage) are not available for a substantial number of years, which unarguably is going to be a major constrain to this study. However, this shortcoming can be overcome by employing the technique of data interpolation to convert annual data to quarterly data, leading to the availability of a higher number of observations as used in recent empirical studies (see [Sakanko, et al., 2019](#); [Abu, Kadandani, Obi & Modibbo, 2019](#)). Therefore, applying the in-built E-views software linear-match last interpolation technique – in which the value of annual observation is being inserted into the last period of the quarterly data, then performs interpolation of the missing values; i.e. 2007Q4 will be given the annual 2007 value, then linear interpolation will fill in 2007Q1, 2007Q2 and 2007Q3 – to the series, we are left with a quarterly data – 2007Q4-2018:4 (T = 45).

To empirically analyze the impact of financial inclusion on inclusive growth, the Autoregressive Distributed Lagged (ARDL) approach ([Pesaran and Shin, 1999](#); [Pesaran, Shin & Smith, 2001](#)) was employed. The rationale behind the choice of this estimation technique is guided by the numerous advantages which it has over other cointegration methods such as the residual-based technique ([Engle & Granger, 1987](#)) and Maximum Likelihood test ([Johansen, 1988](#); [Johansen & Juselius, 1990](#)), including its ability to estimate the relationship between variables whether the sample sizes are small or the series are stationary after first differencing [I(1)], or a combination of I(0) and I(1), in addition to the use of single reduce form equation which estimate the short- and long-run parameters of the model simultaneously, and its ability to allow variables have different optimal lags ([Abu, 2017, 2019](#); [Abu, et al., 2019](#); [Sakanko & David, 2018](#); [Sakanko, et al., 2019](#); [David, et al., 2019](#); [David, 2018](#)).

Furthermore, the ARDL bounds testing was used to tests the null hypothesis of no cointegration against the alternative hypothesis of cointegration. The computed F-statistic is compared with the critical values provided by [Pesaran et al. \(2001\)](#) and/or [Narayan \(2005\)](#). If the computed F-statistic is greater than the upper bound I(1), we reject the null hypothesis of no cointegration and conclude

that there is cointegration between the series. On the other hand, if the computed F-statistic is lesser than the lower bound [I(0)], then we accept the null hypothesis and conclude that there is no cointegration among the series. Furthermore, if the calculated statistic is between I(0) and I(1), the inference would be inconclusive. The ARDL model to be estimated is specified as follow:

$$\Delta IncG_t = a_0 + \sum_{i=1}^n b_{1i} \Delta IncG_{t-1} + \sum_{i=1}^n b_{2i} \Delta FInc_{t-1} + \sigma_1 IncG_{t-1} + \sigma_2 FInc_{t-1} + \varepsilon_{1t} \dots \dots \dots (3)$$

**3. Result and Discussion**

Although it has been argued that there may be no need to conduct a unit root or stationarity test when employing an ARDL estimation technique (see Akinlo, 2006; Duasa, 2007, Abu, et al., 2019), certain authors also encouraged the verification of the pre-testing of series so as to avoid the inclusion of I(2) series in the analysis which tend to generate spurious regression result (see Sakanko & David, 2018; Abu, 2017, 2019; David, 2018). In essence, the Augmented Dickey Fuller (ADF) and Philips-Perron (PP) techniques will be used to check the stationarity properties of the series that will be entering the model. These tests compare the null hypothesis of a series “has a unit root” against the alternative hypothesis that the series “does not have a unit root”.

