POVERTY REDUCTION, GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH IN NIGERIA

ORIAKHI Marian Omosivie
Institute of Public Administration and Extension Services (IPAES)
University of Benin, Benin City, Edo State.
Email: missoriakhi@gmail.com GSM: +2348123613634

ABSTRACT

This Study examines the relationship between poverty reduction, government expenditure, and economic growth in Nigeria. It aims at proving that there is a bi-directional causal relationship between these variables. A Vector Error Correction Model was specified, and variables included in the model were Poverty Reduction (POVRd), Total Government Expenditure (TGEXP), Real Gross Domestic Product Per Capita (RGDPpc) as a proxy for Economic Growth, and Natural Resource Rents (NRENT). Time series data was analyzed for a period of thirty eight (38) years. The Study employed the Block Exogeneity Wald Test to check for causality between variables, the Vector Error Correction Model (VECM) to analyze the speed of adjustment process and short run transmission mechanism among the variables, the Forecast Error Variance Decomposition to examine total variability in variables due to shocks in itself and in other variables of the model, and the Inverse Roots of AR Characteristics Polynomial to check the state of impulse responses in the estimated model. Findings indicate that there exists a bi-directional relationship between variables. Each variable explained to different percentage levels, variations in shocks in itself and in other variables of the model at different periods. In general, there exists a bi-directional causality between total government expenditure and poverty reduction in Nigeria. The study concludes with recommendations for increase in government expenditure to bring about reduction in poverty, the adoption of pro-growth and pro-poor policies and a transparent and corruption free governance.

Key Words: Poverty Reduction, Government Expenditure, Economic Growth
JEL Codes: CO1, O1

1. INTRODUCTION

Poverty is an unacceptable deprivation in human well-being that can comprise both physiological and social deprivation (World Bank Development Report, 2000). It is a multidimensional problem that goes beyond economics to include low incomes and inability to acquire the basic goods and services necessary for survival with dignity (World Bank, 2010), as well as socio-cultural and political concerns. It has been and still is a great threat to the economic progress of many countries across the World. According to a United Nations Statement (1998), poverty is the denial of choices and opportunities, a violation of human dignity, it means lack of basic capacity to participate effectively in the society, it means not having enough to feed and clothe a family, not having a School or Clinic to go to, not having the Land on which to grow one's food or a job to earn one's living.

In recent statistics, Worlds population living under poverty reduced from 11 percent in 2013, to 10 percent in 2015, this number is estimated to be about 736 million people living on less than $1.90 a day, with Sub-Saharan Africa contributing about 413 million people, which is more than half of the extreme poor in the world. About 21% of these 413 million people are Nigerians. Estimates as at 2018, showed that 86.9 million Nigerians (nearly 50% of its population) were living in extreme poverty. Poverty related problems in Nigeria have been on the increase, according to UNICEF (2011), under 5 mortality was at 124 deaths per 1000 live births , infant mortality rate was at 78 deaths per 1000 live

births, 36 percent of under 5 children were stunted, and 10% were wasted. Currently in the country, literacy rate is being threatened pre-mature deaths due to sicknesses are on the increase. The woes of poverty threaten the existence of a progressive society, that is why it is necessary to survey and tackle the poverty issue in-depth.

One major cause of poverty in Nigeria is inadequacy of government expenditure. Supramoko (2002) defines government expenditure as an expenditure to finance government's activities which is aimed to gaining overall social welfare by utilizing some resources, product, and money. Government expenditure varies and ranges from education, defense, general administration, health, to water supply, electricity generation and supply, roads, telecommunications among others. On the other hand, public expenditure on infrastructure has been an issue for policy discourse among researchers and scholars all over the continent. Research have shown that investment in infrastructure has tremendous positive impact on a country's economic growth and development Adenikinju (2005) as cited in Ekpung (2014). Government expenditure is generally of two types; capital expenditure, and recurrent expenditure. Capital expenditure are expenditures on physical structures and infrastructures such as roads, school and hospital buildings etc. while Recurrent expenditure are expenditures on the running and maintenance of various sectors and infrastructures.

According to CBN Annual Report (2014), aggregate expenditure of general government declined by 7.7 percent from the level in 2013 to 10,1842.2 billion, representing 11.4 per cent of GDP, compared with 13.8 per cent in 2013 This was attributed to the low capital budget implementation due to the drop in revenue. In 2015 again, there was a decline in aggregate expenditure of general government by 4.7 per cent from the level in 2014, leaving the figure at N9,704.3 billion . This was attributed to the low capital releases, arising from the drop in revenue. As a proportion of GDP, it represented 10.2 per cent, compared with 11.3 per cent in 2014. (CBN Annual Report, 2015). The inadequacy of government expenditure in the country has greatly affected poverty level in the Country, which in turn has had adverse effects on the growth of the economy.

Kuznets, cited in Todaro (1985), defined a country's economic growth as "a long-term rise in capacity, to supply increasingly diverse economic goods to its population; this growing capacity is based on advancing technology and the institutional and ideological adjustments that it demands. Economic growth can also be defined as the increase, overtime, of a country's capacity to produce those goods and services needed to improve the well-being of the citizens in increasing numbers and diversity. (Anyanwu and Oaikhenan ,1995 as cited in Osinuibi, 2005).

