

Does government spending reduce poverty in Nigeria? Evidence from Auto-Regressive Distributed Lag Specification

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Abstract

This paper analyses the impact of government spending on poverty reducing in Nigeria for the period 1981 to 2017 making use of annual time series data. The study employs the Auto-Regressive Distributed Lag (ARDL) approach. The result of the study revealed that economic service recurrent expenditure (ESRX), social and community recurrent expenditure (SCSRX), Transfer recurrent expenditure (TRX) reduces poverty while transfer capital expenditure (TCX) and administrative recurrent expenditure (ADRX) escalate poverty. Consequently, the study recommends that Government should embark on provision of food subsidies, subsidies farm input for farmers, subsidies transportation cost. Furthermore, government should endeavor to pay pensioners all their entitlements including gratuities as at when due without any delay, government should also be giving stipend to the unemployed and disabled, more poverty alleviating programs should be organize Also, the huge cost of maintaining the government should be reduced by reducing the numbers of political appointees to a reasonable size.

Keywords: Government spending, Poverty, ARDL, Nigeria.

Introduction

Poverty is a menace that is ravaging countries across the globe and it is a challenge to the wellbeing of mankind. Poverty is more prominent in Sub-Sahara Africa and Asia countries. In Nigeria over 60 percent of the population are poor. In 2018 Nigeria became the world Headquarter of poverty by overtaking India as the country with the highest number of poverty people.

The high rate of poverty across the globe is of concern to United Nation and they have been making frantic efforts in reducing it. United Nation in year 2000 formulated a policy called Millennium Development Goals (MDG) and the number one goal is to eradicate extreme poverty across the world by 2015. Unfortunately, this goal was not fully achieved, however, because of the commitment of reducing poverty another policy was formulated in September 2015 called Sustainable Development Goal (SDG) with one of its goal is to eradicate extreme poverty by 2030. Anderson, d'Orey, Duvendack, and Esposito (2017) opined that in achieving the SDG goal of poverty reduction it requires more than just growth, but growth that is combined with distributional changes that by themselves reduce poverty. Samuelson (1954), Musgrave (1956) noted that Poverty can be reduced by allocating scarce resources. Resources can only be efficiently and equitable distributed when allocated by government, through producing of pro-poor goods. Musgrave (1956) defines the functions of public finance as allocation of resources, redistribution and macro-economic stabilization.

This goal of poverty reduction as stipulated by SDG can only be achieve if countries globally including Nigeria strive towards reducing poverty in their various countries. In an effort of reducing poverty in Nigeria successive government

has formulated different policies and programs in other to curb poverty among which are Operation Feed the Nation, subsidies to farmers, the National Directorate for Employment (NDE), Better Life Programme (BLP), petroleum subsidies, the National Poverty Eradication Program (NAPEP), Youth Empowerment Scheme (YES), Social Welfare Service Scheme (SOWESS). During the President Buhari first tenure (2015-2019) he also formulated programs such N-Power, National Home-Grown School Feeding Programme (NHGSFP), National Cash Transfer Project (NCTP), and Government Enterprise and Empowerment Programme (GEEP). All these programs increased government spending. Mehmood and Sadiq (2010), Anderson, d'Orey, Duvendack, and Esposito (2017), Dahmardeh and Tabar (2013), noted that public spending plays an important role in poverty reduction. However, despite the increase in government spending the rate of poverty in Nigeria keep increasing instead of reducing. So there is need to investigate the pattern of Nigeria's public expenditure to know why poverty has not reduced despite the huge the public expenditure. This research work is different from other works because most of the researchers like (Oyediran, Sanni, Adedoyin and Oyewole 2016, Idenyi O.S, Obinna N.J, Agbi P.E, Ogbonnaya O.T (2016), Oziengbe (2013), Oke (2013), Maku (2014), Agbonkhese and Asekome (2014), focused on the impact of public spending on economic growth. However, among the few researchers that investigated the impact of public spending on poverty reduction there is no consensus as researchers like Mehmood and Sadiq (2010), Nwosa (2014) and Mehmood and Sadiq (2010) found that public spending had negative impact on poverty reduction while researchers like Fan, Hazell, and Thorat (1998) and Nazar and Mahmoud (2013), Benneth (2007) argued that public spending had positive impact on poverty reduction so the need to investigate further.

