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Financial Inclusion and Poverty Reduction in Nigeria: A Dynamic Auto-Regressive Distributed Lag Approach

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Abstract

The urge to ascertain whether financial inclusion is driving poverty downwards in Nigeria prompted the study to examine the impact of financial inclusion on poverty reduction in Nigeria over the period 1981-2021 using three measures, namely, commercial bank loan to SMEs (CBLSME), deposit mobilization of rural bank branches (DRB), and loans granted by rural bank branches (LRB). We used a dynamic autoregressive distributed lag method and found that CBLSMEs has a significant positive impact on poverty rate, and a unit positive shock produces a mean poverty rate of about 70 per cent over a 30-year period; DRB has a significant negative impact on poverty rate as it falls by 12% in the long run and 19% in the short run; with a unit positive shock producing a mean poverty rate of about 58 per cent; LRB has significant positive long-run impact on poverty rate but has the desired negative impact in the short run, and a unit positive shock produces a mean poverty rate of about 62% per cent over the same 30-year period. The study concludes that financial inclusion can curb poverty rate in Nigeria through direct short-term loans by rural bank branches. Banks in rural areas should therefore ensure that loans to SMEs are used productively to ensure poverty reduction. Also, the Central Bank of Nigeria should guarantee direct lending to rural dwellers by rural banks to increase the volume of such lending and thus lower poverty rate.

Keywords*: Bank lending, Deposit mobilization, Dynamic ARDL, Financial inclusion, Poverty reduction, Rural banking.*

Introduction

Poverty continues to be a major challenge in Nigeria, and one requiring urgent attention. The World Bank technically defines poverty as surviving on less than US$1.9 a day (World Bank, 2021) but the term generally refers to the condition in which individuals do not have enough financial resources to ensure a minimum standard of living. The poor are usually persons with low income and consumption levels, and they often lack basic provisions such as clean water, proper housing, good education, healthy food, proper medical care, and the like (Koomson et al., 2020; Tita & Aziakpono, 2017). In 1981, the poverty rate in Nigeria was 32 per cent of the total population but it increased to about 44 per cent at the end of year 2021, and it averaged 54.4 per cent between the two periods. The highest rate of 80.8 per cent was recorded in the year 2000 whereas the lowest in the period 1981-2021 is the 1981 value.

There is an argument by Choudhury and Bagchi (2016) that the persistent state of poverty in developing countries can be blamed on high financial exclusion. This line of thought implies that financial inclusion is one of the panacea to eradicating poverty in such climates (Bateman et al., 2019). Arguments in this line include that it (financial inclusion) presents an opportunity for people to benefit from financial services; it contributes to the processes of economic and social advancement of the hitherto excluded group (Mubiru, 2012); and that it essentially

improves the livelihood of common people, all of which ultimately leads to less poverty (Baidoo et al., 2020, Koomson et al., 2020; Baidoo & Akoto, 2019).

The United Nations (2013) further stated that an inclusive economy is imperative for the world's vulnerable people involved in the informal sector for the reason that it facilitates access to financial services. For example, financial inclusion strategies ensure that the poor but active population easily acquire loans that can be invested in economic activities. We are thus able to determine that loans and advances of rural bank branches increased from 0.04 billion naira in 1981 to 119.85 billion naira in 2021 (CBN, 2021). Similarly, when financially included, the poor are also able to save through the financial system which in turn enables them to invest. In this respect, deposit mobilization by rural banks increased from 0.09 billion naira in 1981 to 427.45 billion naira in 2021 according to the aforementioned source.

Sakyi et al. (2021) and Baidoo et al. (2019) are therefore of the opinion that having access to financial services puts the poor in line for asset acquisitions, human capital investment for self-development, and business engagements that would eventually raise their living standard. For these and related reasons, financial inclusion has been unsurprisingly extolled as an innovative approach towards alleviating poverty in developing countries in general and Nigeria in particular (see Churchill & Marisetty, 2020; Le et al., 2019; Umaru & Chibuzo, 2018; Park & Mercado, 2015).

A well-inclusive financial system is expected to drive the poverty rate down considerably (Triki & Faye, 2013). However, this appears not to be the case in Nigeria based on the trend of poverty rate versus some financial inclusion variables in the country between 1981 and 2021 based on underlying data from CBN (2021) and World Bank (2021). The 1980s saw a 13.7 per cent average yearly growth in credit to SMEs (CBLSME), 89.2 per cent in deposit mobilized by rural bank branches (DRB), and more than double, each year, in loans and advances by rural bank branches in the country (LRB). Despite these indications of wider financial inclusion, poverty rate grew 4.8 per cent per year, on average, in that decade.