According to the Central Bank of Nigeria Annual economic report (2014, 2015), estimated real Gross Domestic Product (GDP), measured at 2010 constant basic prices, grew by 6.2 percent, compared with the 5.5 per cent recorded in 2013. The services sector, with a share of 36.2 per cent, accounted for the largest contribution of 2.6 percentage points to the GDP growth. This was followed by industry, trade, agriculture and construction with 1.2, 1.0, 1.0 and 0.5 percentage points, respectively. The non-oil sector remained the growth pole of the economy, recording a growth of 7.2 per cent in 2014, compared with 8.4 per cent in 2013.

Real Gross Domestic Product has been on the increase, however this has not translated to improvement in the welfare of the Country's citizenry. Increases in government expenditure have also not led to improvements in the Country's poverty and growth profile. This Study therefore intends to find out if there exists a bi-directional relationship between poverty reduction, government expenditure and economic growth in Nigeria.

2. LITERATURE REVIEW

Theoretical Literature

The theoretical aspect of this Literature review is focused succinctly on a few models of economic growth and government expenditure.

The Solow Growth Model

The Solow growth model looks at four variables, which are output (Y), Capital (K), Labour (L), and Knowledge (A). It is of the opinion that capital, labour and knowledge (technology) are responsible for output or productivity.

$Y = F(K, AL)$ …….. i

Where AL is referred to as effective labour (which could be seen as the consequence of human capital investment).

The Solow growth model opined that doubling the quantities of capital and effective labor doubles output (Romer, 2012).

$F(CK, CAL) = CY$…….ii

$CY = CF(K, AL)$……iii

It can also be written as

$F(CK, CAL) = CF(K, AL)$……..iv

Where C is a positive constant.

Endogenous Growth Model

The Endogenous Growth Model involves the variables as that of the Solow growth model. A largely standard production function is assumed in which Labour, Capital, and Technology (Knowledge) are combined to produce improvements in technology in a deterministic way (Romer, 2012). The endogenous growth theory posits that output on productivity is affected by improvements in technology and investments in Human Capital.

The production function is a Cobb Douglas production function and it's given as

$Y(t) = [(1 - a_k)\, K(t)]^{\gamma}\, [A(t)(1 - a_L)\, L(t)]^{1-\gamma}$……v

$0 < \gamma < 1$

There is constant returns to Capital (K) and Labour (L).

Other growth models include the Harold-Domar growth model, the Kaldor growth model etc.

Peacock and Wiseman Analysis

The peacock and Wiseman Analysis was propounded by Jack Wiseman and Allen T. Peacock in their monograph "the growth of public expenditure in the United Kingdom" for the period 1890-1955. The theory is also called the displacement theory. Peacock and Wiseman (1967) as cited in Okeke (2014)

suggested that the growth in public expenditure does not necessarily occur in the same way Wagner theorized. According to the theory, public expenditure does not increase in a smooth and continuous manner, but in jerks or step-like fashion. (Bhatia, 2008).

Musgrave and Rostow Development Model of Public Expenditure

Musgrave and Rostow argued that public expenditure is a pre requisite for economic growth (Edame et al, 2014). According to Brown and Jackson (1990), Musgrave argues that over the development period, as total investment as a proportion of growth rise, the relative share of public sector investment falls. Rostow's claims are that once the economy reaches the maturity stage, the mix of public expenditures will shift from expenditures on infrastructure to increasing expenditure on education, health and welfare services (Brown and Jackson, 1990).

The Keynesian Theory of Public Expenditure

According to Keynesians, public spending boosts economic activities as well as act as a tool to stabilize the short run fluctuations in aggregate expenditure (Ju-Haung, 2006). Keynes (1936) argued that market economies had no automatic capacity to generate full employment, and that the economic policy is and should be inextricably linked to social policy. (Connor and Simpson, 2011). His arguments were based on the argument that markets do not always clear as believed by the classical economist. There will always be the problem of unsold inventory prices and wages (in the short run), thus in times where demand is low, the government should increase its spending (injecting new purchasing power) in the economy, so as to stimulate aggregate demand and thereby output through the multiple effect (Chipaumire, 2014), as well as boost employment through the same multiplier effect.

Empirical Literature

Mehmood and Sadiq (2010) using an Error correction modeling technique, investigated the relationship between government expenditure and poverty rate in Pakistan for the period of 1976 to 2010. Findings revealed that government expenditure and poverty rate in Pakistan have a negative relationship.

Dada and Fanowopo (2020) examined the link between economic growth and poverty in Nigeria, using the Autoregressive Distributed Lag co-integration technique. The study concluded that building strong institutions and sound economic growth are important in bringing about reduction in poverty in the Country.

Udoka and Anyinyang (2015) using the ordinary least square multiple regression statistics technique, examined the effect of public expenditure on the growth and development of the Nigerian economy for the period 1980 to 2012. Results indicated that aggregate recurrent and capital expenditure all had positive impact on the economic growth and development of the Nigerian economy, and recommended government increase in its spending on various component of public expenditure.

Okulegu (2013) examined the impact of government expenditure which was represented by government agriculture expenditure on poverty reduction in Nigeria. Findings indicated that there was a negative relationship between poverty reduction and government spending under the study period.

