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FINANCIAL INCLUSION: IMPLICATION ON PER CAPITA INCOME IN NIGERIA



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ABSTRACT

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This study examines the interplay of deposit money banks (DMBs) activities as a link between financial inclusion and economic growth per capita. To achieve the objective of the study, deposits mobilised in rural and urban areas, and credit disbursed to rural and urban areas, were explored to establish the link for a higher level of inclusion in the hierarchy. This study postulates that financial inclusion occurs at the primary, secondary, and tertiary hierarchical levels. Time series data from the Central Bank of Nigeria (CBN) statistical bulletin and the World Bank Financial Indicator for 33 years (1982 – 2018) were gathered to establish the link. Descriptive analysis, Johansen cointegration, vector error correction mechanism (VECM), and ordinary least squares regression tools were used as the estimation techniques. Findings show that although deposit mobilisation and credit disbursed in rural areas are statistically significant in explaining per capita growth and thereby fulfilling the primary level of inclusion in rural areas contrary to expectations, deposit mobilised and credit disbursed in urban areas are not statistically significant in explaining per capita growth. A long-run relationship of the series was also established. The study, therefore, recommends that secondary access inclusion should be implemented for optimal benefits of per capita growth.

Contribution/Originality: This study contributes to the existing literature by examining the extent of the intermediation process of deposit money banks in driving financial inclusiveness and its impacts on growth as well as the interplay between rural and urban areas in Nigeria. The study also further examined the significance of the level of inclusion for growth.

1. INTRODUCTION

Past administrations in Nigeria have done a lot to ensure that financially excluded citizens are included in mainstream economic activities (Babajide et al., 2020). Visible among these is the establishment of specialised institutions (e.g., non-interest banking) and policy controls (e.g., cashless policy and sectoral credit) targeted at inclusive growth (Babajide, Okunlola, Nwuba, & Lawal, 2020; Babajide, Adegboye, & Omankhanlen, 2015; Lawal, Somoye, & Babajide, 2017; Muhammad, Dauda, & Mamman, 2018; Onaolapo, 2015; Uronu & Ndiege, 2018). Similarly, there are microinsurance and pension schemes for self-employed individuals, electronic/mobile banking, and a consumer protection framework, to mention a few. The ease of access to these services plus movement along a hierarchical level of access (of the excluded/vulnerable/poor citizens) would impact the quality of life of the citizens (Dahunsi et al., 2019; Fashina, Asaleye, Ogunjobi, & Lawal, 2018; Onaolapo, 2015). Ultimately, a robust financial institution is the driver of enhanced financial inclusiveness and is complimentary to the growth of per capita income (Ayopo, Isola, & Olukayode, 2015; Babajide et al., 2015; Babajide, Lawal, Asaleye, Okafor, & Osuma, 2020; Bayar & Gavriletea, 2018; Eton, Uwonda, Mwosi, Barigye, & Ogwel, 2019; Kim, Yu, & Hassan, 2018; Nwafor & Yomi, 2018; Onaolapo, 2015; Sharma, 2016). However, while extant literature has confirmed a positive and significant relationship between financial inclusion and economic growth, hierarchical inclusion among the rural and urban populations has not been tested (Ayopo, AI Lawal, & Somoye, 2016a; Babajide et al., 2020; Oladejo et al., 2020; Salisu, Vo, & Lawal, 2021). This study, therefore, goes a step further to provide a new stance to existing debates. The research questions set for this are: i) to what extent does the intermediation function of deposit money banks gears inclusion per capita growth; ii) what level of inclusion is significant to per capita growth; iii) how does this play out in the rural and urban areas? Following the introduction is the literature review, followed by the section on methodology. The results are presented and discussed in section four, and the conclusion and recommendation section completes the paper.

2. LITERATURE REVIEW

Existing literature offers a mixed meaning of the concept of financial inclusion (FI). Demircuc-Kunt & Klapper (2012) are some of the authors who conducted an extensive study early on regarding the meaning and measurement of financial inclusion (Ayopo, AI Lawal, & Olukayode, 2016b; Babajide, Okunlola et al., 2020). According to them, the ownership and use of formal banking products and services constitute financial inclusion. Such things as financial system penetration – formal account opening and use of payment systems – are some of the features regarded as being financially inclusive. Similarly, financial inclusion exists because there has been prior deliberate exclusion of vulnerable/poor citizens from access to the mainstream financial system (Hannig & Jansen, 2010). That is, the existence of poverty is directly linked to financial exclusion because affected people cannot access a wide range of services provided by the mainstream banking system, so sustaining a decent life is elusive to these groups (Babajide, Okunlola, AI Lawal, Okafor, & A Isibor, 2020; Conroy, 2005; Egharevba, Chiazor, Suleiman, Azuh, & Iruonagbe, 2016). By implication, expected business participation brought by this incidence and individual growth of per capita income for ultimate economic prosperity is elusive. The upsurge in cost, unfair product dichotomy, and credit discrimination are some of the reasons for financial exclusion (Mohan, 2006; Shekar & Veeramani, 2018; Uronu & Ndiege, 2018). Also, there could be voluntary self-exclusion due to religious beliefs, culture, or family ties/orientation (Sarma & Pais, 2008).