Table 1: Results of Unit Root Test

Variables	ADF		P-P	
	Levels	First Diff.	Levels	First Diff.
<i>POV</i>	-2.135670	-1.651610*	-0.233941	-2.395156**
<i>HCE</i>	-5.162565***	-3.518903***	-3.967551***	-3.544795***
<i>EMPL</i>	-0.868640	-1.716010***	-1.407959	-1.801055*
<i>PCY</i>	1.587392	-1.752829	-1.275592	-2.320640**
<i>DEPOSITORS</i>	-2.732677	-2.673000**	4.412234***	-2.851838**
<i>ATM</i>	-3.341894**	-2.391477**	-3.195104**	-2.394258**
<i>BANK</i>	-3.187116**	-2.057631**	-4.056767**	-2.080740**
<i>CPS</i>	-3.727406**	-2.744420**	-4.545829*	-2.751857*
<i>LOANSME</i>	-2.247740*	-2.560551**	-4.521468***	-3.123701***
<i>INTERNET</i>	1.126132	0.754645	4.701562***	-2.629403**

**Note:** \*, \*\* and \*\*\* denotes a rejection of the null hypothesis of no unit root at 10%, 5% and 1% levels, respectively

From the stationarity result presented in Table 1, it indicates that, while ADF and P-P test confirms that *HCE*, *ATM* and *BANK* are stationary at levels, and *POV*, *EMPL* and *DEPOSITORS* were made stationary after first differencing, however, there was a disagreement between boths test on the stationarity status of *PCY* and *INTERNET*. Nevertheless, the indication of *PCY* and *INTERNET* as being stationary after the first difference by P-P test indicates that the series in the model is a mixture of I(0) and I(1), which thus validates the use of the ARDL bounds testing method to cointegration (Pesaran & Shin, 1999; Pesaran, et al., 2001) in the estimation of the relationship between the variables.

**ARDL Bound Testing for Co-integration**

From the ARDL bound testing results presented in Table 2, it is shown that the computed f-statistics of the four models estimated (29.08596, 5.643990 42.14439, & 38.88939) exceeds the upper bound (i.e. 3.99) at 1 percent level. Therefore, this confirms the existence of a co integrating (long-run) relationship between the dimensions of financial inclusion (penetration, access and usage) and inclusive growth (poverty, household consumption expenditure, employment opportunities and per capita income).

Table 2: Results of Bound Test

Dependent Variable	Function	$k-1$	F-Statistics
<i>POV</i>	$f(POV/FInc)$	6	29.08596
<i>HCE</i>	$f(HCE/FInc)$	6	5.643990
<i>EMPL</i>	$f(EMPL/FInc)$	6	42.14439
<i>PCY</i>	$f(PCY/FInc)$	6	38.88939

  

Asymptotic critical values						
1%		5%			10%	
I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	
2.88	3.99	2.27	3.28	1.99	2.94	

**Discussion of Long-Run and Short-Run Models**

Given that the bound testing result in Table 2 confirms the presence of a cointegrating (long-run) relationship between indicators of financial inclusion (Depositors, ATM, Bank, Credit, Loan to SMEs, and internet usage) and inclusive growth indicators (poverty, household consumption expenditure, employment and per capita income), the ARDL model was estimated based on the Akaike Information Criterion (AIC) suggested optimal lag-lengths of (1,3,1,1,3,1,3) for poverty model; (2,2,1,0,1,1,1) for household consumption expenditure model; (1,1,3,0,0,1,3) for employment model; and (1,1,3,1,1,0,3) for per capita income model. The long-run and short-run results for the selected models are reported in Table 3 and Table 4.

The long-run results in Table 3 (Panel A) reveal that deposit account ownership and access to bank has a significant positive effect on poverty, employment and per capita income. In essence, a unit increase in account ownership and access to bank raises percentage of population in poverty by 75.3% and 84.3%; percentage of employed population by 2.64% and 0.45%; and per capita income by 39.68% and 18.33% respectively. The results also indicate that access to ATM facilities have a significant positive effect on poverty at 10% level, and a significant negative effect on employment opportunity and per capita income at 1% and 5% level respectively. This implies that, a percent increase in access to ATM facility raises the percentage of the poor population by 4.03% percent, and reduces the percentage of employed population and per capita income by 0.31% and 2.36% respectively.