Ijaiya et al (2011) carried out a study on economic growth and poverty reduction in Nigeria. A multiple regression analysis was employed, and results of this study revealed that initial levels of economic growth did not reduce poverty, however, positive changes in economic led to a reduction in poverty.

They therefore recommended that measures to improve economic growth should be implemented so as to bring about poverty reduction in the country.

3. METHODOLOGY

The model of this study is based on the Keynesian Macroeconomic Framework which is of the opinion that increases in government expenditure will have positive and significant impact on economic growth and by implication, on the level of poverty. To be able to capture the interrelationships among poverty reduction, government expenditure, and economic growth, and also to investigate and suggest ways through which government expenditure can be directed towards poverty reduction the model is specified thus:

$V_t = \alpha_{it} + \sum_{i=1}^{k} A_{ij} V_{t-1} + \phi_{ij} ECM_{t-j} + \sum_{it}$

$V_t = F$ (POVRd, TGEXP, RGDPpc, NRENT)

Where

Vt is a vector of explanatory variables.

POVRd = Poverty Reduction

TGEXP = Total Government Expenditure

RGDPpc = Real Gross Domestic Product Per Capita

NRENT = Natural Resource Rents

This model is specified to examine the dynamic relationships, causal relationships as well as speed of adjustment among the above stated variables.

A Priori Expectations

The following are the apriori expectations of this study

- Poverty Reduction and Government Expenditure are significantly and positively related
- Poverty Reduction and Economic Growth are significantly and positively related
- Government Expenditure and Economic Growth are significantly and positively related
- Poverty Reduction and Natural Resource Rents are significantly and positively related
- Economic Growth and Natural Resource Rents are significantly and positively related

The study period will be from 1981 to 2018. The model is estimated to examine the dynamic interrelationships as well as the speed of adjustment between poverty reduction, government expenditure, and economic growth in Nigeria.

4. RESULTS AND DISCUSSION OF FINDINGS

A unit root test was carried out to check for stationarity among variables, the Johansen Cointegration Test was used to check for cointegration, Block Exogeneity Wald Test was carried out to check for causality amongst variables of the model, and the Vector Error Correction Model was analyzed. The results are presented and discussed as follows;

The Unit Root Tests

The unit root test used in this analysis was the Augmented Dickey Fuller test, and the results are presented below.

Table 4.1: Results of Unit Root Tests

Table 4.1(a): Augmented Dickey Fuller Test at (ADF) Levels

VARIABLES	ADF TEST STATISTICS	95% CRITICAL VALUE OF ADF	ORDER OF INTEGRATION	REMARKS
POVRd	-7.9308	-2.9639	I(0)	Stationary
TGEXP	0.1256	-3.5742	I(0)	Non- stationary
RGDPpc	-2.7140	-3.5683	I(0)	Non stationary
NRENT	-1.7005	-3.5806	I(0)	Non stationary

Table 4.1(b) : Augumented Dickey Fuller Test (ADF) at first Difference

VARIABLES	ADF TEST STATISTICS	95% CRITICAL VALUE OF ADF	ORDER OF INTEGRATION	REMARKS
POVRd	-5.3297	-3.6032	I(1)	Stationary
TGEXP	-10.3433	-3.5742	I(1)	stationary
RGDPpc	-4.3891	-3.5742	I(1)	stationary
NRENT	-7.0241	-3.5806	I(1)	stationary

Table 4.1 presents the results of the unit roots tests performed in E views 8 for all variables in the model at levels and at first difference. POVRD was found to be stationary at levels and first difference, hence we say it is integrated of order zero I(O). TGEXP, RGDPPC and NRENT were found to be non-stationary at levels, however they were all stationary at first difference. They are therefore integrated of order one I(I), hence we reject the null hypothesis of non-stationary among the variables.

Johansen Co-integration Test Results

Haven carried out the Augmented Dickey Fuller tests and established the stationary of the variables at first difference, we proceed to test for long run relationship among the variables using the Johansen co-integration test. This test is used here because of its multivariate nature, and the likelihood of more than one co-integrating relationship.

Table 4.2: Co-integration Test Results

Table 4.2 (a): Johansen Unrestricted Co-Integration

	RANK	**TEST**	**TRACE**	**PROBABILITY**
Hypothesized number of Co-integrating equations (r)	**Eigen values**	**Trace statistics**	**Critical values (0.05)**	**Probability values**
r=0***	0.6108	54.9309	47.8561	0.0094
r≤ 1*	0.4458	27.5587	29.7970	0.0887
r≤ 2	0.2644	10.4380	15.4947	0.2485
r≤ 3	0.0514	1.5303	3.8414	0.2161

Table 4.2 (b): Johansen Unrestricted Co-Integration

Rank Tests: Maximum Eigen Values Statistics

Hypothesized number of co integrating equations (r)	**Eigen Values**	**Trace Statistics**	**Critical Values (0.05)**	**Probability Values**
r=0	0.6108	27.3722	27.5843	0.0532
r≤ 1	0.4458	17.1206	21.1316	0.1664
r≤ 2	0.2644	8.9076	14.2646	0.24939
r≤ 3	0.0514	1.5303	3.8414	0.2161

From table 4.2(a), the trace statistics indicated that there is one co integrating equation at the 0.05 critical levels. However, ignoring the 0.05 critical values, and using the rule of the thumb procedure stated earlier, we can conclude that there are two (2) co integrating equations at the 0.01 and 0.10 level of significance. On the other hand the Maximum Eigen value statistics in table 4.2(b), indicated no co integrating equation(s). However, the evidence of co-integrating equation shows that there exists a long run relationship among the variables, and there is a possibility of the variables converging at equilibrium in the long run.

