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Does Government Spending Reduce Poverty in Nigeria? Evidence from Auto-Regressive Distributed Lag Specification

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Abstract

This study investigated the impact of government spending on poverty reducing in Nigeria between 1981 and 2017. The study employed the Auto-Regressive Distributed Lag (ARDL) estimation technique. 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, and 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, and 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.

Apakah Pengeluaran Pemerintah Mengurangi Kemiskinan di Nigeria? Pembuktian Estimasi *Auto-Regressive Distributed Lag* (ARDL)

Abstrak

Penelitian ini menyelidiki dampak pengeluaran pemerintah terhadap pengurangan kemiskinan di Nigeria antara tahun 1981 hingga 2017. Studi ini menggunakan teknik estimasi Auto-Regressive Distributed Lag (ARDL) yajng mengungkapkan bahwa belanja berulang layanan ekonomi (ESRX), belanja berulang sosial dan masyarakat (SCSRX), belanja berulang transfer (TRX) mampu mengurangi kemiskinan, sementara transfer belanja modal (TCX) dan belanja berulang administratif (ADRX) meningkatkan kemiskinan. Konsekuensinya, penelitian ini merekomendasikan agar pemerintah Nigeria mulai memberikan subsidi pangan, subsidi input pertanian bagi petani, dan subsidi biaya transportasi. Selanjutnya, pemerintah harus berusaha untuk membayar pensiunan semua haknya termasuk gratifikasi pada saat jatuh tempo tanpa penundaan, pemerintah juga harus memberikan tunjangan kepada pengangguran dan penyandang cacat, dan lebih banyak program pengentasan kemiskinan harus diorganisir. Selanjutnya, baiaya pemeliharaan pemerintahan yang sangat besar harus dikurangi dengan cara mengurangi jumlah orang yang diangkat secara politik dalam pemerintahan ke dalam jumlah yang wajar.

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Poverty is a menace that is ravaging countries across the globe and it is a challenge to the wellbeing of mankind. No country or continent can be said to be totally free of poverty, but the rate and level differs. For example, African countries has about 383 millions population living below poverty level, followed by Asia continent which had 327 million, then south America 19 million, North America 13 million, 2.5 million in Oceania and 0.7 million in Europe (Max and Esteban, 2013). This revealed that Poverty is more prominent in Sub-Sahara Africa and Asia countries. In 2018 Nigeria overtook India to become the world Headquarter of poverty.

The high rate of poverty across the globe especially Sub-Sahara Africa and Asia countries 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, & Esposito (2017), opined that achieving the SDG goal of poverty reduction requires not just growth but distributional changes vis-à-vis growth. 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) highlighted public finance functions as redistribution, allocation of resources, 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, 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). [1]During the President Buhari first tenure (2015-2019) he also formulated different programs under National Social investment programme, and these programs increased government spending. Mehmood & Sadiq (2010), Anderson, d'Orey, Duvendack, & Esposito (2017), Dahmardeh & Tabar (2013), noted that public spending is essential in poverty reduction. However, despite the consistence increment in government expenditure the rate of poverty in Nigeria keep increasing instead of reducing. As such there is a 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 & Oyewole

[1] They are N-Power, National Home-Grown School Feeding Programme (NHGSFP), National Cash Transfer Project (NCTP), and Government Enterprise and Empowerment Programme (GEEP), all are aimed at poor and unemployed to alleviate their suffering.

(2016), Idenyi, Agbi, & Oziengbe (2013), Oke (2013), Maku (2014), focused on the effect of public spending on economic growth. However, among the few researchers that investigated the effect of public expenditure on poverty there is no consensus as researchers like Mehmood & Sadiq (2010), Nwosa (2014) and Mehmood and Sadiq (2010) found that public spending had negative impact on poverty reduction while researchers like Fan, Hazell, & Thorat (1998) and Nazar & Tabar (2013) also Benneth (2007), argued that government expenditure had positive impact on reducing poverty so the need to investigate further.

Ravallion (1998), in an attempt to identify people under poverty are came up with what is known as a poverty line. According to him, poverty line serves as the minimum standard of living expected of people at a giving time and anyone living below it is considered poor. According to World Bank the minimum standard of living is $1.25-a-day and anyone living below it is considered poor.

