Public Spending in Education Sector and Poverty Level in Nigeria (1980 – 2015)

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Abstract
This study examined the impact of government spending in education on poverty rate in Nigeria. Data were sourced, covering from 1980 to 2015 from CBN, World Bank, and UNESCO which represent the total annual values of the variables of study. Based on international best practices on public spending in education, UNESCO proposed that developing countries that want to develop should increase their educational funding (to at least 26% of a nation's budget) on the educational sector. The study employed statistical technique of vector autoregressive (VAR) analysis. Pre-estimation tests (i.e. unit root and co-integration test) and post-estimation test (i.e. granger causality test) were used to investigate the linkage relationship between government expenditure on education, educational outcome, and poverty rate in Nigeria. Four vector autoregressive equations where estimated as total government spending on education was disaggregated into recurrent and capital expenditure; and educational outcome was also disaggregated into primary school and tertiary enrolment rate too. The findings revealed that government recurrent expenditure on education did not improve primary school enrolment rate and reduce poverty rate in Nigeria. Government capital expenditure on education improved primary school enrolment rate but not reduce poverty rate. Both government recurrent and capital expenditure on education combined significantly with tertiary enrolment rate to granger cause poverty rate in Nigeria between 1980 and 2015. The study therefore recommended, among others, the implementation of an expansionary fiscal policy on education financing to meet the United Nation's 26% benchmark and improve quality of education and enrolment rate capable of producing entrepreneurs in the society that are not "half-baked" graduates who only wait for blue collar jobs.

Keywords: *Public spending, Poverty, Education, Vector Autoregression (VAR*)

Introduction

There has been wide spread debate among scholars in Nigeria over the relationship between public spending in the education sector and poverty rate. Education has been accepted as a tool to enrich the human capacity development of a country's citizenry all over the world

Education makes one useful to him/herself, the society and the world at large. One who is educated will be easy to lead but difficult to enslave. Education does more than imparting knowledge and skills. It transforms the human beings behavioural patterns (Ebong, 2006). It is a key development index and plays complementary role for overall individual, social and national development. It is a fact that education gives its receiver an avenue to contribute to the growth of the society. According to Orubite, Olele, Kemjika, Abraham and Adekola (2017: 181), "The common belief that education makes a man, draws him out from the Hobbesian 'state of nature' to civility, and develops his innate capacities for a productive life is at the basis of manpower planning". Ige (2016), sees it as an economic investment that raises the quality of life, improves health and productivity in the market and non-market world, increases individual's access to paid employment, as well as facilitates social and political participation of an individual in the development of his/her nation.

However, despite her richness in human and material resources, Nigeria is still classified as one of the poorest countries in the world. Nigerians' poverty level from 1980 to 1986 are as follows: 27.2, 30, 34, 37, 41 and 46.3, respectively. Since independence, various governments have been performing in the allocation of public expenditure into various sectors of the economy. The total budgetary allocation has equally been on the increase yearly. Public spending represents the yearly expenditure by the federal government of a country to achieve some macro-economic objective which may include, increase in human capital development in education, resources, poverty reduction, and increase in national productivity, etc. The importance of public spending in the process of human development is well recognized. Education itself does not only provide a better quality of life for every citizen of any nation, but also have positive effect on the economic growth of a country. The provision of education in any nation is the key element (instrument) of a policy to promote broad-based economic growth and there is no doubt that investment in education (human capital) can contribute significantly to global competitiveness. It had been asserted that (Todaro and Smith, 2009), a well-educated population has longer life expectancy and low mortality rate.

The National Bureau of Statistics (2012) reported that poverty has risen in Nigeria with almost 100 million people living on less than $1 per day, despite the economic growth. The Federal Government of Nigeria has spent the following billions of Naira on education in the following years from its successive budget - 1.5 in 1980, 2.29 in 1990, 12.73 in 1995, 67.57 in 2000, 94.42 in 2005, 172.99 in 2010, 350.57 in 2012 and 373.50 in 2014. Within these periods, poverty level has been on the increase. For instance, in 1980 it was 27.2% and increased to 46.3% in 1985, it reduced slightly to 43.9% in 1990. In 1995, it rose to 59%, while in 2000 it rose to 70% in 2005, it was 51.6% and 2010 – 2012 it increased to 60.9% (CBN, 2011).
Despite the increase in the budgetary allocation in education by the various administrations, the incidence of poverty still remains a mirage in Nigeria. Therefore, this study is geared towards examining the relationship between public spending in education sector and poverty level in Nigeria from 1980 to 2015.

Objectives of the Study

The following objectives guided this study:

i. To establish the relationship between government recurrent expenditure on education, primary school enrolment rate and poverty rate in Nigeria.

ii. Find out the relationship between government capital expenditure on education, primary school enrolment rate and poverty rate in Nigeria.

iii. Ascertain the relationship between government recurrent expenditure on education, tertiary school enrolment rate and poverty rate in Nigeria.

iv. Determine relationship between government capital expenditure on education, primary school enrolment rate and poverty rate in Nigeria.

Research Hypotheses

H01: There is no significant relationship between government recurrent expenditure on education, primary school enrolment rate and poverty rate in Nigeria.

H02: There is no significant relationship between government capital expenditure on education, primary school enrolment rate and poverty rate in Nigeria.

H03: There is no significant relationship between government recurrent expenditure on education, tertiary school enrolment rate and poverty rate in Nigeria.

H04: There is no significant relationship between government capital expenditure on education, tertiary school enrolment rate and poverty rate in Nigeria.