The VEC Granger Causality/Block Exogeneity Wald Tests Results

After establishing the existence of co-integrating relationship(s) amongst the variables, a VEC Granger causality test was applied. The existence of a stable long run or co integrating relationships amongst the variables therefore implies that the four variables are casually related at least in one direction. The VEC Granger causality Test will show us which variables are causally related and in what direction.

Table 4.3: VEC Granger Causality Block Exogeneity Ward Test Results

Panel 1			
Dependent Variable: D(POVRd)			
Excluded	**Chi sq**	**df**	**Probability**
D(LTGEXP)	12.5320*	2	0.0019
D(LRGDPpc)	5.38672	2	0.0677

D(NRENT)	2.2293	2	0.3280
All	22.2967*	6	0.0011

Panel 2			
Dependent Variable: D(POVRd)			
Excluded	**Chi sq**	**df**	**Probability**
D(LTGEXP)	17.3832*	2	0.0002
D(LRGDPpc)	5.5740	2	0.0616
D(NRENT)	14.6129*	2	0.0007
All	23.2058*	6	0.0007

Panel 3			
Dependent Variable: D(POVRd)			
Excluded	Chi sq	df	Probability
D(LTGEXP)	0.9782	2	0.6132
D(LRGDPpc)	1.9225	2	0.3824
D(NRENT)	2.5928	2	0.2735
All	6.8444	6	0.3355

Panel 4			
Dependent Variable: D(POVRd)			
Excluded	Chi sq	df	Probability
D(LTGEXP)	5.0303	2	0.0809
D(LRGDPpc)	1.2820	2	0.0750
D(NRENT)	1.2820	2	0.5267
All	8.7709	6	0.1869

The Block Exogeneity word test suggests that two of the four variables are not exogenous, while the other two are exogenous. This conclusion was reached using the p values of the joint test for each of the equations of the variables. In panel 1, the probability value of the joint test using POVRD as the dependent variable was less than 0.05, this tells us that POVRD is not exogenous (i.e. factors that affect this variable are contained in the model). TGEXP is also not exogenous as shown in panel 2, having a joint probability value of 0.0007, which is less than 0.05.

However, the case of RGDPpc and NRENT in panel 3 and 4 respectively was different. The joint probability of the variables in panel 3 was greater than 0.05 which led to the conclusion that RGDPpc was exogenous, same goes for NRENT in panel four (4), having a joint probability of 0.1869 which is higher than 0.05 indicating NRENT being exogenous. The test also indicated that we can reject the null hypothesis of excluding the lags of some of the variables in the equations of panel 1 and 2, that is, we reject the null hypothesis of excluding the lags of the variable TGEXP in the POVRd equation, and the variables POVRd and NRENT in the TGREXP equation.

Looking at the area of causality, panel I indicated that a unidirectional causality exists between POVRd and TGEXP, panel 2 showed that there existed a unidirectional granger causality running from TGEXP to POVRd and NRENT, all at the 0.05 level of significance. Panel 3 and 4 however indicated

independent causation amongst variables. Panel 3 indicates independent causation between RGDPpc and other endogenous variables, while panel four (4) indicated independent causation between NRENT and the other variables in the panel.
We therefore conclude that there is a strong evidence for a bi-directional causality between POVRd and TGEXP in Nigeria.

Vector Error Correction Methodology

The Vector Error Correction Methodology was estimated in order to analyze the systematic disequilibrium adjustment process and the short run transmission mechanism among the variables. We use VECM here because the time series are stationary in their first difference I(1), and the variables are co-integrated.
The results are presented in table 4.4 below

Table 4.4: VECM Results
System Equations

Explanatory variables	**D(POVRd)**	**D(LTGEXP)**	**D(LRGDPpc)**	**D(LNRENT)**
Constant	25.3259	0.3133	0.648	-0.0092
	[3.8095]***	[3.5536]***	[2.0948]**	[-0.0719]
D(POVRd(1))	-0.6119	0.01171	-0.0003	0.0098
	[-2.4723]**	[3.5667]***	[-0.02652]	[2.0641]**
D(LTGEXP(-1))	-58.7479	-0.7835	-0.0805	-0.3789
	[-3.3724]***	[-3.3911]***	[-0.9923]	[-1.1239]
D (LRDPpc(-1))	9.2302	1.3106	0.1302	2.0207
	[0.2010]*	[2.1519]**	[0.6087]	[2.2739]**
D(LNRENT(-1))	17.1375	-0.5052	0.0542	-0.332
	[0.2010]	[-3.3007]***	[1.0095]	[-1.4865]*
D(POVRd(-1))	-0.0932	0.0031	-0.0006	0.0034
	[-0.5712]	[1.4757]*	[-0.7964]	[1.0837]
D(LTGEXP(-1))	-46.6101	-0.2071	-0.1066	-0.22402
	[-2.27580]***	[-0.9241]	[-1.3550]*	[-0.7345]
D (LRGDPpc(-2))	-97.9425	0.5675	-0.0045	0.1124
	[-2.3083]	[1.0084]	[-0.0230]	[0.1369]
D (LNRENT(-2))	7.7428	-0.4908	-0.0546	-0.923
	[0.5914]	[-2.8268]***	[-0.8953]	[-3.6427]***
Ecm	-0.6483	-0.0168	-0.0001	-0.0127
	[-2.32796]**	[-4.5707]***	[-0.0252]	[-2.3682]**