While account opening is a common feature of financial inclusion, Sureshchandar (2003) expressed a contrary view; in his opinion, social exclusion precedes financial exclusion. Chakraborty & Mukherjee (2012); Onaolapo (2015); Shekar & Veeramani (2018); Tara (2017); Uronu & Ndiege (2018); Obasaju, Olayiwola, Okodua, Adediran, & Lawal (2021) expressed a similar view. Onaolapo (2015) identified financial inclusion in a hierarchy of financial needs. The inability to adequately participate in each stage of the hierarchy leads to financial exclusion irrespective of the order of needs. Financial inclusion is the deliberate action by policymakers to encourage or compel financial

institutions to open access to financial products or services to everyone in society irrespective of their social status. It is a means through which deposit money banks shore up their deposit base by designing unique products that meet the needs of the unbanked population within society (Lawal, Ozturk, Olanipekun, & Asaley, 2020; Uronu & Ndiege, 2018). Overall, access to financial services improves financial planning culture, opens up opportunities, and ultimately impacts growth per capita.

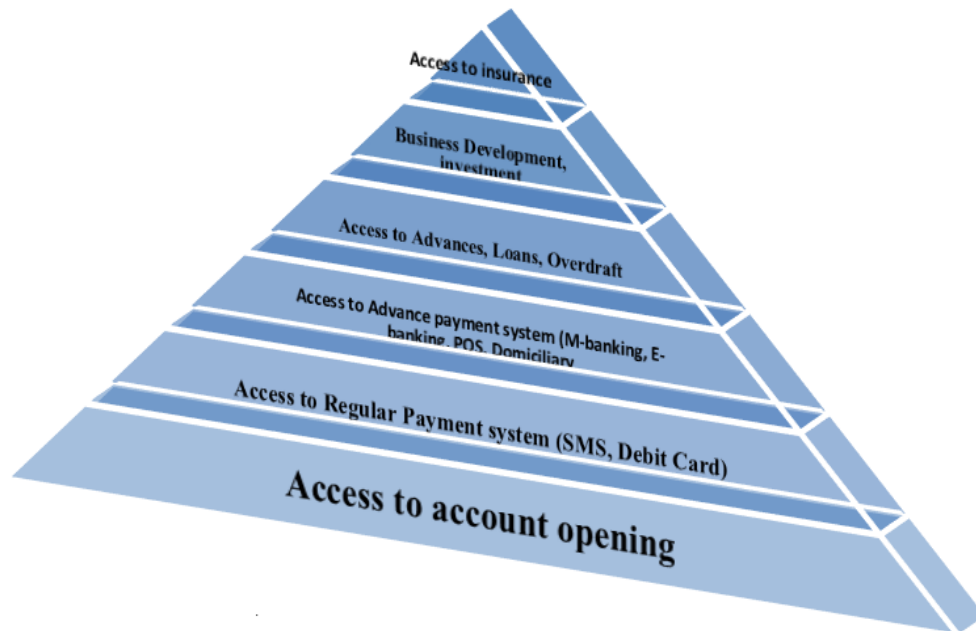


Figure 1. Financial Inclusion Need Hierarchy.

Source: Adapted from Onaolapo (2015).

From Figure 1, as observed by Onaolapo (2015), financial inclusion begins with individual identification by a formal banking institution when opening a bank account. Opening a bank account must be simplified so that deposits can be mobilised in all spectrums. For instance, the means of identification in the first instance using the "know your customer" (KYC) approach was introduced to replace the cumbersome identification process, and zero deposits are a new development to enhance inclusion.

Similarly, after deposits have been mobilised through account opening, the bank customers are introduced to other payment channels, which helps them to manage their funds through the payment system. At this level, individuals are willing to take advantage of the banks' other products, such as receiving messages (SMS), using credit/debit cards for automated teller machine (ATM) transactions, purchasing goods, making payments through their bank accounts, and receiving money among other numerous payment options available.

Subsequently, an extended relationship could lead to the use of advance payment systems, such as the Society for Worldwide Interbank Financial Telecommunication (SWIFT) code, and domiciliary account opening with the bank. Ultimately, other services such as access to loans and advances for business expansion are enhanced. This leads to more significant opportunities for investment advisory services with complimentary insurance cover for possible financial losses. This study, therefore, proposes hierarchy stages of financial inclusion with different easy-to-access hierarchical levels beginning with primary access to financial inclusion, secondary access to financial inclusion, and tertiary access to financial inclusion. Figure 2 below show the proposed financial inclusion hierarchical levels.

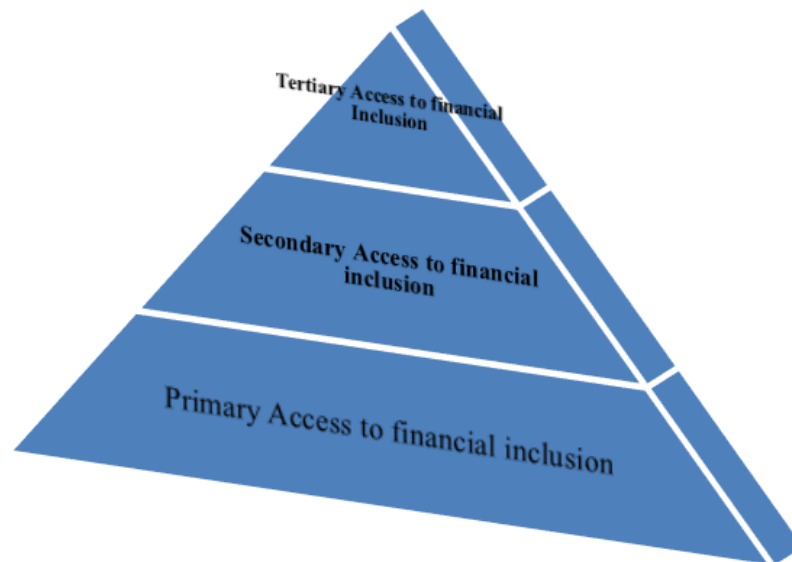


Figure 2. Proposed financial inclusion hierarchy.