Literature Review

Theoretical Framework

The Theory of Human Capital

Human Capital. Economists and historians commonly recognize British economists Sir William Petty (1623-1687) and Adam Smith (1723-1790) as the primary cultivators of human capital theory, (Angela, 2009:2). Petty's recognition is from his book titled Treatise of Taxes and Contributions (1662). Petty x-rayed the states' role in the economy and looked into the value of labour in the productive process. Adam Smith is continuously given the credit with establishing the fundamentals of the economics of human capital (Angela, 2009). In Smith (1776) "The Wealth of Nations", he narrated that "The main cause of prosperity was increasing division of labour." Smith is widely regarded as the first to make a connection between the skill of the worker and higher wage levels. (Becker, 1992: 23).

Modern economists call Smith's insight the theory of "Compensating Wage Differentials" (Rosen 1986). Compensating differential is a term used in economics to explain the relationship between the wage rate and undesirable attributes of a particular job. A Compensating Wage Differential is an equalizing force. The additional amount of pay that a worker must be offered in order to encourage them to accept an undesirable job is a compensating factor. (Rosen 1986). English philosophers John Locke (1632-1704); John Stuart Mill (1806-1873) and German social theorist Karl Marx (1818-1883) all argued that training, not natural ability was key to understanding wage differentials. (Becker 1993).

Human Capital theory resurged in the 1960's primarily through the work of American economists Theodore Schultz (1902-1998) and Gary Becker (1930s). During this period, economists began making tangible connections between education and its impact on the ability of humans to earn higher wages. Schultz, a Nobel prize-winning economist is credited with establishing the term "human capital". (Becker 2006). In his 1958 paper, "The Emerging Economic Scene and Its Relation to High School Education", Schultz was the first to write about the connections between education and productivity. Schultz identified people as the source of the economic growth when other economists were attributing national growth to improvements in technology (Fitz-enz, 2000). Schultz argued that traditional economics did not correctly calculate or consider the value of human knowledge. Jac Fitz-enz (2000),
'Consider all human abilities to be either innate or acquired. Every person is born with a particular set of genes, which determines his innate ability. Attributes of acquired population quality, which are valuable and can be augmented by appropriate investment, will be treated as human capital. (p24)'

What he meant when he said "Attributes of acquired population quality, which are valuable and can be augmented by appropriate investment, will be treated as human capital" is that an increased level of valuable population quality can be acquired through investment in humans, these valuable attributes in human can be called human capital.

According to Angela (2009: 10), "human capital development theory rejected the simplistic assumption of homogenous labour and centered attention of the differentiation of the labour force". This implies that different people with different natural endowments should be scientifically developed through education and training to harness their full potentials for the individual benefits and the overall benefit of the national economy. It has been proven by different studies that the higher the educational attainments of an individual, the better paid that individual will receive in his/her work place, ceteris paribus. The Theory of Human Capital simply states that investment in the development of humans in health and education/training will make them more productive, produce more capital than that of physical capital, thus the term "Human Capital". This is why the researcher adopted it as the theoretical frame work for this study. The researcher believes that investment in humans in the form of education/training help the recipients escape the strongholds of poverty, stimulate productive capacities for their personal benefits and the overall development of the state.

The concept of Human Capital has gained increasing awareness among our intellectuals and in academics. It is as a result of its relevance to the transformation of a less developed economy, as well as to a developed one. The theory of human capital refers to the process of acquiring and increasing the number of persons who have the skills, education and experience which are critical for the economic and political development of a country. It is thus, associated with investment in man and his development as a creative and productive resource (Jhingan, 2008: 387). According to Ebong (2006: 9 - 17), Human Capital is made up of human beings that are made more productive because they are educated and trained. Human capital simply means the required stock of skills necessary to operate the physical capital that will in turn lead to increase in output. Therefore, expenditure on education or industrial training, which improves the skills of labour force is just as much a form of investment as machines, factories, roads and bridges. She noted that economy depended on an adequate supply of educated manpower. In her view, the theory of Human Capital gives the conceptual framework to enhance the allocation of resources to education in the bid to increase the productive manpower of the nation.

Human capital is therefore needed to staff new and expanding government services, to introduce new and better system of land use and new methods of agriculture, to develop new means of communication, to carry forward industrialization, and to build the educational system. Jhingan (2008), noted that innovation or the process of change from static or traditional society, requires very large doses of strategic human capital. In a developing nation like Nigeria, this can effectively be achieved by the right kind of education, through the governments' adequate commitment in its investment in education. Then, the country will not only achieve economic growth, but reduce poverty and actualize authocentric development. This is why Jaijeoba (2015), noted that natural and capital resources are passive factors of production, while the active factors of production are human factors. This implies that no matter the level of technological equipment or physical capital, volume of money and abundance of natural resources that a country poses, if it does not have "educated minds", such a country will not achieve sustainable development. It is in recognition of this vital fact and the macroeconomic benefits of investment in human capital that Ibrahim (2016: 12) stated that "for Nigeria to improve its human resources capacity, it must embark on successive investment in the health and education sectors". Also, according to National Human Development 2016 by

United Nations Development Programme (UNDP), the fundamental precondition for sustainable development is empowerment of the people, referring to their education. The report stated that, "by educating the people, the main barrier to human development; the human mind, can be concared/overcomed". p 19.

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H03: There is no significant relationship between government recurrent expenditure on education, tertiary school enrolment rate and poverty rate in Nigeria.

H04: There is no significant relationship between government capital expenditure on education, tertiary school enrolment rate and poverty rate in Nigeria.

From this stand point, the researcher pin pointed the merits of investment on education, which is human capital development as follows:

- People with more education/training earn higher income than does with less education/training, all things being equal (Ebong, 2006: 9). In support of this fact, Mulongo (2012), asserted that in aggregate, expenditure on education and health on the people will have an effect on the overall productivity in form of more earnings to the individuals and the state/economy at large.
- There need to be an investment on individuals to improve the effective use of their God given potentials, hence to increase their productivity (Ebong, 2006: 13).
- The extent to which any nation will develop is dependent on their capital accumulation and the quality of a nation's labour input depends on the level of education and training they have received.
- The macroeconomic benefits are not just in terms of higher productivity, it empowers the people to advance their interest and resist exploitation (Eyben in Mulongo, 2012). People who are educated are more aware of how to avoid health risks and to live longer, exhibit better consumption/savings habits, less criminal behavior, greater political participation and stronger social cohesion.