Summary Statistics				
	D (POVRd)	**D LTGExp)**	**D (LRGDPpc)**	**D (LNRENT)**
R Squared	0.8562	0.6546	0.2972	0.5129
Adjusted R Squared	0.7844	0.4819	0.0541	0.2694
S.E equation	12.1436	0.161	0.0576	0.235
F-statistics	11.9162	3.7912	0.846	2.1063
Akaike AIC	8.1039	-0.5414	-2.6341	0.2142
Schwarz SC	8.5797	-0.0656	-2.1583	0.6900
Mean Dependent	0.7242	0.1936	0.0285	-0.0375
S.D Dependent	26.1546	0.2237	0.0551	0.2749

Source: Author's computation using Eviews 8.0

The impact of poverty reduction in relation to itself is significant at the 0.05 level of significance with a t ratio of -2.4723. Also, the impact of POVRd in relation to TGEXP is significant at the 0.01% (3.5667) and 0.10 (1.44757) level of significance in lag 1 and 2 respectively with stronger impacts in lag 1. The impact of POVRd on NRENT is significant at the 0.05 level of significance with a t ratio of 2.0641 in lag 1.

The impact of TGEXP on POVRd is significant at the 0.01 level of significance in lags 1 and 2, with a t ratio of -3.3724 and -2.7580 with stronger impacts in lags 1. The impact of TGEXP on itself is significant at the 0.01 level of significance (with t-ratio of -3.3911) in lag one (1). The impact of TGEXP in relation to RGDPpc is significant at the 0.10 level of significance (-1.3550) in lag 2.

RGDPpc was found to have a significant impact of POVRd at the 0.05 level of significance in lag 2 with a t ratio of -2.3083. The impact of RGDPpc on TGEXP was found significant at the 0.05 level of significance (2.1519) in lag 1. The impact of RGDPpc in relation to NRENT was significant at the 0.05 level of significance with a t ratio of 2.2739 in lags 1.

The impact of NRENT is relation to POVRd was found significant at the 0.10 level of significance with a t ratio of 1.4850 in lag 1. Also, the impact of NRENT in relation to TGEXP was found significant at the 0.01 level of significance, with a t-ratio of -3.3007 and -2.8268 in lags 1 and 2 respectively with stronger impacts noticed in lag 1. The impact of NRENT in relation to itself was found significant at the 0.10 (-1.4865), and 0.01 (-3.6427) levels of significance in lags one (1) and two (2) respectively, with stronger impacts in lag 2.

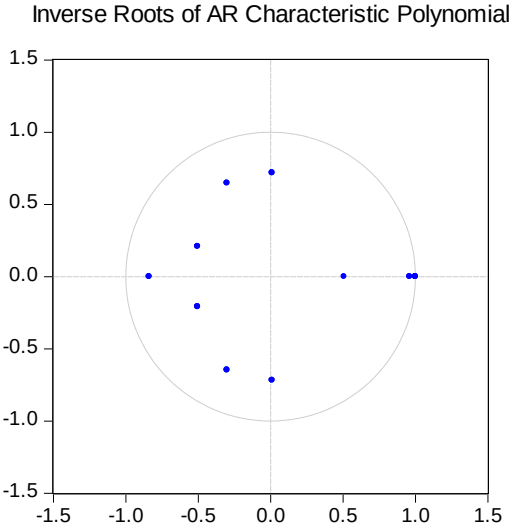
The coefficient of determination (R^2) of 0.85, 0.65, 0.29 and 0.51 in the two lags of the vectors of the variables show that the explanatory variables were able to explain 85% of the systematic variations in POVRd, 65% of the systematic variations in TGEXP, 29% of the systematic variations in RGDPpc, and 51% of systematic variations in NRENT. The f statistics show that the POVRd and TGEXP equations were significant at the 0.01, 0.05 and 0.10 level of significance. NRENT equation was significant at the 0.10 level of significance. However the RGDPpc equation was not found significant.

Of great relevance in the use of VECM is the speed of adjustment of the economy to changes in the variables shown by the ECM coefficient. The ECM coefficient of POVRd is -0.6483, rightly signed and significant at the 0.05 level of significance, it also passed the requirement of the ECM value being between zero (0) and one (1) (in absolute terms). The ECM of POVRd tells us that the economy adjusts to changes in POVRd by about 64.8% in a given period, showing that restoration to equilibrium in the case of temporary disequilibrium in the case of temporary disequilibrium is very reasonable.