The global pursuit of financial inclusion as a vehicle for economic development had a positive effect in Nigeria by the instance of the Central Bank of Nigeria (CBN) as the exclusion rate dipped from 53 per cent in 2008 to 46.3 per cent 2010. Consequently, the CBN collaborated with stakeholders to launch the National Financial Inclusion Strategy on October 23, 2012, with the goal of reaching 80% financial inclusion of the adult population by 2020. However, only 64.1 per cent was achieved in that year which is not too far below the target.

However, since poverty rate in Nigeria is still high, it does appear that the innovative financial products and services, such as those considered in this study, aimed at increasing the financially included segment of the adult Nigerian population, have not yielded the expected outcome yet (CBN, 2021). It is on this premise that this study interrogates the poverty reduction impact of financial inclusion strategies in the country over the period 1981-2021. Specifically, we investigated whether bank credit to small and medium-scale enterprises (SMEs), deposit mobilization of rural branches, and lending of rural branches of commercial banks, have a significant impact on poverty rate in Nigeria.

Literature review

Financial inclusion is defined as a process or situation which allows for ease of access to, or availability of, and usage of formal financial systems by members of the economy (Kama & Adigun, 2013). It describes a process where all members of the economy do not have difficulty in opening bank accounts; can afford to access credit; and can conveniently, easily and consistently use financial system products and facilities.

More compactly, financial inclusion means that adults have access to and can effectively use a range of appropriate financial services (Demirguc-Kunt, Klapper, & Singer, 2017). CBN (2020) stated that financial inclusion is achieved when adult Nigerians have easy access to a broad range of formal financial services that meet their needs at affordable cost. An overview of financial inclusion is presented in Fig. 1.

Fig. 1: Components of financial inclusion
Source: Karmakar (2007)

As shown in Fig. 1, financial inclusion products and services focus on savings, insurance, credit, and payment systems, but the emphasis in on the micro level to capture the hitherto unbanked or informal operators in the economy. The effectiveness of financial inclusion can be ascertained by collecting data on the amount of credit disbursed, deposits kept in banks, remittances made, insurance coverage etc. That is the first step to being financially included as merely opening of bank account without taking the advantage of basic banking services undermines the impact of financial inclusion measures (Singh & Roy, 2015).

The financial development framework provides a strong theoretical link between financial inclusion and poverty (Koomson et al., 2020). The literature has identified direct and indirect mechanisms through which financial inclusion affects poverty (see Koomson et al., 2020, Demirgüç-Kunt et al., 2008; Jalilian & Kirkpatrick, 2002). For the direct channels, financial inclusion helps in reducing poverty through broadening access to credit, insurance, enhancing entrepreneurial possibilities through access to credit which eventually raises income and consumption of individuals, and strengthening productive assets for the marginalized through investment in education, health and new technologies.

On the other hand, the indirect channels demonstrate how finance-induced economic growth tends to benefit the marginalized through the creation of jobs and increased government social spending on education, health and social protection interventions. Given these theoretical

links/channels, this study, therefore, seeks to provide empirical evidence regarding innovative financial inclusion strategies and poverty nexus from the Nigeria perspective.

Also related to this study is the vulnerable group theory of financial inclusion (FI). The basic tenets of the theory are that a country's FI programs must of necessity be directed at the vulnerable members of society who are economically disadvantaged, such as women and the elderly, young people, and persons in poverty (Ozili, 2020). The theory argues that vulnerable people are often the most affected by financial crises and economic recession, hence it is logical to integrate them into the formal financial sector. It can be achieved through unconditional transfer payment by the government which will motivate them to enrol into the formal financial sector to own a formal bank account, thereby increasing the rate of financial inclusion for vulnerable groups. The crux of the theory is, therefore, that financial inclusion efforts should target vulnerable people in society. Between the two theories reviewed, this study is anchored on the financial development theory because it provides a strong theoretical link between financial inclusion and poverty.