In recognition of the micro, macro and external benefits on an educated citizenry, the Nigerian government is urged to take investment on quality education as a necessary prerogative to eradicate poverty and the development of the country at large.

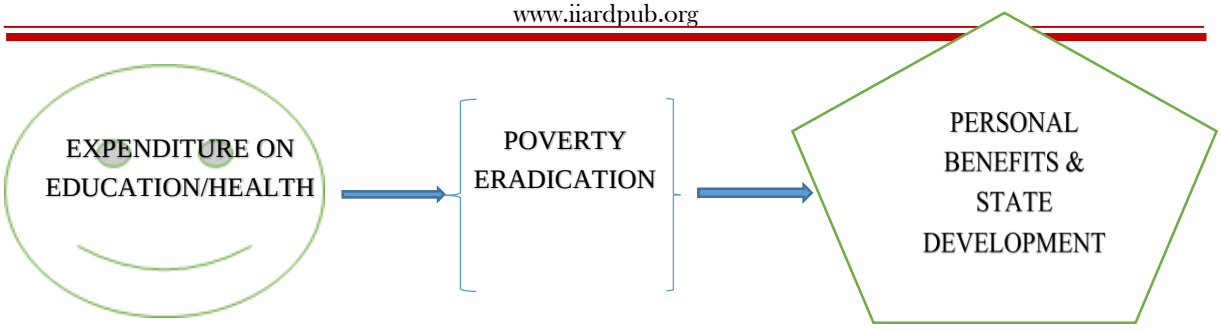

Fig. 2.1: Diagrammatic flow showing the link between investment in education and poverty eradication. Source: Constructed by the researcher.

From the diagram above (fig. 2.1), the researcher attempts to diagrammatically show a relationship between expenditure on education and poverty reduction. Based on the principle of human capital development, which is investment in training, education and health of the individuals that constitute the labour force. As states increase their expenditure in these areas, the labour will become better trained to produce and reproduce more effectively and efficiently. The increase in skill and training through education will attract more earnings. Those, who were unemployable due to lack of productive skill will become equipped with productive knowledge for employment. The circular flow of this singular act of increased expenditure in education at the long run will be increased income, well behaved citizenry, more informed sociopolitical class, poverty reduction as well as the overall development of the state at large.

More so, the theory of Human Capital Development stipulates that investment in humans for higher productivity should be in form of education/training and health. This is because, a healthy person will be in a better sate to put in his/her best than someone who is not healthy, all things being equal. However, in this study, investment in health and its effect on poverty reduction is held constant, therefore need for adequate (empirical) literature review on the aspect of health in human capital development.

Empirical Literature Review

Anthonia (2012) examined the "Impact of Education on Economic Growth using Primary and Secondary Annual Data ranging from 1985 to 2007". The result revealed that only recurrent expenditure has significant effects on economic growth as the academic qualifications of teachers also have significant impact on students' academic performance. The study recommended among others that the government should increase its expenditure on education especially, the capital expenditure, while a good salary scheme with other incentives for teachers' motivation will have to be put in place.

Obi and Obi (2014) studied the Impact of Education Expenditure on Economic Growth as a Means of Achieving the Desired Socio-economic Change needed in Nigeria. Time series data from 1981 to 2012 were employed. The Johansen's co-integration analysis and ordinary least square (OLS) econometric techniques were the statistical tool applied to analyze the relationship between Gross Domestic Product (GDP) and recurrent education expenditure. The result indicated a positive relationship between education expenditure and economic growth, but a long run relationship does not exist over the period under study. The study observed that this puzzle is attributable to labour market distortions, redundancy of the workforce, industrial dispute and job discontinuities as well as leakages in the Nigerian society such as brain drain, among others. It invariably concluded that educational sector in Nigeria has not performed as expected. The half-baked graduates, cultism and the high rate at which people drop-out of schools is alarming. The study therefore suggested total review and overhauling of the

education system through efficient use of public resources, good governance, accountability and transparency.

Ernest (2014), investigated the "Likely Impact of Government Expenditure Policy on Education and Poverty Reduction in Nigeria". An integrated sequential dynamic computable general equilibrium (CGE) model was employed to simulate the potential impact of increase in government expenditure on education in Nigeria. The result revealed that it will be extremely difficult for Nigeria to achieve the MDG (millennium development goals) target, in terms of education and poverty reduction by the year 2015, because as the policy was measured in the analysis, it could not meet the goal. The MDG target for Nigeria in terms of poverty reduction is to reduce the percentage of population living in relative poverty from 54.4% in 2004 to 21.4% by 2015. The study concluded that increase in education investment portfolio will help the country to meet MDG target and reduce poverty level.

Ige (2016), reviewed the "Trends of Financial Allocation to the Education Sector, from Pre independence to the Present Moment." The review showed low allocation. The trend also did not meet the 26% of total annual budget as recommended by United Nations Educational Scientific and Cultural Organization (UNESCO). Political influences and poor accountability were also identified as the major problems of allocations to education.

Oladeji and Abiola (2000) asserted in their findings that poverty alleviation in contemporary Nigeria requires both economic policy and educational reforms in order to enhance the human capital of the poor in particular, the priorities for educational reforms should be in the areas of basic education, vocational education and training. Their work considered "Poverty alleviation with economic growth" strategy as long term solution i.e the latter constitute an immediate and direct shot at the poverty itself. Bello and Rosian (2010) used a panel data analysis consisting of model; fixed-effect, random-effects and weighted least square and found that a unit increase in per capita GDP leads to 0.6 percent increase in poverty. A unit increase in MDG expenditure leads to 11 .56 units increase in relative poverty in the pooled model and this is significant at 95 percent level. Considering GDP and population as independent variables against rate of poverty as dependent variable; the R2 is 0.9 in the pooled model means the independent variables account for 90 percent total variation in the dependent variable (rate of poverty) in this case. They thereby concluded that economic growth and MDG spending has not substantially reduced poverty over the sample period.