- **Primary Level Access to Financial Inclusion:** Financial inclusion starts with the opening of a bank account with a formal financial institution and use of the bank account to carry out business transactions. This is the introduction of an individual to a formal financial system that entitles him to carry out a business transaction via a formal system. The bank customer can store value and receive money, purchase goods, and make payments through the bank account. This also entitles him to the issuance of a debit card that enables him to carry out business transactions more efficiently. Primary level access is the foundation of financial inclusion and holds the highest population in the hierarchy.
- **Secondary Level Access to Financial Inclusion:** At this level, the bank–customer relationship is expected to have been managed and sustained. At this stage, an enabling environment is created for the customers to have access to other intermediate bank services, such as configuration for mobile and internet banking, customisation of the points of sale where required, transfers, and access to an initial bank loan. If the bank official mismanages this level, it may result in the loss of customers. Hence, this level is professionally handled by a well-trained relationship officer. Many banks often lose focus at this stage, indicated by a drop in the number of customers.
- **Tertiary Level of Financial Inclusion:** This is the third level in the hierarchy. Here, the relationship has been fully established, and banks only pay attention to esteemed customers. There are fewer customers at this level than those at the secondary level, but they enjoy higher loans, advances and overdrafts, local and international business facilities for business expansion, such as domiciliary accounts, and have access to SWIFT.

2.1. Empirical Review

Several studies have observed a significant and robust relationship between financial inclusion and economic growth; Eton et al. (2019); Kim et al. (2018); Bayar & Gavriletea (2018); Nwafor & Yomi (2018); Sharma (2016); Babajide et al. (2015); Onaolapo (2015); Babajide et al. (2020); Mohan (2006); Demiurgic-Kunt & Levine (2008) are some of the scholars of this thought. Their assertion that economic openness creates more significant opportunities for citizens and for the country is also supported theoretically. It was estimated that about 1.7 billion adults remain unbanked, with a large percentage of them living in developing countries (World Bank, 2018). Similarly, the literature confirms that a financially informed population is necessary for productivity (Babajide, Lawal, et al., 2020; Muhammad et al., 2018; Shekar & Veeramani, 2018; Tara, 2017; Uronu & Ndiege, 2018). For instance, Uronu & Ndiege (2018) observed that indigent farmers in Tanzania benefited from financial inclusion schemes designed to help them grow and reported increased productivity. Also, in India, Shekar & Veeramani (2018) made a similar

summation of how informed citizens who benefited from financial inclusion-related schemes reported enhanced income. In the Kingdom of Saudi Arabia, Muhammad et al. (2018) also observed that citizens who benefitted from financial inclusion-related activities experienced an improved standard of living. According to the researchers, financial inclusion spurs growth per capita in many ways to include financially informed citizens, economic openness through business opportunities, income multiplier and growth, investment opportunities, improvement in standard of living, and many more (Adeola & Evans, 2017; Babajide et al., 2015; Li et al., 2020; Shetty & Pinto, 2015; Wentzel, Diatha, & Yadavalli, 2016).

3. METHODOLOGY

This study employed a combination of descriptive statistics and ordinary least squares (OLS) regression analysis. The descriptive analyses (skewness, kurtosis, and Jarque–Bera) present the characteristics of the data employed for the study. The study went on to determine the level of their combined significance to the population using GDP per capita income (PCI). Data were sourced from the Central Bank of Nigeria's statistical bulletin 2018, the National Bureau of Statistics (NBS), and the World Bank (2019). EViews 9 and Microsoft Excel 2010 were used for the analyses.

3.1. Description of Variables

a. GDP per Capita

This is a measure of a country's economic output. It signifies the country's population against its productive activities that earn the citizens' income that necessitates financial services, and it is used to measure a country's standard of living.

b. Deposit Money Banks' Rural and Urban Deposits

These are deposits mobilised by banks from individuals, private organisations and groups, such as trade associations, market groups, cooperatives and thrift societies. Private organisations include large corporations and small business firms that have deposits with the bank. A bank–customer relationship starts with the opening of the deposit account to store value. This is the first level of financial inclusion.

c. Deposit Money Banks' Credit to Rural and Urban Areas

Credit in terms of short-term loans and advances are given to individuals and the private sector. Deposit money bank loans are contracted only where an account has been opened with the bank. As such, only those who are customers through account ownership (inclusion) benefit from credits made available by the deposit money banks. This is the second level of inclusion in the hierarchy.

d. Number of Bank Branches

This deals with the availability of bank branches to service customers. Banks are located within the rural and urban centers of the country. The available data regarding the number of branches is scarce; however, there are 25 banks with 5714 branches spread across rural and urban areas of the country (CBN, 2018).