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Methods

Model specification

Guided by empirical literature reviewed the model specification therefore followed the model of Odior (2014) with modifications.

$NPI = f(ADCX, ADRX, ESCX, ESRX, SCSCX, SCRX, TRX, TCX)$

$$NPI = \beta_0 + \beta_1 ADCX + \beta_2 ADRX + \beta_3 ESCX + \beta_4 ESRX + \beta_5 SCSCX + \beta_6 SCRX + \beta_7 TRX + \beta_8 TCX + \mu_t \quad (1)$$

Where the following notation has been used:

NPI= National Poverty Index

ADCX = administration capital expenditure

ADRX = administration recurrent expenditure

ESCX = economic services capital expenditure

ESRX = economic services recurrent expenditure

SCSCX = social and community services capital expenditure

SCSRX = social and community services recurrent expenditure

TRX= Transfers recurrent expenditure

TCX= Transfers capital expenditure

μ_t = error term.

The econometrics form of equation 1 is displayed below in equation 2:

$$(NPI)_t = \beta_0 + \beta_1(ADCX)_t + \beta_2(ADRX)_t + \beta_3(ESCR)_t + \beta_4(ESRX)_t + \beta_5(SCSCX)_t + \beta_6(SCSRX)_t + \beta_7(TRX)_t + \beta_8(TCX)_t + \mu_t \quad (2)$$

Equation (2) needs to be transform for all the variables to have same appropriate coefficient because NPI was in rate while other variables were in billions. Therefore the variables would be log. However, NPI cannot be log because variable on rates or index cannot be log so the model would be log-linear model

$$NPI_t = \beta_0 + \ln \beta_1(ADCX)_t + \ln \beta_2(ADRX)_t + \ln \beta_3(ESCR)_t + \ln \beta_4(ESRX)_t + \ln \beta_5(SCSCX)_t + \ln \beta_6(SCSRX)_t + \ln \beta_7(TRX)_t + \ln \beta_8(TCX)_t + \mu_t \quad (3)$$

Where ln represents natural log.

Data and Source

The study employs annual data covering the period 1981-2017. Data were collated from World Bank Data Base and Central Bank of Nigeria (CBN) statistical Bulletins.

Results and Discussion

Descriptive Analysis

The result of Table 1 below showed that the estimated mean value used to estimate the pattern of distribution recorded highest mean value of 689.481 for transfer recurrent expenditure and the minimum mean value was recorded by social and community service recurrent expenditure. The standard deviation showed that transfer recurrent expenditure (TRX) is the most volatile variable (1090.519) while National Poverty Index (NPI) is the least volatile variable (6.549). The skewness statistics showed that national poverty index is negatively skewed while the remaining variables were

positively skewed. The Kurtosis statistics showed that Economic service recurrent expenditure (ESRX), Transfer capital expenditure (TCX) and Transfer recurrent expenditure (TRX) are leptokurtic indicating that the distributions are peaked relative to normal distribution while the Kurtosis statistics showed that NPI, ADCX, ADRX, ESRX, SCSCX, SCSRX are mesokurtic, indicating that the distribution of the variables is bell shaped and implying that the variable has normal distribution. The Jarque-Bera statistic rejected the null hypothesis of normal distribution for the NPI, ADCX, ADRX, ESCX and SCSCX while the null hypothesis of normal distribution for ESRX, SCSRX, TCX and TRX were accepted at the same critical value (that is five percent).