Method of Study

Research Design

Research design has to do with the development of strategies for finding missing link which when discovered will help in the solution of identified problems.

Model Specification

An economic model can be referred to as a simplification of the real world in which essential features of an economic relationship or set of relationship are explained using diagrams, words and often mathematics (Powell, Hausman and Newey, 1991).

The following data starting from 1980 to 2015 were used in this study:

i. Poverty Rate;
ii. Government Recurrent Expenditure on Education;
iii. Government Capital Social and Community Service on Education;
iv. Tertiary School Enrolment; and
v. Primary School Enrolment;

The functional, mathematical, and econometric specifications are provided as follows:

Functional Specification

i. POV = f (PSE, GREE) 3.1
ii. POV = f (PSE, GCSCSE) 3.2
iii. POV = f (TSE, GREE) 3.3
iv. POV = f (TSE, GCSCSE) 3.4

Vector Autoregressive (VAR) Econometric Specifications

See Appendix II

Where

i. POV = Poverty;
ii. GREE = Government Recurrent Expenditure on Education;
iii. GCSCSE = Government Capital Social and Community Service on Education;
iv. PSE = Primary School Enrolment; and
v. TSE = Tertiary Education Enrollment

Data collection and source.

Annual time series data is mainly used for this study. The data was collected from secondary sources and the period covered is from 1980-2015. Some of the sources include World Bank Data, CBN Statistical Bulletin and Annual Report and Statement of Accounts and National Bureau of Statistics (NBS).

Method of Data analysis

The econometric technique of vector autoregressive (VAR) analysis was adopted to estimate the relationship between the dependent and independent variables used in this study. Test of stationarity (i.e. unit root test), co-integration test, VAR model and granger causality were used to investigate the effect of government expenditure on education and poverty reduction in Nigeria.

Unit Root Test

The examination of time series properties of economic data is now a common practice and serves as a guide to subsequent multivariate modeling and inference. When we discover that the variables are integrated of order greater than or equal to one, then there is every possibility that these variables are co-integrated. We will employ the Augmented Dickey-fuller test (ADF) to test for the stationarity of our data at level and at difference. The model is stated below:

$y_{t} = \mu + P_{yt} - 1 + \varepsilon t$.....(3)

Where μ and P are parameters εt are assumed to be white noise, y is a stationary series.

If $-1<P<1$. If P = 1, y is a non-stationary series.

If the process is started at some point, the variance of y increases steadily with time and goes to infinity. If the absolute value of P > 1, the series is explosive. Therefore, the hypothesis of stationary series can be evaluated by testing whether the absolute value of P is strictly <1. The simple unit root test described above is valid because the series is AR (I) process. If the series is correlated at higher order lags, the assumption of white noise disturbances is violated.

Co-integration Test

This study used the co-integration test to investigate if the variables included in the model have long run relationship. If the variables we were using in this research work are found to be co-integrated, it will prove statistical evidence for the existence of a long term relationship. We employed the maximum likelihood test procedure as established by Johansen and Juselius (1990).

Vector Autoregressive (VAR)

Mentioned in the preceding sub-section, the response of expenditure on education, which can lead to poverty reduction and other selected related variables of indicators is analysed through the use of an unrestricted multivariate VAR model. This model was first advocated by Sims (1980), and has today become popular among economists for studies like these as it is a relatively easy model to use when analysing multivariate time series (Luetkepohl, 2011). The variables treated in the VAR-model are all seen as endogenous, with no imposed structural relationships or restrictions. Through a multivariate framework, this model captures how changes in a particular variable are related to changes in its own lags, as well as to changes in other variables and their lags. Therefore, before implementing a VAR, the optimal lag length need to be determined.

Results and Interpretation

This section presents and interprets the results. Furthermore, the results for each model were presented and interpreted under the following headings:

a) Test of Stationarity;
b) Cointegration Test;
c) Vector Autoregressive Model Estimation and Testing.

Poverty Model I

This model investigated the impact of government recurrent expenditure on education on poverty reduction in Nigeria. To achieve this, the study estimated a VAR model that includes government recurrent expenditure on education, primary school enrolment rate and poverty rate.

4.1.1 Stationarity Tests

Due to the problem of unit root that is evident in most time series, this research conducted unit root tests to ascertain the stationarity of time series collected and used in the investigation of the dynamic relationship between government recurrent expenditure on education, primary school enrolment rate and poverty reduction in Nigeria. Tables 4.1 and 4.2 shows the unit root tests (i.e. Augmented Dickey-Fuller and Phillips-Peron) results at levels and first difference respectively. The results in Table 4.1 confirms the expected unit root in the time series at levels. The ADF and PP test result shows that the null hypothesis of unit root cannot be rejected.

Table 4.1: ADF and PP Unit Root Test Results at Level

	ADF			PP		
Variables	Constant	Constant and Trend	None	Constant	Constant and Trend	None
LPOV	-2.39	-1.27	0.54	-2.83	-3.05	0.66
LGREE	-1.00	-2.97	0.54	-1.00	-3.60*	0.42
LPSER	-2.96	-2.88	-0.31	-2.23	-2.30	-0.07
	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95	5% Critical Value = -2.97	5% Critical Value = -3.56	5% Critical Value = -1.95

Source: Author's Computation using STATA

Table 4.2 shows the ADF and PP unit root test results after first differencing of the time series. The null hypothesis of unit root can be rejected. All the time series were stationary at 5% level of significance.
The unit root tests shows that all the time series had unit root at levels but became stationary after differencing once.