3.2. Model Specification

Following Onaolapo (2015) and Babajide et al. (2015), we specify:

PCI = f(Financial Inclusion). Explicitly, this is written as:

$$PCI = f(RD, UrD, CrRA, CrUA, NoB) \quad (1)$$

Where:

PCI = per capita income.

RD = deposit money banks' rural deposit mobilization.

UrD = deposit money banks' urban deposits.

CrRA = credit to the rural areas.

CrUA = credit to the urban areas.

NoB = number of deposit money bank branches.

Equation 1 is the linear presentation of the relationship between our variables of interest.

$$\text{Explicitly, } \text{PCI} = \lambda + \delta_1 \text{RD} + \delta_2 \text{UrD} + \delta_3 \text{CrRA} + \delta_4 \text{CrUA} + \delta_5 \text{NoB} + \mu_{it} \tag{2}$$

When we transform Equation 1 we get Equation 2, as presented above.

Where:

PCI = per capita income as the dependent variable.

RD, UrD, CrRA, CrUA, and NoB are the explanatory variables.

λ = intercept.

$\delta_1, \delta_2, \delta_3$ = coefficient parameters.

μ_{it} = error term.

3.2.1. Descriptive Model Specified

In Equations 3 to 5 below, we present the descriptive specifications of our model.

$$\text{Skewness: } \text{Sk} = \frac{\sum f(x - \mu)^3}{\sigma^3} \tag{3}$$

Where: Sk = skewness; X = mean of distribution; μ = parameter; σ = standard deviation.

Decision criterion: Sk = 0 = symmetric (+) = long right tail; (-) = long left tail

$$\text{Kurtosis} = \frac{\sum f(x - \mu)^4}{\sigma^4} \tag{4}$$

Decision criterion: 3 = mesokurtic; > 3 = peak (leptokurtic); < 3 = flat (platykurtic)

$$\text{Jarque-Bera Stats} = \text{JB} = n \left[\frac{(Nb1)^2}{6} + \frac{(b2-3)^2}{24} \right] \tag{5}$$

Decision criterion: b1 = sample skewness coefficient; b2 = kurtosis coefficient.

4. RESULTS PRESENTATION AND DICUSSION

4.1. Descriptive Results (Stylised Facts)

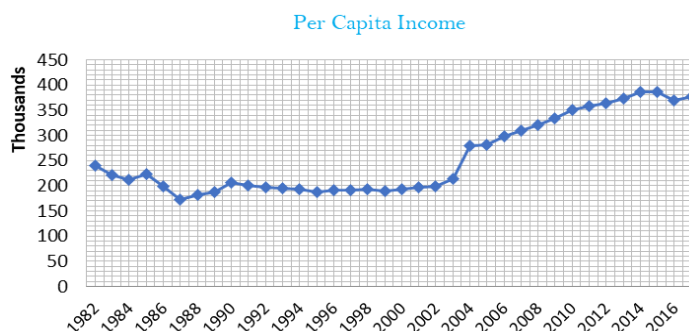


Figure 3. Per capita income.

Source: World Bank (2019).

In Figure 3 above, it can be deduced that per capita income maintained a steady rise between 1990 and 2004 from its slightly downward trend in 1986. This is likely to be the period of the devaluation of Nigeria's currency and the introduction of the Structural Adjustment Programme. Similarly, the country's per capita income increased from 2006 to 2014 when there was a rebase of the GDP component of the per capita measurement. It dropped significantly in 2016 when the country entered into a period of technical recession.

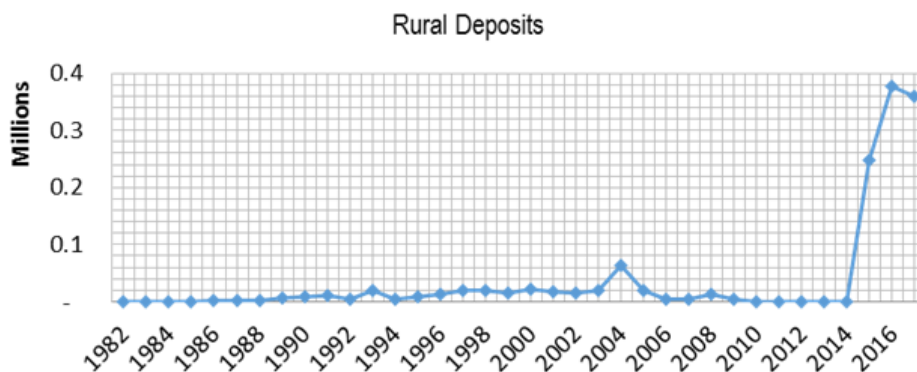


Figure 4. Deposit money banks' rural deposits.

Source: World Bank (2019).

Figure 4 above depicts mobilised deposits of deposit money banks in rural areas. It remained at a low level for an extended period between 1982 and 2002. It increased marginally in 2004 during the introduction of the National Economic Empowerment Development Strategy (NEEDS) and dropped again in 2006. However, there was a great effort made towards inclusiveness since 2012 when the country announced the National Financial Inclusion Strategy after accepting the Maya declaration of 2011, where members of the Alliance for Financial Inclusion, a network of financial system supervisors and regulators across the globe, met in Riviera Maya, Mexico and agreed to drive financial inclusion. Deposit mobilisation by formal institutions increased astronomically.