The TGEXP has an adjustment co-efficient of -0.0168, which was rightly signed, telling us that the economy adjusts to changes in TGEXP by about 1.68% in a given period, though significant, the speed of adjustment to equilibrium in a case of temporary disequilibrium is very slow. The adjustment coefficient of RGDPpc was -0.0001 indicating that the economy adjusts to changes in RGDPpc by 0.01% in a given period, the ECM was rightly signed with a very low speed of adjustment, however,

it wasn't significant as required by theory. On the other hand, NRENT had an ECM value of -0.0127, significant at the 0.05 level of significance, telling us that the economy adjusts to changes in NRENT by 1.27%. The magnitude of the absolute value of the ECM coefficient of NRENT indicates that in the event of a displacement from equilibrium, the speed of restoration to equilibrium is very slow.

4.5 Inverse Roots Of AR Characteristic Polynomial



The figure above reports the inverse roots of the characteristics AR polynomial. This is done to check the state of impulse responses in the estimated model. The above shows the estimated VEC is dynamically stable, since all inverted roots fall within the circle, with just one exactly on the circle, with just one exactly on the circle, showing that one root is equal to one. This result shows that the impulse responses are good. The model is stable, and hence it will be useful for policy recommendations and simulations.

Results of Forecast Error Variance Decomposition (FEVDS)

The forecast error variance decomposition is used to aid the interpretation of a Vector Auto Regression (VAR) model, the variance decomposition indicates the amount of information each variable contributes to the other variables in the auto regression. In this study, the variance decomposition was generated over ten periods forecasting horizons as shown in table 4.6 below.

Table 4.6: Forecast Error Decomposition Estimates (%)

Explanatory Variables						
Variables	**Horizons**	**POVRd**	**TGEXP**	**RGDPpc**	**NRENT**	**Standard Errors**
	1	100.000	0.0000	0.0000	0.0000	12.1436
	2	59.6199	29.1856	0.4439	10.7504	15.7927
	3	56.3252	20.0018	10.1391	13.5338	19.0946
	4	52.4221	24.1731	10.4002	13.0044	19.9788
POVRd	5	51.2066	21.8612	13.787	13.1450	21.4328
	6	48.5163	21.9709	13.0818	16.4308	22.0359
	7	48.4756	21.0820	12.5169	17.9254	22.883
	8	46.6776	22.3360	12.1171	18.8691	23.3178

	9	45.6923	21.5395	12.2808	20.4873	23.7968
	10	44.0825	21.6250	12.1360	22.1563	24.2275
	1	16.3348	76.2764	0.0397	7.3488	0.1610
	2	22.0619	56.8210	15.7027	5.4142	0.1892
	3	39.3618	47.474	10.4550	2.7085	0.2677
TGExp	4	44.9207	40.8182	11.6483	2.6126	0.3437
	5	47.8260	32.8727	17.4212	1.8799	0.4368
	6	51.7556	27.8464	19.0193	1.3785	0.5363
	7	53.4348	25.4356	20.0394	1.0900	0.6456
	8	54.1869	23.0709	21.8176	0.9245	0.7611
	9	55.0092	21.052	23.1426	0.7960	0.8822
	10	55.5443	19.7608	23.9972	0.6975	1.0078
	1	1.6850	0.0000	98.3149	0.0000	0.0565
RGDPpc	2	0.9839	1.7186	96.0246	1.2727	0.0869
	3	1.5786	3.6830	93.7900	0.9483	0.1105
	4	3.6796	3.2353	91.6329	1.4521	0.1257
	5	6.5217	4.0464	88.0971	1.3347	0.1403
	6	10.5821	4.8601	83.3894	1.1681	0.1538
	7	15.0352	6.1499	77.6507	1.1640	0.1674
	8	20.5107	7.1415	71.0857	1.2619	0.1802
	9	26.1215	8.1656	64.4531	1.2597	0.1932
	10	32.0142	9.1995	57.5656	1.2205	0.2075
	1	5.9910	0.0000	0.0956	93.9133	0.2350
	2	4.8509	2.8313	12.6879	79.6297	0.3480
	3	8.2515	3.8153	18.2762	69.6569	0.3880
	4	14.0466	3.3218	16.8813	65.7501	0.4225
NRENT	5	16.2982	2.7470	17.5870	63.3675	0.4807
	6	18.5526	2.2453	21.6631	57.5387	0.5470
	7	22.4147	1.8594	23.1139	52.6118	0.6014
	8	25.6545	1.7699	23.9198	48.6556	0.6569
	9	27.8939	1.5884	25.4394	45.0781	0.7195
	10	30.1644	1.4136	26.7875	41.6342	0.7853

Source: Author's computation using Eviews 8.0

The table above shows that shocks to POVRd explained about 100% in the first horizon to 44.08% in the 10th horizon of variations in itself, showing a decline from period one to period ten. Shocks to TGEXP showed irregular movements in no particular direction, moving upward and downwards at each forecast horizon, explaining a range of about 0.00% in horizon 1 to 29.18% in horizon 2 of variations in POVRd. RGDPpc explained about 0.00% in the first horizon to about 13.7870 in horizon 5, the FEVd table shows us that there was an increase in its explanatory ability from period 1 to 5, but this fell after period 5 to period 10.

Shocks to NRENT explained a range of 0.00% in horizon 1 to 22.15% in horizon 10 of the variations in POVRd with its explanatory ability rising all through the forecast period.

Taking a look at the next set of forecast horizons, shocks to POVRd, explained about 16.33% in horizon 1 to 55.54% in horizon 10 of variations in TGEXP, rising all through the forecast period. On the other hand, shocks of TGEXP explained about 19.76% in horizon 10 to 76.27% in horizon 1 (one) of variations in itself, falling at each forecast horizon.