Table 4.2: Unit Root Test after First Difference

	ADF			PP		
Variables	Constant	Constant and Trend	None	Constant	Constant and Trend	None
LPOV	-7.96*	-8.44*	-8.00*	-7.96*	-8.44*	-8.00*
LGREE	-7.46*	-7.38*	-6.82*	-7.46*	-7.38*	-6.82*
LPSER	-7.46*	-7.38*	-6.82*	-7.46*	-7.38*	-6.82*
	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95

Source: Author's Computation using STATA 14

4.1.2 Cointegration Test

Table 4.3: Johansen Test for Cointegration

Null Hypothesis	Trace Stat.	5% Crit. Value	Max. Eigenvalue Stat.	5% Crit. Value
$r = 0$	20.18	29.68	9.97	20.97
$r \leq 1$	6.33	15.41	5.66	14.07
$r \leq 2$	1.85	3.76	2.90	3.76

Source: Author's Computation using STATA 14

Having established the stationarity of the selected time series at first differencing, it is therefore appropriate to determine the existence or none existence of a cointegrating vector among the series. Though there exist different cointegration tests, this study adopted the Johansen test as the preferred test. Johansen test, which has no cointegrating vector as its null hypothesis, provides two statistics (trace and maximum eigenvalue statistics) as the basis for drawing conclusion.
The Johansen test result presented in Table 4.3 shows that the null hypothesis of no cointegration vector cannot be rejected as both the trace and maximum eigenvalue statistics are less than the 5% critical values. This result implies that a long run relationship does not exist between government recurrent expenditure on education, primary school enrolment rate and poverty rate.
The cointegration results above makes the vector autoregressive (VAR) approach the most appropriate since we have a case of non-stationary time series at levels and no cointegrating vector.

4.1.3 Vector Autoregressive Model Estimation and Testing

4.1.3.1 Lag Selection Criteria

Table 4.4 Shows that lag-order selection criteria results. The result shows five (5) criterion statistics. Though the Akaike's information criterion and LR test are our primary concern, the

result shows that all the criteria suggested one lag. We therefore proceed by estimating VAR with one lag.

Table 4.4: Selection Order Criteria Result for the Poverty Model I

Lag	LR	FPE	AIC	HQIC	SBIC	P
0		.001341	1.8991	1.94465	2.03651	
1	110	.000076*	-.975925*	-.793731*	-.426274*	0.000
2	8.7898	.000103	-.688106	-.369267	.273783	0.457
3	6.2198	.000156	-.319976	.135509	1.05415	0.718
4	24.294*	.000139	-.516671	.075459	1.26969	0.004

Source: Author's Computation using STATA

4.1.3.2 Post Estimation Tests

It is important and necessary that we conduct some diagnostics or post estimation before adopting and discussing the result of the estimated VAR model and other associated statistics (i.e. granger causality). This is necessary to enable us figure out the adequacy of the model and other results. As long as a model passes the test, the model is considered adequate for adoption and discussion. The first test conducted is the Lagrange-multiplier (LM) test for autocorrelation in the residuals.

4.1.3.2.1 Autocorrelation Test

Table 4.5: Lagrange-Multiplier (LM) test for autocorrelation (VAR with one lag)

Lag	chi2	Df	Prob>chi2
1	11.40	9	0.24952
2	2.34	9	0.98481
3	3.9489	9	0.91475
4	23.0763	9	0.00603

H0: no autocorrelation at lag order

Source: Author's Computation using STATA

The autocorrelation test is done using the Lagrange-Multiplier (LM) test of residuals. The LM test of autocorrelation result presented in Table 4.5 above shows that we can reject the null hypothesis of no autocorrelation in the residuals at all level of significance at three lags out of the four lag orders.

4.1.3.2.2 Normality Test

The text for the normality of the residuals was done through the Jarque-Bera test. Table 4.6 shows that we can reject the null hypothesis of normally distribution of residuals for one of the individual equations. Though this test failed, it is worthy of mention that this phenomenon is common and will not necessarily and crucially distort the final results.

Table 4.6: Jarque-Berra test for normality (VAR with one lag)

Equations	chi2	Df	Prob>chi2
D_lpov	196.726	2	0.00000
D_lpser	1.189	2	0.55184
D_lgree	67.809	2	0.00000
ALL	265.725	6	0.00000

H0: residuals are normally distributed

Source: Author's Computation using STATA

4.1.3.3 VAR Model Estimation

Table 4.7 below shows the short run VAR result. The column labelled *Dlpov* is the estimated poverty rate model. The coefficient of lag 1 of *lpser* (primary school enrolment) has a positive sign as reported to be 0.06. The result shows that a 1% increase in one lag of primary school enrolment led to 0.06% increase in poverty rate during the study period. The p-value in parentheses shows that the coefficient of *lpser* is not statistically significant even at 10% level of significance. Moreover, the coefficient of *lgree* (government recurrent expenditure in education) has a positive sign as reported to be 0.03. The result shows that a 1% increase in one lag of *lgree* led to 0.03% increase in poverty rate during the study period. The p-value in parentheses shows that the coefficient of *lgree* is only statistically significant at 10% level of significance.

Moreover, table 4.7 also shows a column labelled *Dlpser* as the estimated primary school enrolment rate model. The coefficient of lag 1 of *lpov* (poverty rate) has a negative sign as reported to be -0.05. The result shows that a 1% increase in one lag of poverty rate led to 0.05% decrease in primary school enrolment rate during the study period. The p-value in parentheses shows that the coefficient of *lpov* is not statistically significant at even 10% level of significance. Moreover, the coefficient of *lgree* (government recurrent expenditure in education) has a positive sign as reported to be 0.003. The result shows that a 1% increase in one lag of *lgree* led to 0.003% increase in primary school enrolment rate during the study period. The p-value in parentheses shows that the coefficient of *lgree* is not statistically significant even at 10% level of significance.