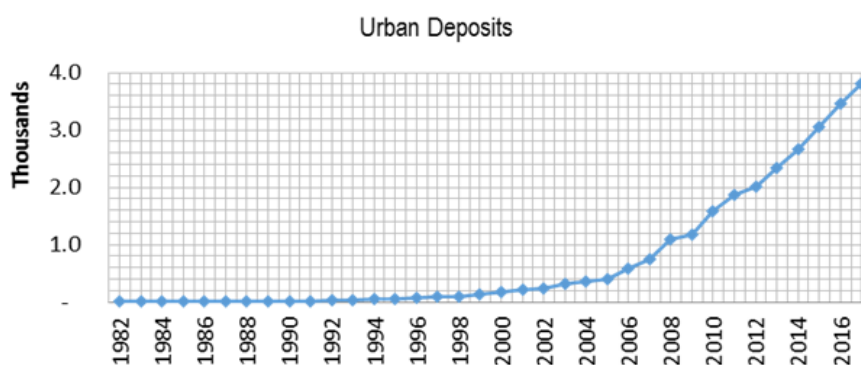


Figure 5. Deposit money banks' urban deposits.

Source: World Bank (2019).

Deposit money banks' deposits mobilised and this mimics that of urban areas, as shown in Figure 5. The figure depicts a slight difference from 2004 and we can see an upward trend after that period until 2017.

Figure 6 present the results of the deposit money banks' credit to rural areas. From the results it can be deduced that despite deposits mobilised in rural areas, the share of loans and advances extended by the deposit money banks was very low. It remained very low until 2013 when it rose sharply and continued to rise all through 2014 but declined sharply in 2015 when oil prices began to fall in the international market.

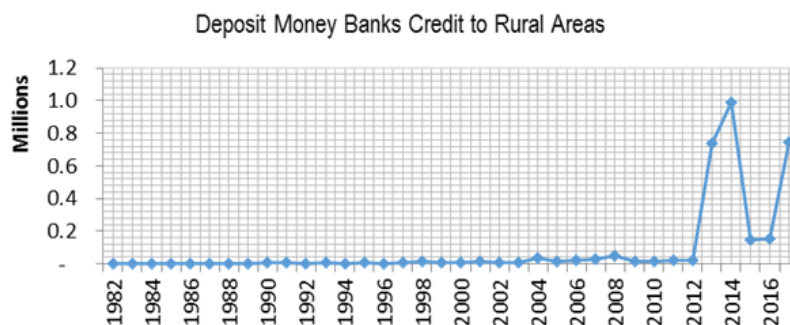


Figure 6. Deposit money banks' credit to rural areas.
Source: World Bank (2019).

As opined by Tara (2017); Shekar & Veeramani (2018); Muhammad et al. (2018); and Uronu & Ndiege (2018), opening an account is not enough to constitute inclusion; there must be easy access to other banks' products, such as loans/credit. The credit component of financial inclusion had been meager until shortly after the technical recession and the government's decision to spend its way out of recession and commence social investment by disbursing government guarantee credit to small and medium enterprises in the country.

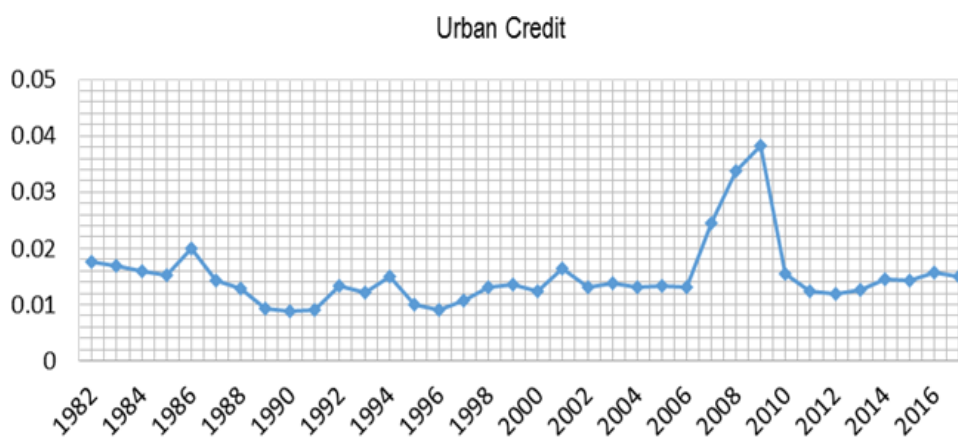


Figure 7. Deposit money banks' credit to urban areas.
Source: World Bank (2019).

From Figure 7, it can be deduced that, unlike rural areas, credit to urban areas maintained oscillatory movement. It shows that financial institutions give more credit to the private sector in urban areas than rural areas despite the volume of deposits. This may be connected to the infrastructure deficit that makes it impossible for businesses to thrive in rural areas as they cannot access banking facilities.