Odior (2014) investigated the impact of public spending on poverty reduction and education in Nigeria using computable general equilibrium (CGE) model to stimulate the impact. The study found that increase in government expenditure on education stimulates growth and reduce poverty in Nigeria. Oriavwote and Ukawe (2018), examined the relationship between public spending and Poverty in Nigeria using ECM model and granger causality estimation techniques. The study revealed that public spending on education and building and construction positively impact per capita income, also, there is bi-causal relationship between public spending on education and per capita income while there is no causality relationship between public expenditure on building and construction and the per capita income. Fan, Hazell, & Thorat (1999) investigate into how government spending reduces rural poverty in India, from 1970 and 1993 using simultaneous equations model. The study found that government spending on rural infrastructure, agricultural R&D, and irrigation reduced poverty in rural India. Mehmood & Sadiq (2010) investigated the impact of public expenditure on poverty in Pakistan from 1976 to 2010 using Johnson Cointegration to analyses the data. The study revealed that government expenditure had a negative impact on poverty reduction

Nwosa (2014), investigated the impact of government spending on poverty and unemployment rates in Nigeria between 1981 and 2011 using adopted Ordinary Least square (OLS) method. The study revealed that government expenditure positively impacts on unemployment rate while it negatively affects poverty rate. Benneth (2007), examined the how fiscal policy alleviates poverty in Nigeria using general equilibrium model (GEM) estimation technique. The result revealed that although revenue enhance income redistribution, but public spending is more effective in redistributing income and consequently reduce poverty. Osundina, Ebere & Osundina (2014), assessed the impact of disaggregated public spending on infrastructure on poverty in Nigeria using employed Vector Autoregressive Model method to estimate the model. The study showed that government expenditure on building and construction reduce poverty while, public expenditure on health does not affect poverty

Nyarkoh (2016), examined the impact of public expenditure on poverty in Ghana

between 1960 and 2013 using Vector Error Correction (VECM) test. The research found that increase in government spending has no impact on poverty in Ghana. Ogbara, Ebong & Abraham (2018), examined the impact of public expenditure on poverty rate in Nigeria using vector autoregressive (VAR) technique. The findings revealed that both recurrent and capital expenditure on education had no impact on poverty reduction in Nigeria.

METHODS

This study employed ARDL bound estimation technique to analysis the impact of public expenditure on poverty reduction in Nigeria. ARDL bound test was used because it accommodates mixed order of integration i.e it allows for combination of I(0) and I(1) as against Johansen cointegration test which only accommodates variables that are integrated at first difference.

Model specification

Guided by the reviewed empirical literature the model is specified in line with the model of Odior (2014) with modifications i.e inclusion of more categories of government expenditure as against focusing on only education sector

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

$$NPI=\theta_0+\theta_1 ADCX+ \theta_2 ADRX + \theta_3 ESCX + \theta_4 ESRX + \theta_5 SCSCX + \theta_6 SCRX + \theta_7 TRX + \theta_8 TCX + \mu_t \quad (1)$$

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

t= Error Term

The justification for using the variables is to allow for more robust investigation into how government spending reduce poverty as most of the study reviewed explored government expenditure in an aggregate form and this may not truly show which of the government expenditure helps to reduce poverty. The few that disaggregate government expenditure only focus on education and health sectors which are under one of my variables "social and community services"

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

$$(NPI)_t = \theta_0+\theta_1(ADCX)_t+ \theta_2(ADRX)_t+ \theta_3(ESCX)_t+ \theta_4(ESRX)_t+ \theta_5(SCSCX)_t+ \theta_6(SCRX)_t+ \theta_7(TRX)_t+ \theta_8(TCX)_t+\mu \quad (2)$$

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 as shown in equation 3.

(1)

$$(NPI)_t = \theta_0 + In\theta_1(ADCX)_t + In\theta_2(ADRX)_t + In\theta_3(ESCX)_t + In\theta_4(ESRX)_t + In\theta_5(SCSCX)_t + In\theta_6(SCRX)_t + In\theta_7(TRX)_t + In\theta_8(TCX)_t + \mu_t. \quad (3)$$

Where In represents natural log.

RESULT

Descriptive Analysis

The result on Table 1 below revealed 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 revealed that Economic service recurrent expenditure (ESRX), transfer capital expenditure (TCX) and transfer recurrent expenditure (TRX) are 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 probability statistic showed that NPI, ADCX, ADRX, ESCX and SCSCX were not normally distributed while ESRX, SCSRX, TCX and TRX were normally distributed.