Table 1. Descriptive Analysis

Variables	NPI	ADCX	ADRX	ESCX	ESRX	SCSCX	SCSRX	TRX	TCX
Mean	6.549	109.129	464.993	100.123	146.633	55.537	132.959	71.764	206.513
Std. Dev.	0.814	1.882	2.021	1.877	1.877	1.877	1.877	1.877	1.877
Skewness	-2.475	1.842	2.185	1.845	1.897	2.185	2.185	2.185	2.185
Kurtosis	0.840	0.772	0.818	0.770	0.807	0.818	0.818	0.818	0.818
Jarque-Bera	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	37	37	37	37	37	37	37	37	37

Unit Root Test

The Unit Root test examined the statistical properties of all the variables. The ADF tests for unit root were conducted for the variables in the model. The results of the test at levels and first difference are presented above. The result showed that that variables like ADCX, ADRX, ESCX, ESRX, SCSCR,TRX and TCR are integrated of order one, I(1), while variable NPI is stationary at level. Based on the ADF test the condition for Johansen cointegration test is not met. Consequently, this research would employ the ARDL – Bound testing method of co-integration analysis rather than the Johansen method

Table 2. Unit Root Test

VARIABLE	AT LEVELS		FIRST DIFFERENCE		LEVEL OF INTEGRATION
	ADF Test	IN-LEVELS	ADF Test	IN-LEVELS	
LOGADRCX	-1.581	-2.631	-2.548	-10.247	1(1)
LOGADRX	-1.391	-2.693	-2.748	-9.893	1(1)
LOGESCR	-1.701	-2.621	-2.546	-9.813	1(1)
LOGESRX	-1.207	-2.671	-2.546	-9.813	1(1)
LOGSCSCX	-1.627	-2.628	-2.546	-9.813	1(1)
LOGSCSRX	-1.712	-2.631	-2.548	-9.813	1(1)
LOGTRX	-1.384	-2.658	-2.547	-9.813	1(1)
LOGTCX	-1.307	-2.620	-2.546	-9.813	1(1)
LOGNPI	-1.124	-2.621	-2.546	-9.813	0(0)

ARDL Bound Co-integration Test

The result presented in table 3 above showed that the value of the F-statistics for the estimating model is 5.593096 which is higher than the upper bound critical value at 5%, showing that there is co-integration among the variables in the model, thus the study presented both the long run and short run ARDL regression estimate

Table 3. ARDL test

Variables	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(ADCX)	0.909	4.033	0.226	0.824
LOG(ADRX)	-33.567	35.781	-2.127	0.048
LOG(ESCX)	5.808	2.935	1.979	0.064
LOG(ESRX)	3.243	5.484	0.571	0.576
LOG(SCSRX)	3.859	5.881	0.655	0.511
LOG(SCSRX)	28.125	12.144	2.316	0.023
LOG(TCX)	-4.096	1.839	-2.238	0.039
LOG(TRX)	2.006	4.902	0.409	0.688
C	76.712	10.547	7.275	0.001

Long-Run ARDL Model analysis

Table 4 .Long Run ARDL regression

Variables	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(ADCX)	0.909	4.033	0.226	0.824
LOG(ADRX)	-33.567	35.781	-2.127	0.048
LOG(ESCX)	5.808	2.935	1.979	0.064
LOG(ESRX)	3.243	5.484	0.571	0.576
LOG(SCSRX)	3.859	5.881	0.655	0.511
LOG(SCSRX)	28.125	12.144	2.316	0.023
LOG(TCX)	-4.096	1.839	-2.238	0.039
LOG(TRX)	2.006	4.902	0.409	0.688
C	76.712	10.547	7.275	0.001

The co integration equation is:

$$NPI = 76.712 + 0.909LOG(ADCX) - 33.567LOG(ADRX) + 5.808LOG(ESCX) + 3.243LOG(ESRX) - 0.639LOG(SCSRX) + 28.125LOG(SCSRX) - 4.096LOG(TCX) + 2.006LOG(TRX).$$

The above result revealed that ADRX and SCSRX have significant effect on NPI at 5% significant level while ESCX has significant effect on NPI at 10% significant level and ADCX, ESRX, SCSRX, and TRX have no significant. In summary, the result showed that ESCX, and SCSRX had positive impact on NPI while TCX had negative impact on NPI.