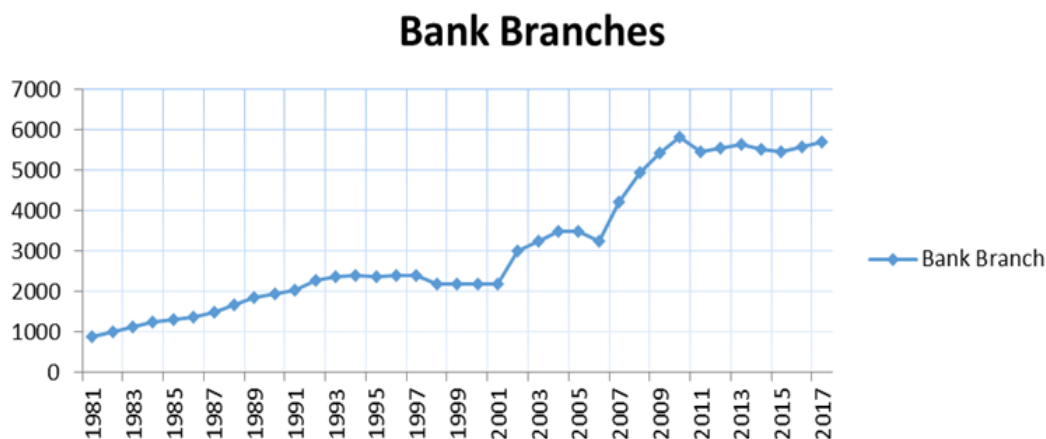


Figure 8. Number of bank branches.
Source: World Bank (2019).

The number of banks branches reached its peak in 2010, at 5810, and declined gradually to settle at 5714 in 2017, as shown in Figure 8. This may be connected to the recession period of 2016. Despite the consolidation exercise in 2005, the number of bank branches increased immediately but began to stagnate and decline as mobile and internet banking became more popular.

Table 1. Descriptive results.

	PCI	RD	UrD	CrRA	CrUA	NoB
Mean	254511.6	36000.05	741.2787	14.98806	86493.55	44.36111
Median	213241.5	7041.050	145.8876	13.41000	11154.45	31.50000
Maximum	385228.0	376308.9	3800.100	38.35000	988587.9	90.00000
Minimum	173012.0	19.72322	2.321200	8.690000	35.90000	21.00000
Std. Dev.	74874.82	91598.97	1102.890	6.052701	230597.8	23.22210
Skewness	0.637414	3.089845	1.498064	2.487290	3.032377	0.677108
Kurtosis	1.736666	11.02469	3.977655	9.524186	10.72680	2.146128
Jarque–Bera	4.831802	153.8763	14.89889	100.9672	144.7270	3.844496
Probability	0.089287	0.000000	0.000582	0.000000	0.000000	0.146278
Sum	9162416.	1296002.	26686.03	539.5700	3113768.	1597.000
Sum Sq. Dev.	1.96E+11	2.94E+11	42572832	1282.232	1.86E+12	18874.31
Observations	36	36	36	36	36	36

Table 1 above shows the descriptive statistical characteristics of the common variables included in the study. From the table, the skewness, which measures the asymmetry distribution of series around its mean, is normally distributed and positive. When skewness is positive it has a long right tail. A negative skewness is indicated by a long left tail, while zero skewness means the distribution is normal. Thus, the series RD (3.08), UrD (1.4), CrRA (2.4), and CrUA (3.0) all have a long right tail, while PCI (0.6) and NoB (0.6) have normal distribution. Similarly, the series' kurtosis shows that RD, UrD, CrRA, and CrUA are peaked, while PCI and NoB are flat at > 3 and < 3 , respectively. Also, the Jarque–Bera statistics of normality show that RD, UrD, CrRA, and CrUA are normally distributed from the corresponding probability; hence, we accept the null hypothesis for the four variables and reject the null hypothesis for the PCI and NoB series.

Table 2. Unit root results.

	Critical Values	Augmented Dickey-Fuller	Prob.	Order
D(PCI)	1% = -4.252879 5% = -3.548490 10% = -3.297094	-4.941266	0.0018	I(1)
D(CBRD)	1% = -7.374307 5% = -3.603202 10% = -3.238054	-7.041296	0.0000	I(1)
D(UD)	1% = -4.252879 5% = -3.548490 10% = -3.207094	-4.351358	0.0079	I(1)
D(CRPS)	1% = -4.252879 5% = -3.548490 10% = -3.207094	-5.235257	0.0008	I(1)
D(CRRA)	1% = -4.284580 5% = -3.562882 10% = -3.215267	-5.147183	0.0012	I(1)
D(NoB)	1% = -5.252879 5% = -3.548490 10% = -3.207094	-5.468684	0.0004	I(1)

Subsequently, the stationarity status of the variables was examined using the unit root test. Looking at the series from Table 2, gross domestic product per capita income D(PCI) showed acceptance of the null hypothesis at a level. However, it was rejected at first difference I(1), having to be significant at -4.941266 and at 0.0018. Similarly, all series followed same trend becoming stationary at I(1). Gujarati, Porter, & Gunaskar (2009) observed that when series are stationary at I(1), determining their long-run relationship is essential. Thus, the study proceeded to test for the long-run relationship between the variables with the Johansen cointegration technique.

Table 3. Johansen cointegration results.