Unit Root Test

The Unit Root test is used to examine the statistical properties of the variables. There is different technique that can be used to conduct the test, however, this study employed ADF. The results of the test at levels and first difference are presented above. The result showed that all the variables were stationary at the first difference except NPI. Based on the result it is evident that the appropriate estimation technique is ARDL because it is the one that accommodates mixed order of integration. The results of unit root test are displayed in Table 2.

Table 1. Descriptive Analysis of Variables

Variables	NPI	ADCX	ADRX	ESCX	ESRX	SCSCX	SCSRX	TCX	TRX
Mean	54.142	98.379	377.273	184.545	107.825	48.808	223.453	57.915	689.481
Std. Dev.	6.549	109.129	464.993	180.123	146.828	55.927	312.959	71.764	1090.519
Skewness	-0.034	0.662	0.891	0.474	1.327	0.827	1.191	1.411	2.079
Kurtosis	2.476	1.842	2.185	1.862	3.897	2.195	2.756	3.859	6.930
Jarque-Bera	0.430	4.772	5.919	3.379	12.097	5.227	8.840	13.431	50.487
Probability	0.806	0.092	0.0518	0.185	0.002	0.073	0.012	0.001	0.000
Observations	37	37	37	37	37	37	37	37	37

Sources: Data processed

Table 2. Unit Root Test Result

	AT LEVELS			IST DIFFERENCE			LEVEL OF INTEGRATION
VARIABLE	**ADF-Test**	**1% C.V**	**5% C.V**	**ADF-Test**	**1% C.V**	**5% C.V**	
LOG(ADCX)	-1.548	-3.633	-2.948	-10.247	-3.633	-2.948	I(1)
LOG(ADRX)	-1.594	-3.633	-2.948	-7.855	-3.633	-2.948	I(1)
LOG(ESCX)	-0.791	-3.627	-2.946	-6.315	-3.633	-2.948	I(1)
LOG(ESRX)	-1.202	-3.627	-2.946	-9.817	-3.633	-2.948	I(1)
NPI	-5.624	-3.627	-2.946	-8.753	-3.633	-2.948	I(0)
LOG(SCSCX)	-0.72	-3.633	-2.948	-9.387	-3.633	-2.948	I(1)
LOG(SCSRX)	-1.984	-3.654	-2.957	-7.833	-3.633	-2.948	I(1)
LOG(TRX)	-0.395	-3.627	-2.946	-7.886	-3.633	-2.948	I(1)
LOG(TCX)	-3.124	-3.627	-2.946	-6.629	-3.633	-2.948	I(1)

Sources: Data processed

Table 3. F-Statistic Test

	F-Statistics	
	5.593096	
Critical Values	**Lower Bound**	**Upper Bound**
5%	2.11	3.15

Sources: Data processed

ARDL Bound Test

The result presented in Table 3 showed 5.593096 as the value of F-statistics and it is higher than both the upper and lower bound which means that there is co-integration among the variables. The thumb rule is that when variables co-integrate in a model, both the long and short run ARDL regression should be estimated. Therefore this study estimates both the short and long run. The result of long-run ARDL model analysis is shown in Table 4.

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).

Table 4. Long-Run ARDL Model Analysis Result

Variables	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(ADCX)	0.909	4.023	0.226	0.824
LOG(ADRX)	-33.567	15.781	-2.127	0.048
LOG(ESCX)	5.808	2.935	1.979	0.064
LOG(ESRX)	3.243	5.684	0.571	0.576
LOG(SCSCX)	-0.639	3.881	-0.165	0.871
LOG(SCSRX)	28.125	12.144	2.316	0.033
LOG(TCX)	-4.096	1.839	-2.228	0.039
LOG(TRX)	2.006	4.902	-0.409	0.688
C	76.712	19.547	3.925	0.001

Sources: Data processed

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 positively impact NPI while TCX had negative impact on NPI.

Short-Run ARDL Model analysis

Based on the Bound test which revealed the existence of co-integration relationships among the variables, the appropriate estimation technique in determining the behavior in the short run is Auto-Regressive Distributed Lag Error Correction Model (ARDLECM) which is depicted in Table 5.

The result in Table 5 shows that the coefficient of ECM which was -0.698 revealed that about 69.8% of the previous year's disequilibrium in poverty rate is been corrected by ADRX, ESRX, SCSRX, TRX and TCR.

The results also showed that economic services recurrent expenditure had negative impact on poverty rate in Nigeria. 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 priory expectation.