We dug up relevant empirical studies that explored the link between financial inclusion and poverty reduction in various climates to which we can compare our findings. Eze and Alugbuo (2021) examined the effect of financial inclusion on poverty reduction in Nigeria using data from the World Bank's 2017 Global Findex survey for Nigeria, doing so with a logit model and an instrumental variable model. The dependent variable was a dummy variable labelled "poor," which was set to 1 if the individual's "within economy income quintile" was in the bottom 40%, and 0 otherwise. The study established that financial inclusion reduces household poverty in Nigeria even after controlling for endogeneity in the explanatory variables.

Koomson et al. (2020) examined the relationship between financial inclusion and how vulnerable Ghanaian households are to poverty. The data for the study were obtained from the Ghana Living Standards Survey of 2016/17. The multiple correspondence method was used to produce a financial inclusion index, using a three-stage feasible least squares to estimate households' vulnerability to poverty, through the probit technique. The results revealed that an improvement in financial inclusion has the tendency to reduce the likelihood of household's to be poor by 27% and can therefore avert how households are exposed to future poverty by 28%.

In Indonesia, Dawood et al. (2019) studied whether financial inclusion eased household poverty. The study used the binary logistic (Logit) model with data from about 300,000 households. It was revealed that financial inclusion has the tendency to reduce the probability of households from absolute poverty. Likewise, Bakari. et al. (2019) examined the effect of financial inclusion on poverty reduction in SSA using a static panel data model (fixed effect and random effect). The study indicated that savings (32.5%), ratio of credit to the private sector to GDP (11.7%), ATM access (27.4%), information technology (49.1), inflation (96.1) and government expenditure are critical in reducing poverty in SSA. Rural banking and affordable internet services are also pivotal in reducing poverty in sub-Saharan Africa.

Nsiah et al. (2021) investigated the threshold effect of financial inclusion on poverty reduction in sub-Saharan Africa (SSA). Using an annual dataset spanning 2010 to 2017, the authors used Hansen's estimation and Differenced generalized method of moments (GMM) methods to estimate the threshold level of financial inclusion that will reduce poverty and factors that influence financial inclusion respectively. The results showed that beyond a threshold level of

0.365, financial inclusion would lead to poverty reduction with money supply being positively significant towards poverty reduction in SSA.

The study by Jacob et al. (2021) examines the role of bank credits on poverty reduction in Nigeria in the period 1980-2016 and found no causal relationship between bank credit and poverty level in Nigeria, but a unidirectional causal relationship between agricultural loan and poverty flowing from poverty. Also, the OLS result shows a significant positive impact of bank credit, and a significant negative impact of agricultural loan, on poverty level in Nigeria. However, the study did not focus on rural areas.

Churchill and Marisetty (2020) investigated the effect of financial inclusion on poverty using 45,000 households in India and focusing on access to credit. The study revealed that, there is a negative relationship between financial inclusion and poverty, implying that financial inclusion reduces poverty. Mohammed et al. (2017) used panel data on 35 countries to investigate the determinants and the relationship between financial inclusion and poverty reduction in Sub-Saharan Africa (SSA). The authors used Treatment Effect version of the Heckman Sample Selection Model and propensity score matching (PSM) for robustness checks. The study found that the use of bank accounts, savings, withdrawal and access to credit significantly reduced poverty.

Umaru and Chibuzo (2018) investigated the relationship that exists between financial inclusion and poverty reduction considering the moderating effects of microfinance in Nigeria. Using simple random sampling technique, a self-administered questionnaire was used to elicit data from 384 customers of microfinance banks from the three senatorial districts in Kebbi State Nigeria. The results from the Partial Least Square (PLS)-Structural Equation Modelling (SEM) show a significant positive effect of financial inclusion on poverty reduction.

Methodology

The financial development framework provides a strong theoretical framework for this study because it links financial inclusion to poverty (Koomson et al., 2020). The framework provides for direct and indirect mechanisms through which financial inclusion affects poverty. This study focuses on the former, which emphasizes that financial inclusion helps in reducing poverty through broadening access to credit, enhancing entrepreneurial possibilities through access to credit, among others. Thus, the functional relationship can be expressed as,

$$\text{Poverty} = f(\text{Financial inclusion}) \quad (1)$$

In this study, the direct channels of financial inclusion take the form of commercial bank credit to, and deposits of, rural dwellers. Therefore, the model is represented as follows,

$$PVR = f(CBLSME, DRB, LRB, UNR) \quad (2)$$

where, PVR is poverty rate, CBLSME is commercial bank loan to small and medium-scale enterprises, DRB is deposit mobilized by rural bank branches, LRB is loan by rural bank branches, and UNR is unemployment rate, the control variable.