Hypothesized No. of CE(s)	Trace Eigen Value	Trace Statistic	Critical Value (0.05)	Prob**	Max. Eigen Value	Max. Statistic	Critical Value	Prob.
None*	0.967499	268.8619	117.7082	0.0000	0.967499	116.5008	44.9720	0.0000
At most 1*	0.852685	152.3610	88.80380	0.0000	0.852685	65.11626	38.33101	0.0000
At most 2*	0.652692	87.24478	63.87610	0.0002	0.652692	35.95651	32.11832	0.0161
At most 3*	0.599137	51.28827	42.91525	0.0059	0.599137	31.08059	25.82321	0.0092
At most 4*	0.325022	20.20768	25.87211	0.2156	0.325022	13.36456	19.38704	0.2995
At most 5*	0.182307	6.843119	12.51798	0.3612	0.182307	6.843119	12.51798	0.3612

Note: Trace & max. eigen test indicates four cointegrating equations at the 0.05 level.

* Denotes rejection of the hypothesis at the 0.05% level. ** MacKinnon, Haug, & Michelis (1999) p-value

A cointegration test seeks to establish the presence or absence of cointegration between series of the same order of integration through forming a cointegrating equation. By so doing, the long-run relationship is established through trace and/or maximum eigen statistics with their corresponding probability (Gujarati et al., 2009). From the results of the cointegration test, as presented in Table 3, the null hypothesis of no cointegrating relationship for both trace statistic and maximum statistic for the series is rejected and that there are, at most, four cointegrating equations, meaning that a long-run equilibrium relationship exists between the series – per capita income, rural and urban deposits, rural and urban credits, and number of bank branches. In order words, the trace statistic indicates 268.8619 with a probability of 0.0000 and a maximum eigen statistic of 116.5008 with a probability of 0.000, respectively. Thus, in Equation 6 a vector error correction model (VECM) is specified to determine both the short- and long-run convergence to equilibrium as follows:

$$\Delta\Psi_t = \beta_0 + \sum_{i=1}^n \beta_1 \Delta\Psi_{t-1} + \sum_{i=0}^n \lambda_1 \Delta\chi_{t-1} + \Omega\chi_{t-1} + \mu_t \quad (6)$$

Where: Ω is the error correction term (ECT) and μ_t is the OLS residuals from the long-run OLS equation.

Table 4. VECM long-run model.

PCI(-1)	RD	UD(-1)	CrUA	CrRA	NoB
1.000000	3.419587	-824.3314	1150.096	0.930966	163.4731
	(0.85842)	(25.1713)	(1359.18)	(0.20391)	(318.311)
	[3.98358]	[-32.7489]	[0.84617]	[4.56365]	[-0.51356]

Having established the number of cointegrating equations, the study performed the vector error correction estimates. From the results, as shown in Table 4, a mixed outcome was established. Deposit money banks' rural deposit (RD) mobilisation indicates a positive coefficient influence on per capita growth of the economy at 3.419, and it is statistically significant at > 2 , as indicated by the t-statistic of 3.98358. Kim et al. (2018), Bayar & Gavriletea (2018), Nwafor & Yomi (2018), Sharma (2016), Babajide et al. (2015), Onaolapo (2015), and Mohan (2006) found a similar positive relationship between financial inclusion and economic growth. Babajide et al. (2015) further explained that formal account deposits with deposit money banks enhance per capita income through higher capital formation, and Sharma (2016) corroborated this statement by reporting a strong positive association between economic growth and various financial inclusion dimensions, such as banking service penetration,

availability and use of banking services in terms of deposits, and a unidirectional causality between the number of deposit/loan accounts and GDP. Similarly, credit to rural areas (CrRA) is also positive at 1%, with a standard error of 0.20391 and a statistically significant t-statistic value of 4.56365. This finding corroborates Hartarska, Nadolnyak, & Shen (2015) and Ayeomoni & Aladejana (2016). Contrary to expectation, several studies (Allen, Demirguc-Kunt, Klapper, & Peria, 2016 and Demirguc-Kunt & Klapper, 2012) reported rural residents to be financially excluded. By implication, the effect of financial inclusion in the rural areas is positive and significant to explain per capita income in Nigeria, thereby fulfilling the primary and secondary levels of inclusion in the rural areas in Nigeria. However, deposits mobilised by the deposit money banks in urban areas (UrD) exert a negative influence on per capita growth at -824.3 but is not statistically significant at < 2 . Also, credit to urban areas (CrUA) shows that a positive coefficient was established at 1150.0, but it is not statistically significant with a t-statistic of 0.84617 in the long run. These results are also surprising because urban areas have a high concentration of financial institutions, especially banks. The trend analysis shows an increase in mobilization and credit disbursement in urban areas, which requires further investigation. By implication, the primary and secondary inclusions in urban areas are not as effective as expected. The result for the number of bank branches is not significant at the 5% significance level. This means that the number of bank branches is not a determinant of per capita income growth in Nigeria.

The short-run error correction mechanism helps to determine the speed of adjustment to the long-run effect in the future, away from previous deviations. As such, the previous period's deviation from the long-run equilibrium is corrected in the current period at an adjustment speed of 0.24%. The ECM is negative and conforms to the rule of thumb at -0.002440. Similarly, a percentage change in the rural deposit $D(RD(-2))$ coefficient of -0.053080 is associated with a decrease of 0.05% in PCI on average, all things being equal, in the short run.