In addition, while the results show that access to credit have a significant negative effect on poverty, employment opportunities and per capita income at 1% and 5% level, and a significant positive impact on household consumption expenditure at 10% level, the results also indicates that loans to SMEs have a significant negative impact on employment and per capita income at 1% level while internet usage have a significant negative impact on poverty and employment opportunities. This indicates that, a percent change in access to credit reduces poverty, employment and per capita income 10.5%, 0.14% and 1.92%, and reduces household consumption expenditure by 7.27%. Also, a unit change in loans to SMEs and internet usage reduces employment and per capita income by 1.17% and 14.68% and poverty and employment by 1.18% and 0.03% respectively.

The short-run result in Table 3 (Panel B) indicates that two period lag value of deposit account ownership, access to ATM and credit, loans to SMEs, and internet usage have a significant negative effect on poverty, while access to bank, one and two period lagged values of access to credit and internet usage have a significant positive impact on poverty. This indicates that poverty increases by 37.8%, 0.73%, 0.87%, 0.13% and 0.19% with a unit increase in access to bank, and access to credit and internet usage in the past one and two quarters respectively. Also, a 1% increase deposit account ownership in the past two quarters of, access to ATM and credit, loans to SMEs and internet usage reduces poverty by 6.65%, 1.75%, 3.09%, 17.45% and 0.26% respectively.



In the short-run result (Panel B), it is also shown that the one quarter past value of household consumption expenditure, ownership of deposit account, access to ATM, and one quarter past value of internet usage have a significant positive impact on household consumption expenditure at 1% level, while one quarter past value of ownership of deposit account, access to credit and loans to SMEs have a significant negative effect on household consumption expenditure at 1% level. In essence, household consumption expenditure is raised by 0.52%, 153.2%, 1.93%, and 0.90% for a percent increase in household consumption expenditure in past quarter, ownership of deposit account, access to ATM and internet usage in the past quarter. Similarly, a unit change in ownership of deposit account in the past quarter, access to credit and loans to SMEs reduces household consumption expenditure by 64.4%, 3.67% and 28.67% respectively.

Table 3: Result of ARDL Model

Panel A: Long-Run Coefficient				
Variables	<i>POV</i>	<i>HCE</i>	<i>EMPL</i>	<i>PCY</i>
<i>Constant</i>	-507.6911***	-218.4858	41.57927***	-245.8835***
<i>lnDEPOSITORS</i>	75.32583***	51.09968	2.641718***	39.67989**
<i>ATM</i>	4.028625*	-7.161061	-0.308291***	-2.360702**
<i>BANK</i>	84.33116**	-44.29858	0.445368*	18.33339***
<i>CPS</i>	-10.45425***	7.268130*	-0.136675***	-1.920233**
<i>LOANSME</i>	-48.17368	-44.26104	-1.170110***	-14.67887***
<i>INTERNET</i>	-1.182295**	-1.078512	-0.028308***	-0.056828
Panel B: Short-Run Coefficient				
Variables	$\Delta$ <i>POV</i>	$\Delta$ <i>HCE</i>	$\Delta$ <i>EMPL</i>	$\Delta$ <i>PCY</i>
$\Delta$ <i>HCE</i> (-1)		0.512106***		
<i>ln</i> $\Delta$ <i>DEPOSITORS</i>	-0.348012	153.2576***	0.080096	7.916585***
<i>ln</i> $\Delta$ <i>DEPOSITORS</i> (-1)	-5.381592	-64.39433***		
<i>ln</i> $\Delta$ <i>DEPOSITORS</i> (-2)	-6.644671*			
$\Delta$ <i>ATM</i>	-1.745496***	1.932040**	-0.053084***	0.771778***
$\Delta$ <i>ATM</i> (-1)			0.031402*	0.289902**
$\Delta$ <i>ATM</i> (-2)			0.028851**	0.371337***
$\Delta$ <i>BANK</i>	37.82164***			11.15184***
$\Delta$ <i>CPS</i>	-3.089606***	-3.673977***		-0.68 0367***
$\Delta$ <i>CPS</i> (-1)	0.733239***			
$\Delta$ <i>CPS</i> (-2)	0.869038***			
$\Delta$ <i>LOANSME</i>	-17.45066***	-28.66735***	0.025807	
$\Delta$ <i>INTERNET</i>	-0.262909***		0.003080	0.146444***
$\Delta$ <i>INTERNET</i> (-1)	0.127234*	0.896571***	0.006079***	0.033670***
$\Delta$ <i>INTERNET</i> (-2)	0.187658***		0.007663***	0.047342***
$\epsilon_{t-1}$	-0.141822***	-0.162312***	-0.176248***	-0.110754***
Adj. <i>R</i> <sup>2</sup>	0.951220	0.863853	0.922063	0.951395
D-W Stat	2.145469	2.177715	2.478264	2.293034