The explicit form of the model therefore is,

$$PVR = \alpha_0 + \beta_1 CBLSME + \beta_2 DRB + \beta_3 LRB + \beta_4 UNR + \mu t \quad (3)$$

All parameters of the model, except UNR, are expected to be less than zero ($\beta_1, \beta_2, \beta_3, < 0$).

The study employed annual time series data covering the 41-year period 1981-2021 in Nigeria. The data for CBLSME, DRB, and LRB were obtained from Central Bank of Nigeria (CBN) Statistical Bulletin of year 2021 available at: https://www.cbn.gov.ng/publication/statistical_bulletin. The raw data is available in Appendix I. The poverty rate and the unemployment rate data were obtained from world development indicators, available at: https://databank.worldbank.org/reports.aspx?source=2andcountry=NGA.

Results

Table 1: Descriptive statistics of the study data

```
. su pvr cblsme drb lrb unr

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
         pvr |         41    54.96098    13.14007         32       80.8
      cblsme |         41     31.8361    26.47365       6.23     123.93
         drb |         41    51.66805    109.1186        .02     427.45
         lrb |         41    80.56976    203.5803        .04     988.59
         unr |         41    13.86878    9.625544          2       35.1

.
```

Source: Researchers' computations (2024) with STATA 16

The result in Table 1 shows that poverty rate (PVR) in Nigeria averaged 55 per cent within the 41-year period 1981-2021 This is quite high and is characteristic of a developing country; ranging between 32 and 81 per cent in the process. Among the three components of financial inclusion, lending by rural bank branches (LRB) has the highest mean (80.6 billion naira) followed by deposit mobilized by rural bank branches, DRB, (51.7 billion naira), while commercial bank loan to SMEs (CBLSME) has the least average (31.8 billion naira).

4.1 Unit root test results

We conducted stationarity test using the Augmented Dickey-Fuller (ADF) test and then the Phillips-Perron (PP) test. The results are presented in Tables 2 and 3.

Table 2: Summary of Augmented Dickey Fuller (ADF) unit root test results

Variable	ADF Test Statistic @ Level	5% critical value	P-value	ADF Test Statistic @ 1st Difference	5% critical value	P-value	Order of Integration
PVR	-2.905	-2.958	0.045	-	-	-	I(0)
CBLSME	-2.250	-2.958	0.189	-7.781	-2.961	0.000	I(1)
DRB	2.937	-2.958	1.000	-4.147	-2.961	0.001	I(1)
LRB	-3.86	-2.958	0.002	-	-	-	I(0)
UNR	-0.026	-2.958	0.956	-5.821	-2.961	0.000	I(1)

Source: Researchers' computations (2024) with STATA 16

The result in Table 2 shows that PVR and LRB are stationary at level whereas CBLSME, DRB, and UNR are at first difference, according to the ADF method.

Table 3: Summary of Phillips-Perron (PP) unit root test results

Variable	Z(t) test Statistic @ Level	5% critical value	P-value	Z(t) test Statistic @ 1st Difference	5% critical value	P-value	Order of Integration
PVR	-2.753	-2.958	0.065	-4.859	-2.961	0.000	I(1)
CBLSME	-2.224	-2.958	0.198	-7.916	-2.961	0.000	I(1)
DRB	-2.720	-2.958	0.999	-4.281	-2.961	0.000	I(1)
LRB	-3.762	-2.958	0.001	-	-	-	I(0)
UNR	0.123	-2.958	0.968	-5.810	-2.961	0.000	I(1)

Source: Researchers' computations (2024) with STATA 16

The Phillips-Perron unit root test result in Table 3 confirms the ADF result in Table 2 in the case of CBLSME, DRB, LRB, and UNR. However, the latter shows that the dependent variable, poverty rate (PVR), is stationary at first difference, whereas the ADF result shows it to at level. Since at least one of the two tests reported that PVR is an I(1) series, and both reported that the predictors are a mixture of I(0) and I(1)s, we can therefore apply the autoregressive distributed lag (ARDL) approach of Pesaran, Shin, and Smith, 2001) to estimate the model. First, we used the *varsoc* command in STATA to determine the optimum lag order of the autoregressive model and the result is available in Table 4 in Appendix II.

Autoregressive distributed lag (ARDL) result

We obtained a result of the order ARDL(1,0,2,4,4) as presented same in Table 4.