Table 4.7: VAR Estimation Results

		Equations (N = 35)		
Elements (I.e. exogenous)		Dlpov	Dlpser	Dlgree
lpov	L1	0.5055***	-0.0516	0.7792
		(0.00)	(0.27)	(0.22)
lpser	L1	0.0597	0.7780***	-0.8344
		(0.86)	(0.00)	(0.60)
lgree	L1	0.0279*	0.0025	0.8796***
		(0.08)	(0.62)	(0.00)

P-values in parentheses (*** significant at 1%; ** significant at 5%; and * significant at 10%)
Source: Author's Computation using STATA 14

4.2 Poverty Model II

This model investigated the impact of government capital expenditure on education on poverty reduction in Nigeria. To achieve this, the study estimated a VAR model that includes government capital expenditure on education (using government capital expenditure on social and community services as a proxy), primary school enrolment rate and poverty rate.

4.2.1 Stationarity Tests

Tables 4.9 and 4.10 shows the unit root tests (i.e. Augmented Dickey-Fuller and Phillips-Perron) results at levels and first difference respectively for the time series used in the poverty model II. The results in table 4.9 confirm the expected unit root in the time series at levels. The ADF and PP test result shows that the null hypothesis of unit root cannot be rejected.

Table 4.9: ADF and PP Unit Root Test Results at Level

	ADF			PP		
Variables	Constant	Constant and Trend	None	Constant	Constant and Trend	None
LPOV	-2.39	-1.27	0.54	-2.83	-3.05	0.66
LGCSCSE	-0.50	-2.33	0.99	-0.52	-3.45	0.63
LPSER	-2.96	-2.88	-0.31	-2.23	-2.30	-0.07
	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95	5% Critical Value = -2.97	5% Critical Value = -3.56	5% Critical Value = -1.95

Source: Author's Computation using STATA

Table 4.10 shows the ADF and PP unit root test results after first differencing of the time series. The null hypothesis of unit root can be rejected. All the time series were stationary at 5% level of significance.
The unit root tests shows that all the time series had unit root at levels but became stationary after differencing once.

Table 4.10: Unit Root Test after First Difference

	ADF			PP		
Variables	Constant	Constant and Trend	None	Constant	Constant and Trend	None
LPOV	-7.96*	-8.44*	-8.00*	-7.96*	-8.44*	-8.00*
LGCSCSE	-9.00*	-8.83*	-8.55*	-9.00*	-8.83*	-8.55*
LPSER	-7.46	-7.38	-6.82	-7.46	-7.38	-6.82
	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95

Source: Author's Computation using STATA 14
* implies significance at 5% level of significance.

4.2.2 Cointegration Test

Table 4.11: Johansen Test for Cointegration

Null Hypothesis	Trace Stat.	5% Crit. Value	Max. Eigenvalue Stat.	5% Crit. Value
$r = 0$	23.31	29.68	21.72*	20.97
$r \leq 1$	5.78	15.41	7.83	14.07
$r \leq 2$	1.36	3.76	2.38	3.76

Source: Author's Computation using STATA 14

The Johansen test result presented in Table 4.11 shows that the null hypothesis of no cointegration vector cannot be rejected as both the trace and maximum Eigenvalue statistics are mostly less than the 5% critical values and not fulfilling the condition of at least two cointegrating vectors. This result implies that a long run relationship does not exist between government capital expenditure on education, primary school enrolment rate and poverty rate.

The cointegration results above makes the vector autoregressive (VAR) approach the most appropriate since we have a case of non-stationary time series at levels and no cointegrating vector.

4.2.3 Vector Autoregressive Model Estimation and Testing

4.2.3.1 Lag Selection Criteria

Table 4.12 shows that lag-order selection criteria results. The result shows five (5) criterion statistics. Though the Akaike's information criterion and LR test are our primary concern, the result shows that three of the criteria suggested two lags. We therefore proceed by estimating VAR with two lag.

Table 4.12: Selection Order Criteria Result for Poverty Model II

Lag	LR	FPE	AIC	HQIC	SBIC	P
0		.000797	1.3788	1.42435	1.51622	
1	112.38	.000042	-1.57068	-1.38849	-1.02103*	0.000
2	29.27	.00003*	-1.92291*	-1.60408*	-.961025	0.001
3	10.37	.00004	-1.68462	-1.22913	-.310488	0.321
4	19.90*	.000041	-1.7439	-1.15177	.042461	0.019

Source: Author's Computation using STATA

4.2.3.2 Post Estimation Tests

4.2.3.2.1 Autocorrelation Test

Table 4.13: Lagrange-Multiplier (LM) test for autocorrelation (VAR with one lag)

Lag	chi2	Df	Prob>chi2
1	34.47	9	0.00
2	19.18	9	0.02
3	7.75	9	0.56
4	15.27	9	0.08

H0: no autocorrelation at lag order

Source: Author's Computation using STATA

The autocorrelation test is done using the Lagrange-Multiplier (LM) test of residuals. The LM test of autocorrelation result presented in Table 4.13 above shows that we can reject the null hypothesis of no autocorrelation in the residuals at 5% level of significance at two lags out of the four lag orders.

4.2.3.2.2 Normality Test

The text for the normality of the residuals was done through the Jarque-Bera test. Table 4.14 shows that we can reject the null hypothesis of normally distribution of residuals for two of the individual equations. Though this test failed, it is worthy of mention that this phenomenon is common and will not necessarily and crucially distort the final results.