Note: \*, \*\* & \*\*\* indicates 10%, 5% & 1% significance level; ln denotes logarithm;  $\Delta$  is the first difference operator

In addition, the result shows that access to ATM and credit have a significant negative effect on employment opportunity and per capita income at 1% level respectively, which implies that a unit change in access to ATM and credit reduces employment by 0.053% and per capita by 0.68% respectively. Also, access to ATM and internet usage in the past one and two quarters have a significant positive effect on employment at 1% level. A unit change in access to ATM and internet usage in the past one and two quarters raises employment by 0.053%, 0.031%, 0.029% 0.0061% and 0.008% respectively.

Similarly, deposit account ownership, access to bank, and access to ATM and internet usage in the current, past one and two quarters have a significant positive effect on per capita income at 1% level. In essence, a 1% increase in deposit account ownership, access to bank, and current and past one and two values of access to ATM and internet usage raises per capita income increase by 7.92%, 11.15%, 0.77%, 0.029%, 0.37% 0.15, 0.034% and 0.047% respectively.

The coefficient of the error correction term lagged by one period ( $\varepsilon_{t-1}$ ) of the four models are all highly statistically significant, less than one and negative, and therefore suggest that 14%, 16%, 18% and 11% disequilibrium in poverty, household consumption expenditure, employment opportunities and per capita income will be corrected within a quarter.

The negative effect of indicators of financial inclusion (save access to Bank and lag values of access to credit and internet usage) on poverty in the short-run is consistent with the outcome of past studies (see [Agyemang-Badu, et al., 2018](#); [Zia & Prasetyo, 2018](#); [Swamy, 2010](#); [Park & Mercado, 2015](#); [Bakari, et al., 2019](#)). This finding indicates that poverty is reduced in the short-term with increased access to ATM and credit, loan to SMEs, internet usage and deposit account ownership. On the other hand, while the positive impact of deposit account ownership, and access to bank and ATM suggest that the penetration and access to financial products/services is very low in Nigeria, the negative effect of access to credit and internet usage point to their efficacy in poverty reduction in the long run.

Correspondingly, the negative effect of the penetration and access dimension of financial inclusion (lag of deposit account ownership, access to credit and loans to SMEs) on household consumption expenditure in the short-run to some extent conforms with the findings of ([Adamu and Suleiman, 2018](#)). This outcome therefore implies that, notwithstanding the positive impact of access to ATM deposit account ownership and lagged value of internet usage on household consumption expenditure, access to credit facilities which ought to raise the consumption expenditure of households is not readily available or accessible. However, the positive effect of access to credit in the long-run is a testament to the potentials of credit facilities in raising household spending.

In addition, the short-run positive impact of lags of access to ATM, internet usage, access to a bank, and ownership of deposit account on employment and per capita income is in line with the work of ([Nyarko, 2018](#)), which indicates that penetration and access dimension of financial inclusion raises employment opportunity and per capita income. On the other hand, while the positive effect of access to bank and deposit account ownership on employment and per capita income in the long-run are indications that increased ownership of deposit account and access to bank will increase employment opportunity as well as per capita income, however, the current available ATM facilities, access to credit and loans to SMEs as well as access to internet/usage will result to unemployment and reduced per capita income in the future.