Table 4: Summary of the ARDL result of the poverty model

Adj.	Long-run			Short-run		
Pvr L1.	Variable	Coef.	P-value	Variable	Coef.	P-value
-0.7804***	CBLSME(L1)	.4306	0.000***	CBLSME(D1)	.3360	0.001***
	DRB(L1)	-.1241	0.001***	DRB(D1)	-.1885	0.026**
	LRB(L1)	.1336	0.003***	DRB(LD)	-.1470	0.019**
	UNR(L1)	-.8604	0.044**	LRB(D1)	-.0207	0.015**
	-cons	50.32945	0.000	LRB(LD)	-.1137	0.000***
				LRB(L2D)	-.0755	0.000***
				LRB(L3D)	-.0476	0.007***
				UNR(D1)	.7209	0.070
				UNR(LD)	1.9038	0.000***
				UNR(L2D)	1.5049	0.003***
				UNR(L3D)	.6539	0.145

Source: Researchers' computations (2024) with STATA 16 (*** = sig. at 0.01; ** = sig. at 0.05)

The result shows that the short-run model adjusts to long-run equilibrium at the sped of 78% per annum which implies a return to full equilibrium in about 15 months (1.3 years) following a period of disequilibrium. In the long run, a 1 unit increase in the first lag of commercial bank loan to small and medium-scale enterprises (CBLSME(L1)) significantly increases poverty rate (PVR) by 43% per annum; a unit increase in the first lag of deposit mobilized by rural bank branches (DRB(L1)) significantly lowers PVR by 12%; a unit increase in the first lag of lending of rural bank branches (LRB(L1)) significantly increases PVR by 13%, and a unit increase in the first lag of unemployment rate (UNR(L1)) significantly lowers PVR by 86%.

In the short run however, a 1 unit increase in the first difference of commercial bank loan to small and medium-scale enterprises (CBLSME(D1)) significantly increases poverty rate (PVR) by 34% per annum; a unit increase in the first difference of deposit mobilized by rural bank branches (DRB(D1)) significantly lowers PVR by 19%; a unit increase in the lag difference of deposit mobilized by rural bank branches (DRB(LD)) significantly lowers PVR by 15%; a unit increase in the first difference of lending of rural bank branches (LRB(D1)) significantly lowers PVR by 2%; a unit increase in the lag difference of lending of rural bank branches (LRB(LD)) significantly lowers PVR by 11%; whereas a unit increase each in the lag of the second and third differences of lending of rural bank branches, (LRB(L2D)) and (LRB(L3D)), significantly lowers PVR by 8% and 5% respectively. Lastly, a unit increase in the first difference of unemployment rate (UNR(D1)) significantly raises PVR by 72%. Similarly, a unit increases in the lag of the first and second differences of UNR [UNR(LD) and UNR(L2D)], significantly exert a positive influence on the poverty rate.

ARDL Bounds test result

The summary of the ARDL Bounds test is presented as follows.

Table 5: Summary result of ARDL Bounds test

Ho: no level relationship						**F = 6.715**		
Case 2						**t = -4.575**		
	Critical values							
	10%		**5%**		**1%**		**p-values**	
Statistic	**I(0)**	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
F-stat	2.379	3.614	2.903	4.325	4.200	6.078	0.001	0.006
T-stat	-2.456	-3.580	-2.839	-4.032	-3.629	-4.965	0.001	0.020
decision	Rejection (.r)		Rejection (.r)		Rejection (.r)		N/A	

Source: Researchers' computations (2024) with STATA 16

In Table 5, the computed F-stat (6.715) is greater than the theoretical values at 5% and 1% upper bounds. Also, the upper bound p-values of the F-stat and T-stat are each less than 0.05. Consequently, the null hypothesis of no level (long-run) relationship is rejected at the 5% and 1% levels of sig. This implies that there is long-run relationship, which is desirable.

Model diagnostics

Post estimation or diagnostic tests conducted on the residuals of the estimated results include the serial correlation, heteroscedasticity, normality, and stability tests.

(i) Results of autocorrelation and heteroskedasticity test

We conducted the Breusch-Godfrey LM test for autocorrelation with this result.