Conversely, urban deposits $D(UD(-2))$ to a short-run effect average an increase of 8.134%, all things being equal, in the long run. Similarly, credit to urban areas $D(CrUA(2))$ indicates that a percentage change in the credit of urban areas is associated with a 130% increase in the country's per capita income on average in the short run. Also, credit to rural areas $D(CrRA(-2))$ indicates that a change in credit to rural areas is associated with a 0.024% decrease in per capita income, on average, in the short run.

Table 5. VECM short run model.

Regressors	Coefficient	Standard Error	T-statistics
Constant	3491.459	(10656.8)	[0.32763]
D(PCI(-1))	0.256593	(0.25139)	[0.94115]
D(PCI(-2))	-0.171469	(0.33528)	[-0.54458]
D(RD(-1))	-0.113643	(0.13566)	[-0.83774]
D(RD(-2))	-0.053080	(0.15868)	[-0.33451]
D(UD(-1))	21.80824	(63.6737)	[0.34250]
D(UD(-2))	8.134710	(84.4196)	[89.8927]
D(CrUA(-1))	151.5659	(811.737)	[0.18672]
D(CrUA(-2))	130.0364	(645.004)	[0.20161]
D(CrRA(-1))	-0.004170	(0.02898)	[-0.14391]
D(CrRA(-2))	-0.024517	(0.02736)	[-0.68413]
D(NoB1)	-229.5759	(335.572)	[-0.68413]
D(NoB2)	105.1851	(273.141)	[0.38509]
ECM(-1)	-0.002440		

From the system equation, the coefficient of the variable confirms the error correction mechanism to long-run equilibrium at the speed of adjustment of $c(1) = -0.002440$, as shown in Table 6. This implies that about 0.24% of the departure from long-run equilibrium is corrected each period. However, the negative coefficient is not statistically significant, indicating that the explanatory variables do not Granger-cause growth of per capita income.

This outcome is a sharp contrast to economic a priori expectation and calls for diagnostic proof of variables in the model.

Table 6. Ordinary least squares results.

	Coefficient	Std. Error	T-statistic	Prob.
C(1)	-0.002440	0.026160	-0.093261	0.9267
C(2)	0.236593	0.251388	0.941149	0.3584
C(3)	-0.171469	0.314865	-0.544578	0.5924
C(4)	-0.113643	0.135655	-0.837739	0.4126
C(5)	-0.053080	0.158677	-0.334515	0.7417
C(6)	21.80824	63.67367	0.342500	0.7357
C(7)	8.134710	84.41963	0.096360	0.9242
C(8)	151.5660	811.7372	0.186718	0.8539
C(9)	130.0364	645.0040	0.201606	0.8424
C(10)	-0.004170	0.028978	-0.143907	0.8871
C(11)	-0.024517	0.027358	-0.896167	0.3814
C(12)	-229.5759	335.5719	-0.684133	0.5022
C(13)	105.1851	273.1412	0.385094	0.7044
C(14)	3491.459	10656.85	0.327626	0.7468

Table 7. VECM diagnostic test of heteroskedasticity.

Joint test:		
Chi-sq.	Df.	Prob.
532.2826	564	0.6548

As proof of the appropriateness of the model, a diagnostic test of heteroskedasticity was performed. The results in Table 7 shows that, jointly, the null hypothesis of no heteroskedasticity in the model is not rejected as indicated by the probability value of 0.6548. This confirms the appropriateness of the model as not heteroskedastic, which means that results obtained can be relied upon to make inferences for the country.

5. CONCLUSION AND RECOMMENDATIONS

The study examined the impact of financial inclusion variables on GDP per capita in Nigeria. First, the results of the cointegration test established the existence of a long-run relationship between rural deposits (RD), urban deposits (UrD), credit to rural areas (CrRA), credit to urban areas (CrUA), the number of bank branches (NoB), and per capita income. However, the t-statistics resulting from the vector error correction mechanism show that only rural deposits and rural credit are statistically significant based on t-stats greater than two (3.98358 and 4.56365 respectively), while urban deposits, urban credit and the number of bank branches are not statistically significant. Also, all variables except urban deposits (UrD) have positive coefficients. This may imply the over-concentration of banking activities in urban areas despite possible saturation, thereby not positively influencing workers' well-being. Worthy of note is the significant relationship between rural financial inclusion and per capita income. The implication of this is that the banks have failed to explore the opportunities provided to them by rural areas, possibly due to low, weak, or lack of critical infrastructure in rural areas.

Furthermore, the ordinary least squares regression results The study also confirms the stability of the ordinary least square residuals using a heteroskedasticity diagnostic test. From the results, since the probability value is greater than 5%, it means that H_0 is accepted, but the model is desirable. The desirability of the overall significance of the result on financial inclusion and per capita income rises further questions, especially due to the acceptance of the null outcome.

The study, therefore, recommends that deposit money banks should increase their volume and value of business activities in rural areas for full optimization of financial inclusion. Deliberate action should be taken to establish a foundational relationship up to the tertiary level in both the rural and urban areas of the country. The effort to open

more branches in rural areas in the form of agent banking should be intensified. The regulatory authorities should discourage the concentration of banks in rural areas, and the government should provide basic amenities for companies to thrive in rural areas of the country.

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