Engle-Granger Theorem argued that when co-integration exist among variables, ECM is considered more appropriate because of its the encompassing power over other forms of dynamic specifications. Therefore the short run analysis is presented below using ECM.

ARDLECM

Sequel to the existence of co-integration relationships among the variables as revealed in the ARDL Bound test, the best estimation technique to be used in determining the short-run behavior of the variables is Auto-Regressive Distributed Lag Error Correction Model. The Error Correction Model captures the short run dynamics of the system and its coefficient measures the speed of adjustment to obtain equilibrium in the event of shock to the system. The below table shows the result of the short run dynamics of equation.

Table 5. Auto-Regressive Distributed Lag Error Correction Model

Variables	Coefficient	Std. Error	t-Statistic	Prob.*
DLOG(ADRX)	2.529	1.305	1.937	0.069
DLOG(ESRX)	-2.814	0.784	-3.681	0.002
DLOG(SCSRX)	-3.797	0.743	-5.112	0.001
DLOG(TCX)	0.478	0.116	4.183	0.002
DLOG(TRX)	-5.384	1.035	-5.192	0.001
ConstEq(-1)*	-0.698	0.032	-21.849	0.000

Short-Run (Dynamic) ARDL Model analysis

The Table 5 above shows the short run (dynamics) results. The optimal lag combination for the models is obtained via Schwartz Information criterion (SIC).

From the result the ECM term is well defined, that is negative and statistically significant at 5% level. The coefficient is -0.698 which indicates that 69.5 percent of the previous year’s disequilibrium in poverty rate is been corrected by ADRX, ESRX, SCSRX, TRX and TCR. This also showed the speed at which the model converges to equilibrium. The magnitude of this coefficient implies that nearly 69.5 percent of any disequilibrium in poverty rate is corrected by the some of the selected variable within one period (one year). The implication is that the present value of poverty rate will adjust to changes in ADRX, ESRX, SCSRX, TRX and TCR.

The results also showed that economic services recurrent expenditure had negative significant impact on poverty rate in Nigeria at 5% significant level. This implies that as government increases its recurrent expenditure on agriculture, construction, transportation and communication the rate of poverty would reduce. This conform to the apriori expectation.

In the same vein, the result revealed that Social and community service recurrent expenditure had negative significant impact on poverty rate in Nigeria at 5% significant level. This implies that as government increases its recurrent expenditure on education and health the rate of poverty would reduce. This conform to the apriori expectation.

Furthermore, the result showed that transfer recurrent expenditure had negative significant impact on poverty rate in Nigeria at 5% significant level. This implies that as

government increases its recurrent expenditure on public debt servicing, pension and gratuities, contingencies/subventions the rate of poverty would reduce. This conform to the apriori expectation.

Conversely, the result showed that transfer capital expenditure had positive significant impact on poverty rate in Nigeria at 5% significant level. This implies that as government increases its capital expenditure on public debt servicing, pension and gratuities, contingencies/subventions the rate of poverty would increase. This does not conform to the apriori expectation.

Lastly, the result revealed that administrating recurrent expenditure had positive effect on poverty level in Nigeria at 10% significant level. This implies that as government increases its recurrent expenditure on external defence, internal security, general administration and National assembly the level of poverty increases. This does not conform to the apriori expectation.

Diagnostic tests

Having estimate both the short and long-run analysis, it is required to verify whether the estimated model follow the OLS technique assumptions so as to know the efficiency and consistency of the model.