Table 6: Breusch-Godfrey LM test for autocorrelation

lags(p)	Chi2	df	Prob > chi2
4	3.171	4	0.1027

H0: no serial correlation

Source: Researchers' computations (2024) with STATA 16

The result in Table 6 clearly shows that the null hypothesis of no serial correlation is accepted at the 5% level for 4 lags. We therefore conclude that the regression residuals of the estimated ARDL model are serially uncorrelated.

We used the autoregressive conditional heteroskedasticity (ARCH) method to conduct the heteroskedasticity test and found that the null hypothesis of 'no heteroskedasticity' is accepted at the 5% level of significance, considering that the p-value of the Chi-Square statistic is greater than 0.05. This implies that the distribution of the regression residuals is homoscedastic.

(ii) Test for normality of distribution of the residuals

We tested for the normality of the estimated model using the Skewness/Kurtosis test.

Table 7: Result of heteroskedasticity test

```
. predict resid, residuals
(4 missing values generated)

. sktest resid
```

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
resid	37	0.8589	0.5369	4.32	0.1155

Source: Researchers' computations (2024) with STATA 16

The p-values of the Skewness, Kurtosis and adjusted Chi-square are all greater than 0.05. We can therefore safely conclude that, at the 5% level of significance, the residuals are normally distributed which meets our expectation.

Dynamic ARDL/Simulation results

We also performed simulations on the ARDL model to determine the effect of shocks in each of the three financial inclusion variables on the dependent variable. Specifically, we simulated the effects of one-unit positive shocks in CBLSME, DRB, and LRB, on poverty rate (PVR). The robustness of the results is proved by the p-values of the F-statistics (0.002, 0.012, & 0.041 respectively. We present here the graphical results which show the mean predicted values of the dependent variable over a 30-year period.

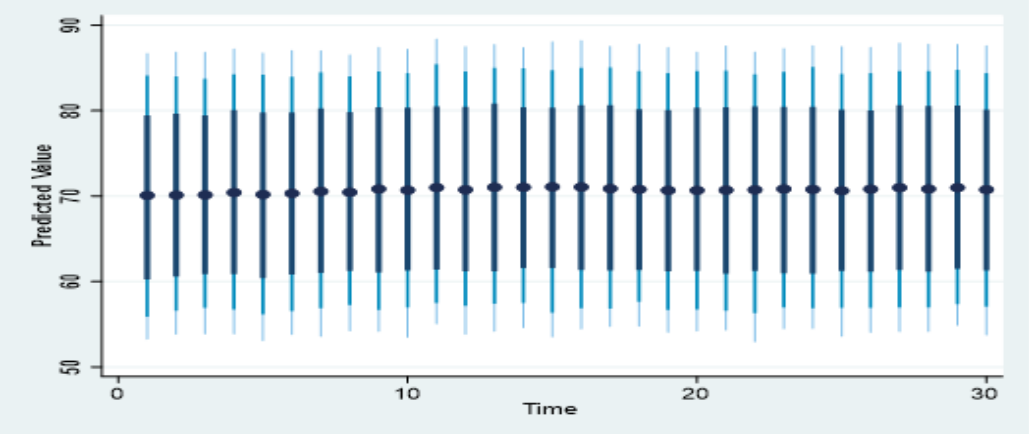

Fig 2: Effect of a unit positive shock in CBLSME on poverty rate

Source: Researchers' computations (2024) with STATA 16
We gleaned from this result (Fig. 2) that a one-unit positive shock in commercial bank loan to small and medium scale enterprises (CBLSME) appears to slightly increase the predicted value of poverty rate from period 4. Overall, the shock resulted in a mean predicted value of PVR of 70% (slightly higher from period 10).