Table 4.14: Jarque-Berra test for normality (VAR with one lag)

Equations	chi2	Df	Prob>chi2
D_lpov	68.54	2	0.00000
D_lpser	0.57	2	0.75238
D_ lgcscse	0.90	2	0.63711
ALL	70.01	6	0.00000

H0: residuals are normally distributed

Source: Author's Computation using STATA

4.2.3.3 VAR Model Estimation

Table 4.15 below shows the short run VAR result. The column labelled *Dlpov* is the estimated poverty rate model II. The coefficient of lag 2 of *lpser* (primary school enrolment) has a positive sign as reported to be 0.62. The result shows that a 1% increase in two lag of primary school enrolment led to 0.62% increase in poverty rate during the study period. The p-value in parentheses shows that the coefficient of *lpser* is not statistically significant at even 10% level of significance. Moreover, the coefficient of *lgcscse* (government capital expenditure in education) has a positive sign as reported to be 0.01. The result shows that a 1% increase in two lag of *lgcscse* led to 0.01% increase in poverty rate during the study period. The p-value in parentheses shows that the coefficient of *lgcscse* is also not statistically significant at even 10% level of significance.

Moreover, table 4.15 also shows a column labelled *Dlpser* as the estimated primary school enrolment rate model. The coefficient of lag 2 of *lpov* (poverty rate) has a negative sign as reported to be -0.16. The result shows that a 1% increase in two lag of poverty rate led to 0.16% decrease in primary school enrolment rate during the study period. The p-value in parentheses shows that the coefficient of *lpov* is statistically significant at 5% level of significance. Moreover, the coefficient of *lgcscse* (government capital expenditure on education) has a positive sign as reported to be 0.02. The result shows that a 1% increase in two lag of *lgcscse* led to 0.02% increase in primary school enrolment rate during the study period. The p-value in parentheses shows that the coefficient of *lgcscse* is statistically significant only at 10% level of significance.

Table 4.15: VAR Estimation Results for Poverty Model II

		Equations (N = 45)		
Elements (I.e. exogenous)		Dlpov	Dlpser	Dlgcscse
		0.62***	-0.16	1.84***
lpov	L2	(0.00)	(0.04)	(0.00)
		0.02	0.45***	-1.20
lpser	L2	(0.94)	(0.00)	(0.26)
		0.01	0.02*	0.74***
lgcscse	L2	(0.77)	(0.09)	(0.00)

P-values in parentheses (*** significant at 1%; ** significant at 5%; and * significant at 10%)
Source: Author's Computation using STATA 14

Table 4.16: Granger Causality Tests Based on VAR Poverty Model II

	chi2Statistics (p-values)			
Dependent Variables	Dlpov	Dlpser	Dlgcscse	Joint Causality
Dlpov		.0049	0.0831	0.0852
	-	(0.94)	(0.773)	[0.96]
Dlpser	4.1962**	-	2.9177*	4.2105
	[0.04]		[0.08]	[0.122]
Dlgcscse	10.692***	1.2599		12.471***
	[0.00]	[0.262]	-	[0.00]

P-values in parentheses (*** significant at 1%; ** significant at 5%; and * significant at 10%)

Source: Author's Computation using STATA

4.3 Poverty Model III

This model investigated the impact of government recurrent expenditure on education on poverty reduction in Nigeria. To achieve this, the study estimated a VAR model that includes government recurrent expenditure on education, tertiary enrolment rate and poverty rate.

4.3.1 Stationarity Tests

Tables 4.17 and 4.18 shows the unit root tests (i.e. Augmented Dickey-Fuller and Phillips-Perron) results at levels and first difference respectively for the time series used in the poverty model III. The results in table 4.17 confirm the expected unit root in the time series at levels. The ADF and PP test result shows that the null hypothesis of unit root cannot be rejected.

Table 4.17: ADF and PP Unit Root Test Results at Level

	ADF			PP		
Variables	Constant	Constant and Trend	None	Constant	Constant and Trend	None
LPOV	-2.39	-1.27	0.54	-2.83	-3.05	0.66
LGREE	-1.00	-2.97	0.54	-1.00	-3.60*	0.42
LTER	-0.97	-2.99	1.70	-1.58	-5.96*	1.39
	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95	5% Critical Value = -2.97	5% Critical Value = -3.56	5% Critical Value = -1.95

Source: Author's Computation using STATA

* implies significance at 5% level of significance.

Table 4.18 shows the ADF and PP unit root test results after first differencing of the time series. The null hypothesis of unit root can be rejected. All the time series were stationary at 5% level of significance.

The unit root tests shows that all the time series had unit root at levels but became stationary after differencing once.

Table 4.18: Unit Root Test after First Difference

	ADF			PP		
Variables	Constant	Constant and Trend	None	Constant	Constant and Trend	None
LPOV	-7.96*	-8.44*	-8.00*	-7.96*	-8.44*	-8.00*
LGREE	-7.46*	-7.38*	-6.82*	-7.46*	-7.38*	-6.82*
LTER	11.59*	11.38*	11.03*	11.59*	11.38*	11.03*
	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95

Source: Author's Computation using STATA 14
* implies significance at 5% level of significance.

4.3.2 Cointegration Test

Table 4.19: Johansen Test for Cointegration for Poverty Model III

Null Hypothesis	Trace Stat.	5% Crit. Value	Max. Eigenvalue Stat.	5% Crit. Value
$r = 0$	37.18*	29.68	16.65	20.97
$r \leq 1$	11.65	15.41	10.75	14.07
$r \leq 2$	1.73	3.76	0.93	3.76

Source: Author's Computation using STATA 14

The Johansen test result presented in Table 4.19 shows that the null hypothesis of no cointegration vector cannot be rejected as both the trace and maximum Eigenvalue statistics are mostly less than the 5% critical values and not fulfilling the condition of at least two cointegrating vectors. This result implies that a long run relationship does not exist between government recurrent expenditure on education, tertiary enrolment rate and poverty rate.
The cointegration results above makes the vector autoregressive (VAR) approach the most appropriate since we have a case of non-stationary time series at levels and no cointegrating vector.