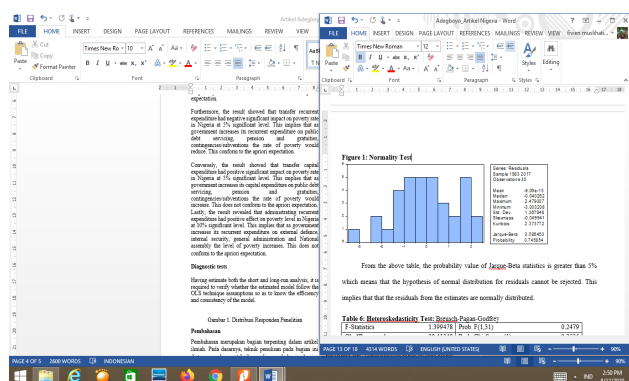
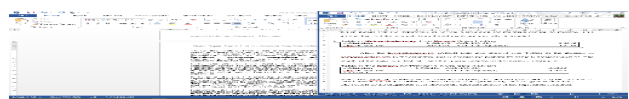


Figure 1. Normality Test

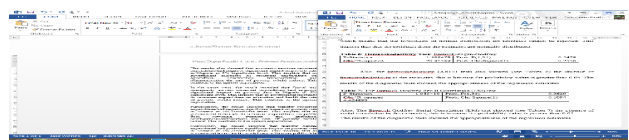
From the above table, the probability value of Jarque-Beta statistics is greater than 5% which means that the hypothesis of normal distribution for residuals cannot be rejected. This implies that that the residuals from the estimates are normally distributed.

Table 6: Heteroskedasticity Test: Breusch-Pagan-Godfrey



Also, the heteroskedasticity (ARCH test) also showed (see Tables 6) the absence of homoskedasticity in the estimates, this is because the probability value is greater than 0.05. The results of the diagnostic tests showed the appropriateness of the regression estimates.

Table 7: The Breusch-Godfrey Serial Correlation (LM) test



Also, The Breusch-Godfrey Serial Correlation (LM) test showed (see Tables 7) the absence of serial correlation in the estimates, this is because the probability value is greater than 0.05.

The results of the diagnostic tests showed the appropriateness of the regression estimates.

Conclusion and Policy Recommendations

This study assessed the impact of government spending on poverty reducing in Nigeria for the period 1981 to 2017. The Bound test revealed that the variables co-integrated and that there is both the long-run and the short-run relationship between government spending and poverty rate in Nigeria. Employing the Autoregressive Distributed Lag (ARDL) technique, the study observed that ESRX, SCSRX and TRX reduces poverty rate in Nigeria while ADRX and TCX increases poverty rate in Nigeria

Recommendations

The focus of this study is to determine the impact of government expenditure on reducing poverty in Nigeria. Having identify the aspect of government expenditure that affects poverty rate in the country, I therefore recommend the following appropriate policies to guild the government in reducing poverty through government expenditure.

I. The study revealed that economic services recurrent expenditure like agriculture, construction, transportation and communication reduces poverty in Nigeria therefore the government should embark on provision of food subsidies, subsidies farm input for farmers, subsidies transportation cost, maintenance of roads and other infrastructure in transportation and communication sector in order to reduce poverty in Nigeria.

II. Since the study revealed that social and community services recurrent expenditure like education and health reduces poverty in Nigeria therefore the government should further increase her spending in feeding pupils in primary schools, employ more teachers to schools in order to encourage more enrollment to schools and to reduce unemployed graduates, employ more health personnel in order to improve the wellbeing of the citizens and increase their salary in order to encourage them to stay in the country, government should make drugs available at every public hospital and should be subsidies.

III. Also, the study showed that transfer recurrent expenditure pension and gratuities as well as subventions reduces poverty in Nigeria therefore the government should endeavor to pay pensioners all their entitlements including gratuities as at when due without any delay, government should also be giving stipend to the unemployed and disabled, more poverty alleviating programs should be organize

IV. Since administrative recurrent expenditure such as external defence, internal security, general administration and National assembly increases poverty rate, therefore government should reduce its spending on maintenance on national assembly and possibly revert to uni-cameral parliamentary system, furthermore, the huge cost of maintaining the government should be reduce by reducing the numbers of political appointees to a reasonable size, the numbers of Personal Assistant, Special Personal Assistant,

Senior Special Assistant, Ministers/Commissioners and Ambassadors should be reduced.

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