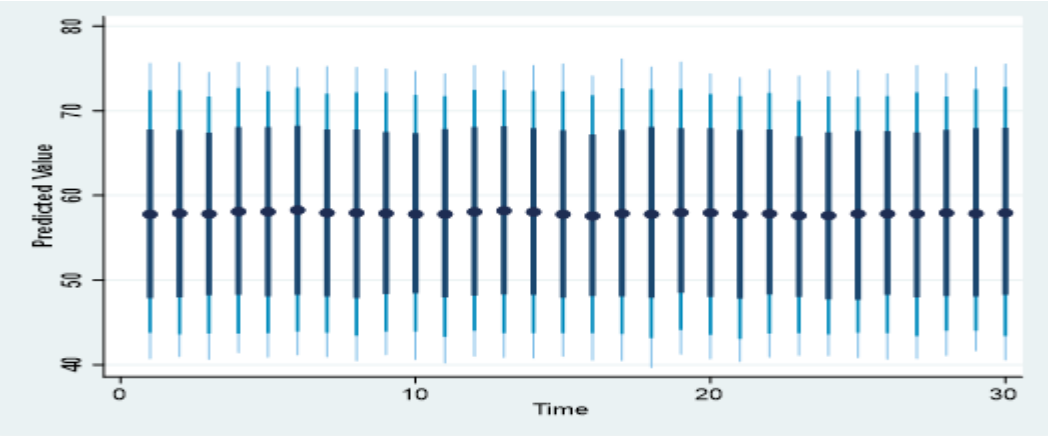

Fig 3: Effect of a unit positive shock in DRB on poverty rate
Source: Researchers' computations (2024) with STATA 16

The result in Fig. 3 shows that a one-unit positive shock in deposit mobilized by rural (commercial) bank branches (DRB) appears to slightly lower the predicted value of poverty rate from period 7. Overall, the shock resulted in a lower mean predicted value of PVR of about 58% (compared to 70% in the case of CBLSME).

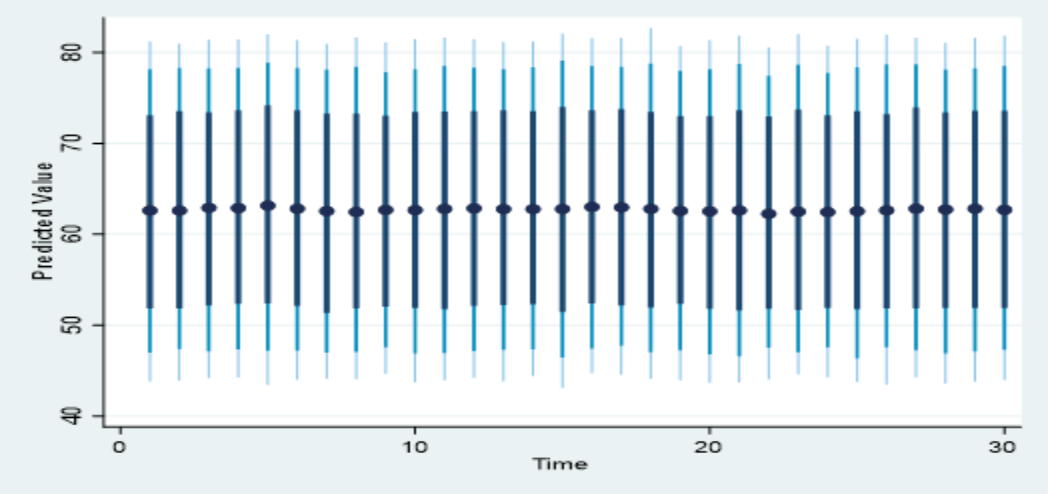

Fig 4: Effect of a unit positive shock in LRB on poverty rate
Source: Researchers' computations (2024) with STATA 16

The result in Fig. 4 shows that a unit positive shock in loans by rural (commercial) bank branches (LRB) appears to slightly lower the predicted value of poverty rate from period 6. Overall, the shock resulted in a lower mean predicted value of PVR of about 62% (compared to 70% in the case of CBLSME), but a little higher than the 58% obtained in the case of DRB. The result implies that the goal of poverty reduction can be achieved faster with financial inclusion by focusing on DRB and LRB more than CBLSME.

Discussion

First, this study finds that direct bank credit to SMEs increases, rather than decrease, poverty rate in Nigeria. The result does not support the expectation that SMEs can have a direct pro-poor effect through a larger SME sector and greater employment. If one unit increase in commercial bank loans to SMEs results in more than 30% increase in the short or long run, it then means that the borrowed funds may not have been channelled into economic ventures. For examples, individuals may disguise as SMEs simply to obtain funds to personal use. This is common in a developing country like Nigeria, a lower-middle income country, where poverty rate averaged 52% between 2011 and 2021. This may explain the growth of poverty rate alongside growth of bank credit to SMEs in the country. The findings differ from those of Owolabi and Nasiru (2017) who reported that SME financing has no significant impact on poverty in Nigeria.