Shocks to RGDPpc explained a range of 0.03% in horizon one to 23.99% in horizon 10 of variations in TGEXP, rising throughout the forecast period.
Shocks of NRENT explained about 0.69% in horizon 10 to about 7.34% in horizon 1 of variations in TGEXP, falling all through the forecast period. shocks of POVRd explained about 0.98% in horizon 2 to 32.01% in horizon 10 of variations in RGDPpc, showing a fall from period one (1) in period two (2), and subsequent increases to horizon ten (10).
Shocks to TGEXP explained about 0.00% in horizon 1 to 9.19% in the 10th horizon, increasing throughout the forecast period.
Shocks to RGDPpc explained about 57.56% in the 10th horizon to 98.31% in the 1st horizon, falling throughout the forecast period. Shocks of NRENT explained about 0.00% in horizon 1 to 1.45% in horizon 4 of variations in RGDPpc, having various increases and decreases in no particular order throughout the forecast period. Shocks of POVRd explained about 4.85% in horizon 2 to 30.16% in horizon 10 of variations in NRENT, increasing all through the forecast period.
Shocks of POVRd explained about 4.85% in horizon 2 to 30.16% in horizon 10 of variations in NRENT, increasing all through the forecast period. Shocks of TGEXP, explained about 0.00% in the 1st horizon to 3.81% in the 3rd horizon of variations in NRENT, showing increases through horizon 1 to 3, and continuous decrease in subsequent horizons. Shocks to RGDPpc explained about 0.09% in horizon 1 to 26.78% in horizon 10 of variations in NRENT, increasing at each forecast horizon of the forecast period. Shocks to NRENT explained a range of 41.63% in horizon 10 to 93.91% in horizon 1 of variations in itself, with its explanatory ability falling throughout the forecast period.
In order to conclude on which explanatory variables explained best the variations in the dependent variables, we succinctly review the results of the FEVO.
Shocks to POVRd explained about 44.08% to 100.00% of variations in itself, shocks to TGEXP explained about 0.00% to 29.18% of variations in POVRd. shocks to RGDPpc explained about 0.00% to 13.78% of variations in POVRd, and shocks to NRENT explained a range of about 0.00% to 22.15% of variations in POVRd, leading us to the conclusion that apart from POVRd (which is both explanatory and dependent), TGEXP can be said to have most significantly accounted for the variations in POVRd, closely followed by NRENT, with RGDPpc accounting the least.
Shocks to POVRd explained about 16.33% to 55.54% of variations in TGEXP. Shocks to TGEXP explained about 19.76% to 76.27% of variations in itself, shocks to RGDPpc explained about 0.03% to 23.99% of variations in TGEXP, while shocks to NRENT explained about 0.69% to 7.34% of variations in TGEXP. Excluding TGEXP, we can conclude that shocks to POVRd predominantly explained the variations TGEXP, followed by RGDPpc, with NRENT affecting TGEXP the least.
Shocks to POVRd explained about 0.98% to 32.01% of variations in RGDPpc, shocks to TGEXP explained about 0.00% to 9.19% of variations in RGDPpc, RGDPpc explained about 57.56% to 98.13% of variations in itself, and NRENT explained a range of 0.00% to 1.45% of variations in RGDPpc. We therefore conclude that POVRd predominantly accounted for the variations in RGDPpc.
Shocks to POVRd explained about 4.85% to 30.16% of variations in NRENT. Shocks to TGEXP explained about 0.00% to 3.81% of variations in NRENT shocks to RGDPpc explained about 0.09% to 26.78% of variations in NRENT, while shocks to NRENT explained a range of 41.63% to 93.91% of variations in itself. We can conclude here therefore that RGDPpc most significantly explains the variations in NRENT, closely followed by POVRd, with TGEXP accounting the least.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The Paper evaluated if there exists a bi-directional causal relationship between poverty reduction, government expenditure and economic growth in Nigeria using the VEC Granger Causality Test, Vector Error Correction Model, and the Forecast Error Variance Decomposition. The overall system of the VEC Causality test showed evidence for a bi–directional relationship between poverty reduction

and total government expenditure, and a predominant accountability for changes in poverty reduction was attributed to total government expenditure. Findings of the study have the following implications;

- The unit root test revealed that the data structure of Nigeria has greatly improved, and will most likely give trusted results when used for empirical analysis.
- The negative sign of Natural Resource Rents (NRENT), in the correlation matrix, which is contrary to a priori expectation, tells us that increases in NRENT, will not cause TGEXP, POVRd, or RGDPpc to increase, but rather, it will cause them to fall. This could be attributed to the presence of corruption and misappropriation of funds in the country.
- The evidence of a bi-directional causation between TGEXP and POVRd shows that government spending, when directed to the right issues, will bring about reduction in poverty. However, the non-causality between RGDP and NRENT with each other, and other variables used in the model tells us that economic growth has not led to increases in any of the variables in the model (TGEXP, POVRd, NRENT).
- The speed of adjustment of POVRd is quite impressive, however, the other variables had very slow and unimpressive speed of adjustment, hence the ability of the Nigerian economy to respond to changes in Total Government Expenditure, Economic Growth, and Natural resource rent is weak.
- The FEVD tells us that TGEXP most significantly accounted for variations in POVRd, and POVRd most significantly explained the variations in Total Government Expenditure, and Economic growth, while RGDPpc predominantly accounted for variations in Natural resource rent (NRENT) in the country.