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

Furthermore, the result showed that transfer recurrent expenditure had negative

Table 5. Short-Run ARDL Model Result

Variables	Coefficient	Std. Error	t-Statistic	Prob.*
DLOG(ADRX)	2.529	1.305	1.937	0.069
DLOG(ESRX)	-2.814	0.764	-3.681	0.002
DLOG(SCSRX)	-3.797	0.743	-5.112	0.001
DLOG(TCX)	0.478	0.126	3.783	0.002
DLOG(TRX)	-5.364	1.033	-5.192	0.001
Coint-Eq(-1)*	-0.698	0.032	-9.249	0.000
R-squared	0.757		Durbin-Watson stat	2.049
Adjusted R-squared	0.721		S.D. dependent var	2.962

Sources: Data processed

impact on poverty rate in Nigeria. This implies that as government increases its recurrent expenditure on public debt servicing, contingencies/subventions, pension and gratuities the rate of poverty would reduce. This conform to the prior expectation.

Conversely, the result revealed that transfer capital expenditure had positive impact on poverty rate in Nigeria. This implies that as government increases its capital expenditure on public debt servicing, contingencies/subventions, pension and gratuities the rate of poverty would increase.

Lastly, the short run ARDL Model result showed that recurrent expenditure on administrating had positive effect on poverty level in Nigeria at 10% significant level. This implies that as government increases its recurrent expenditure on external defense, internal security, general administration and national assembly the level of poverty increases.

Diagnostic tests

Having estimate the ARDL analysis, this study proceeds to check if the estimate is in line with the OLS assumptions in order to know the consistency and efficiency of the model. The results of diagnostic test is shown in Table 6.

From the Table 6 it can be seen the probability value of Jarque-Berra is 0.7459 (74.59%) and is greater than 5% which means that the residuals from the estimates are normally distributed. Also, the result revealed that the probability value of the heteroskedasticity (ARCH test) is 0.2479 (24.79%) and is greater than 5% which means that homoskedasticity is absent in the model. Lastly, the result revealed that there is absent of serial correlation in the model because the probability is higher than 5%.

Table 6. Diagnostic Tests Table

Test	F-Stat (Prob)
Jarque-Berra test	0.5865 (0.7459)
Breusch-Godfrey Serial Correlation test	1.0854 (0.3629)
Breusch-Pagan-Godfrey Heteroskedasticity Test	1.3995 (0.2479)

Sources: Data processed

DISCUSSION

The result revealed that recurrent expenditure on economic services had negative effect on poverty i.e. economic services recurrent expenditure reduces poverty, it further showed that a percentage increase in recurrent expenditure on agriculture, construction, transportation and communication led to 0.02814 unit reduction in poverty rate in Nigeria.

Also, the result revealed that recurrent expenditure on Social and community service had negative impact on poverty i.e. social and community service recurrent expenditures reduces poverty in Nigeria, it further showed that a percentage increase in recurrent expenditure on education and health led to 0.03797 unit reduction in poverty rate in Nigeria.

Furthermore, the result showed that recurrent expenditure on transfer had negative effect on poverty rate in Nigeria i.e. transfer recurrent expenditure reduces poverty, it also revealed that a percentage increase in contingencies/subventions, public debt servicing, pension and gratuities, led to 0.05364 unit reduction in poverty rate in Nigeria.

Conversely, the result revealed that capital expenditure on transfer had positive impact on poverty rate i.e. transfer capital expenditure aggravate rate of poverty, it also revealed that a percentage increase in contingencies/subventions, public debt servicing, pension and gratuities led to 0.00478 unit increase in poverty rate in Nigeria.

In addition, the result revealed that recurrent expenditure on administrating had positive impact on poverty level i.e. administrating recurrent expenditure increases poverty rate, it also showed that a percentage increase in recurrent expenditure on external defense, general administration, internal security, and National assembly will lead to 0.02529 unit increase in poverty rate in Nigeria.

Lastly, it was revealed that capital expenditure on administrating and Social and capital expenditure on community service had no impact on poverty rate in Nigeria.

CONCLUSION & RECOMMENDATION

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

The purpose of this study is to determine how government expenditure impact 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.

First of all, 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.

Second of all, Since the study revealed that recurrent expenditure on social and community services 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 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.

The third recommendation, 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.

The last, Since administrative recurrent expenditure such as external defense, 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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