Second, the study finds that the long-run impact of deposit mobilization of rural bank branches on poverty rate is positive, whereas the short-run impact is negative. This implies that instilling a short-term savings culture in rural dwellers appears to be a financial inclusion strategy that achieves the desirable goal of poverty reduction in Nigeria. Increase in deposit mobilization of rural bank branches implies that the more rural dwellers are able to save, or the existing ones saved more, either case, despite the low income prevalent in the area. Moreover, increase in deposit mobilization enhances banks' ability to provide credit to rural dwellers. This development is found to lower poverty rate by 12% in the long run and 19% in the short run. The findings are similar to those of Bakari et al (2019) and Mohammed et al. (2017) who reported that savings and rural banking are pivotal in reducing poverty in sub-Saharan Africa (SSA).

Third, we also found that an increase in the value of direct loans by rural bank branches is pro-poor in the short run as it results in a 2.1 per cent reduction of poverty rate in Nigeria. Increase in the value of loans by rural bank branches may be due to additional customers requesting one or increase in the credit granted to existing customers. Banks usually verify the credit worthiness and viability of their clients so it could be said that direct bank loans to rural dwellers are more productive than loan to SMEs as regards poverty reduction. However, the fact that the long-run effect of this factor is positive implies that only short-term lending is pro-poor in Nigeria. The findings are a departure from those of Jacob et al (2021) which reported a significant positive impact of bank credit on poverty level in Nigeria in the period 1980-2016. But it supports those of Mohammed et al. (2017) that access to credit lowers poverty rate in the SSA region.

Conclusion and recommendations

On the evidence of the results obtained, the study concludes that financial inclusion helps to reduce poverty rate in Nigeria through bank savings and direct short-term loans of rural bank branches. It is therefore important that banks in rural areas ensure that loans to SMEs are used productively to ensure that this financial inclusion component contributes to poverty reduction in Nigeria. Managers of rural bank branches should introduce products that are designed to attract the rural saver as this will help to increase the bank's ability to lend to rural dwellers. The Central Bank of Nigeria should guarantee direct lending to rural dwellers by rural banks so as to increase the volume of such lending and thus lower the poverty rate.

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APPENDIX: DATA

Year	PVR(%)	CBLSME(N'B)	DRB(N'B)	LRB(N'B)	UNR(%)
1981	32	6.23	0.09	0.04	5.2
1982	35.5	8.31	0.11	0.04	4.3
1983	39	9.84	0.13	0.04	6.4
1984	43	11.39	0.28	0.06	6.2
1985	54.1	13.94	0.31	0.11	6.1
1986	46	14.21	0.87	0.37	5.3
1987	45.4	14.91	1.23	0.49	7
1988	45	15.3	1.38	0.66	5.3
1989	44.5	16.9	5.72	3.72	4.5
1990	44	18.7	8.36	4.73	3.5
1991	43.5	19.8	10.58	5.96	3.1
1992	61.9	20.40	4.61	1.90	3.4
1993	49	15.46	19.54	10.91	2.4
1994	54.7	20.55	4.86	1.60	2
1995	60	32.37	8.81	8.66	5.9
1996	68.7	42.30	12.44	4.41	5.4
1997	70	40.84	19.05	11.16	5.8
1998	74.6	42.26	18.51	11.85	6
1999	78.2	46.82	15.86	7.50	19.9
2000	80.8	44.54	20.64	11.15	18.1
2001	70.5	52.43	16.88	12.34	13.7
2002	70.1	82.37	14.86	8.94	12.2
2003	60.8	90.18	20.55	11.25	14.8
2004	54.7	54.98	64.49	34.12	13.4
2005	60	50.67	18.46	16.11	11.9
2006	65	25.71	3.12	24.27	12.3
2007	58	41.10	3.08	27.26	12.7
2008	55.5	13.51	13.41	46.52	14.9
2009	50	16.37	3.30	15.59	19.7
2010	60.9	12.55	0.02	16.56	21.4
2011	71.5	15.61	0.02	19.98	23.9
2012	54.7	13.86	0.02	22.58	24.3
2013	35.2	15.35	0.02	739.92	29.5
2014	33	16.07	0.48	988.59	27.4
2015	60	12.95	90.37	29.17	26.8
2016	72	10.75	87.93	43.78	24.87
2017	61.2	10.75	185.34	530.99	20.42
2018	39.1	44.82	308.85	200.07	23.13
2019	40	123.93	354.86	202.59	27.1
2020	46.3	62.51	351.50	107.52	33.3
2021	65	83.74	427.45	119.85	35.1

Source: Central Bank of Nigeria Statistical Bulletin (2021); World Bank (2021)