The Study therefore recommends the following;

- Increased total government expenditure and proper disbursement of funds to various sectors in such a way that would bring about poverty reduction and economic growth.
- Pro-poor and pro-growth policies should be adopted.
- Better and achievable poverty alleviation programmes and schemes that are achievable and suite the Nigerian situation should be set up.
- Investment in key sectors of the economy such as the agricultural sector, education sector, and health sector to bring about reduction in poverty and economic growth.
- More and better employment opportunities
- Transparent and corruption free governance

.

REFERENCES

Adenikinju A., 2005. Analysis of the cost of Infrastructure failures in developing economy: The case of the electricity sector in Nigeria. AERC research paper 148. African Research Consortium, Nairobi. The Regal Press Kenya Limited, Nairobi Kenya.

Anyanwu, J.C. and Oaikhenan, H.E. (1995). Modern Macroeconomics: Theory and Applications in Nigeria. Joanee Educational Publishers Limited, Onitsha, Nigeria.

Bhatia H.L. (2008). Public Finance 26th Edition. Vikas Publishing House PVT LTD. Pages 218-246. New Delhi.

Brown, C. V., and Jackson, P.M. (1990). Public Sector Economics 4th Edition. Basil Blackwell Publishers Oxford UK and Cambridge USA.

Central Bank of Nigeria (2014). Annual Economic Report

Central Bank of Nigeria (2015). Annual Economic Report

Chipaumire, G., Ngirande, H., Method, M. & Ruswa, Y. (2014). The Impact of Governemnt spendiing on Economic Growth: Case South Africa. Mediterranean Journal of Social Sciences MCSER Publishing, Rome- Italy. Volume 5, No1 page 109-118.

Connor, S., and Simpson. G. (2011). Social Policy for Social Welfare Professionals. Policy Press.

Dada, J. T. & Fanowopo O. (2020). Economic Growth and Poverty Reduction in Nigeria: The Role of Institutions. Ilorin Journal of Economic Policy Vol. 7, No. 1, pp 1-15.

Edame, G.E. and Fonta W.M. (2014). The Impact of Government Expenditure on Infrastructure in Nigeria: A Co-integrating and Error Correction Specification. International ournal of African and Asian Studies. Volume 3.

Ekpung E.G., (2014). Trends Analysis of Public Expenditure on Infrastructure and Economic Growth in Nigeria. International Journal of Asian Social Science. Volume 4, Issue 4. Pages 480-491.

Ijaiya G. T., Ijaiya M.A, Bello R. A. & Ajayi M. A. (2011). Economic Growth and Poverty Reduction in Nigeria. International Journal of Business and Social Sciences vol. 2 No. 15; August 2011.

Ju-Huang, C. (2006). Government expenditures in China and Taiwan: Do they follow Wagner`s law? Journal of economic development, 31(2)139-148.

Keynes, J. M. (1936). The general Theory of Employment, Interest and Money. Harcourt: Brace and co, New York.

Mehmood, R. and Sadiq, S. (2010). The relationship between government expenditure and poverty: A Cointegration Analysis. Romanian Journal of Fiscal policy. Volume 1, issue page 29 – 37.

Okeke, B.C. (2014). Impact of Public Sector Spending on Health and Education Outcomes in Nigeria.

Okulegu B.E. (2013). Government Spending and Poverty reduction in Nigeria's Economic Growth. International Journal of Social Sciences and Humanities Reviews vol. 4 No. 1 May, 2013 page 103- 113.

Osinubi, T.S. (2005). Maccroeconometric Analysis of growth, unemployment and poverty in Nigeria. Pakistan Economic and Social Review Volume XLIII, No.2 pp. 249-269.

Peacock, A.T. and Wiseman, J. (1967). The Growth of Public Expenditure in the United Kingdom. Revised edition, London: George Allen and Unwin, Ltd.

Romer, D. (2012). Advanced Macroeconomics. McGraw Hill Advanced Series in Economics. Fourth Edition, pp 10, 102.

Supramako, M. (2002). Ekonomi Publik: Untuk Keu an gan dan Pernbangunam Daerah. Andi. Yogyakarta.

Todaro, M.P. (1985). Economic Development in the Third World. Third Edition, Longman Publishing Group.

Udoka, C.O. and Anyingang, R.A. (2015). The Effect of Public Expenditure on Growth and Development of Nigerian Economy (1980-2012). International Review of Management and Business Research. Volume 4. Issue 3 page 823 – 833.

UNICEF (2011). United Nations Children Fund.

United Nations (1998). Statement of Commitment for Action to Eradicate Poverty Adopted by Administrative Committee on Co-ordination (ACC). Press Release EcoSoc/5759.

World Bank Development Report (2000). New York and Washington: Oxford University Press and World Bank.

World Bank (2010). Policy Research Working Paper WPS 5284

United Nations (1998). Statement of Commitment for Action to Eradicate Poverty Adopted by Administrative Committee on Co-ordination (ACC). Press Release EcoSoc/5759.