## Results of Diagnostic Tests

Due to the obvious issues associated to the use of time series data for estimation purpose, such as the possibility of encountering problems of serial-correlation and heteroscedasticity, which tends to invalidate or make unreliable any estimates generated, there is therefore need to examine the reliability of the estimated results. For this purpose, diagnostic tests were conducted.

The diagnostics results reported in Table 5 indicate that the model for employment opportunities have a problem of serial correlation, the four ARDL models are void of the problems of serial correlation, heteroscedasticity, functional form, and normal distribution. This therefore entails that the estimate results are valid. In addition, the plot of the Cumulative Sum of Recursive Residuals

(CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) which lies within the 5% significant lines/critical boundaries also confirms the stability of the models.

Table 5: Results of Stability Test

LM Test Statistics	<i>POV</i>	<i>HCE</i>	<i>EMPL</i>	<i>PCY</i>
Autocorrelation: CHSQ	2.311202 [0.3149]	4.176945 [0.1239]	22.33242 [0.0001]	1.088558 [0.2968]
Heteroscedasticity: CHSQ	26.65093 [0.1131]	14.30108 [0.4275]	16.09052 [0.3761]	19.34625 [0.2511]
Normality: Jaque-Bera	0.508595 [0.775461]	4.650532 [0.97757]	1.632589 [0.442067]	0.876149 [0.645278]
Functional Form: Ramsey	14.45789	1.721824	0.151710	2.621300
RESET F-stat	[0.0010]	[0.1985]	[0.151710]	[0.1185]

#### 4. Conclusions

This paper examines the effect of financial inclusion on inclusive growth in Nigeria, using quarterly data over the period of 2007-2018. Employing the ARDL bounds testing techniques, the empirical evidence shows the presence of significant cointegrating (long-run) relationship between the indicators of financial inclusion (ownership of deposit account, access to bank, ATM and credit, loans to SMEs and internet usage) and dimensions of inclusive growth (poverty, household consumption expenditure, employment, and per capita income). The result demonstrates that, while increases in ownership of deposit account, and access to bank and ATM leads to an increase in poverty, and access to credit, loans to SMEs and internet usage reduces employment opportunities and per capita income in the long-run, however, the access to credit was discovered to reduce poverty and increase household consumption expenditure, same as account ownership and access to bank increases employment opportunities and per capita income in the long-run.

In the short-run, the results indicate that lag of account ownership, access to ATM and credit, loan to SMEs and internet usage reduces poverty, and lag of household consumption expenditure, account ownership, and access to ATM and lag of internet usage increases household consumption expenditure, while the access to bank and lags of access to credit and internet usage were discovered to increase poverty, and the lag of account ownership, access to credit and loans to SMEs reduces household consumption expenditure in the short-run. In addition, the result also shows that lags of access to ATM and lags of internet usage (and account ownership and access to bank) increase employment opportunities (and per capita income) in the short-run, while access to ATM and access to credit reduces employment and per capita income respectively.

Based on these findings, this study therefore recommends policies and actions that will promote and increase in level of financial inclusiveness both in the short- and long-run, specifically the enhancement and increase in access to ATM, banks, internet, and most importantly, the access to credit facilities in Nigeria.

For instance, aside from the central government, through the central bank of Nigeria (CBN) reducing the lending interest rate in order to reduce the cost of borrowing from commercial and specialised banks, the federal government should also make provision for special loans and credit facilities to the indigents and low-income earners with little or no asset as collateral security. Similarly, in addition to the reduction of formalities involved in opening accounts in financial institutions, the use of electronic payment platforms such as ATM/POS facilities and internet payment options should be encouraged, especially in rural areas where setting-up a *brick and mortar* financial institution might not be profitable.

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