4.3.3 Vector Autoregressive Model Estimation and Testing

4.3.3.1 Lag Selection Criteria

Table 4.20 shows that lag-order selection criteria results. The result shows five (5) criterion statistics. Though the Akaike's information criterion and LR test are our primary concern, the result shows that four of the criteria suggested four lags. We therefore proceed by estimating VAR with two lag.

Table 4.20: Selection Order Criteria Result for Poverty Model III

Lag	LR	FPE	AIC	HQIC	SBIC	P
0		.029775	4.99943	5.04225	5.14342	
1	80.30	.002982	2.69198	2.86324	3.26791*	0.000
2	12.51	.003765	2.89542	3.19512	3.9033	0186
3	19.87	.003786	2.82636	3.25449	4.26618	0.019
4	32.64*	.002557*	2.28417*	2.84074*	4.15594	0.000

Source: Author's Computation using STATA

4.3.3.2 Post Estimation Tests

4.3.3.2.1 Autocorrelation Test

Table 4.21: Lagrange-Multiplier (LM) test for autocorrelation (VAR with one lag)

Lag	chi2	Df	Prob>chi2
1	17.70	9	0.04
2	10.91	9	0.28
3	7.88	9	0.55
4	7.98	9	0.54

H0: no autocorrelation at lag order

Source: Author's Computation using STATA

The autocorrelation test is done using the Lagrange-Multiplier (LM) test of residuals. The LM test of autocorrelation result presented in table 4.21 above shows that we can reject the null hypothesis of no autocorrelation in the residuals at 5% level of significance at three lags out of the four lag orders.

4.3.3.2.2 Normality Test

The text for the normality of the residuals was done through the Jarque-Bera test. Table 4.22 shows that we can reject the null hypothesis of normally distribution of residuals for two of the individual equations. Though this test failed, it is worthy of mention that this phenomenon is common and will not necessarily and crucially distort the final results.

Table 4.22: Jarque-Berra test for normality (VAR with one lag)

Equations	chi2	Df	Prob>chi2
D_lpov	0.520	2	0.77090
D_lter	76.665	2	0.00000
D_lgree	1.028	2	0.59814
ALL	78.213	6	0.00000

H0: residuals are normally distributed

Source: Author's Computation using STATA

4.3.3.3 VAR Model Estimation

Table 4.23 below shows the short run VAR result. The column labelled *Dlpov* is the estimated poverty rate model III. The coefficient of lag 4 of *lter* (tertiary enrolment rate) has a positive sign as reported to be 0.62. The result shows that a 1% increase in four lag of tertiary enrolment rate led to 0.62% increase in poverty rate during the study period. The p-value in parentheses shows that the coefficient of *lter* is not statistically significant at even 10% level of significance. Moreover, the coefficient of *lgree* (government recurrent expenditure in education) has a positive sign as reported to be 0.03. The result shows that a 1% increase in four lag of *lgree* led to 0.03% increase in poverty rate during the study period. The p-value in parentheses shows that the coefficient of *lgcscse* is also not statistically significant at even 10% level of significance.

Moreover, table 4.23 also shows a column labelled *Dlter* as the estimated tertiary enrolment rate model. The coefficient of lag 4 of *lpov* (poverty rate) has a negative sign as reported to be -0.12. The result shows that a 1% increase in four lag of poverty rate led to 0.16% decrease in primary school enrolment rate during the study period. The p-value in parentheses shows that the coefficient of *lpov* is statistically significant at 5% level of significance. Moreover, the coefficient of *lgree* (government recurrent expenditure on education) has a positive sign as reported to be 0.02. The result shows that a 1% increase in four lag of *lgree* led to 0.39% increase in tertiary enrolment rate during the study period. The p-value in parentheses shows that the coefficient of *lgree* is statistically significant at 1% level of significance.

Table 4.23: VAR Estimation Results for Poverty Model III

		Equations (N = 45)		
Elements (I.e. exogenous)		Dlpov	Dlter	Dlgree
		0.16	0.19	2.44**
lpov	L4	(0.42)	(0.79)	(0.04)
		0.62	-0.12	0.35
lter	L4	(0.22)	(0.48)	(0.23)
		0.03	0.39***	0.49***
lgree	L4	(0.23)	(0.00)	(0.00)

P-values in parentheses (*** significant at 1%; ** significant at 5%; and * significant at 10%)
Source: Author's Computation using STATA 14

4.4 Poverty Model IV

This model investigated the impact of government capital expenditure on education on poverty reduction in Nigeria. To achieve this, the study estimated a VAR model that includes government capital expenditure on education, tertiary enrolment rate and poverty rate.

4.4.1 Stationarity Tests

Tables 4.25 and 4.26 shows the unit root tests (i.e. Augmented Dickey-Fuller and Phillips-Perron) results at levels and first difference respectively for the time series used in the poverty model IV. The results in table 4.25 confirm the expected unit root in the time series at levels. The ADF and PP test result shows that the null hypothesis of unit root cannot be rejected.

Table 4.25: ADF and PP Unit Root Test Results at Level

	ADF			PP		
Variables	Constant	Constant and Trend	None	Constant	Constant and Trend	None
LPOV	-2.39	-1.27	0.54	-2.83	-3.05	0.66
LGCSCSE	-0.50	-2.33	0.99	-0.52	-3.45	0.63
LTER	-0.97	-2.99	1.70	-1.58	-5.96*	1.39
	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95	5% Critical Value = -2.97	5% Critical Value = -3.56	5% Critical Value = -1.95

Source: Author's Computation using STATA
* implies significance at 5% level of significance.

Table 4.26 shows the ADF and PP unit root test results after first differencing of the time series. The null hypothesis of unit root can be rejected. All the time series were stationary at 5% level of significance.
The unit root tests shows that all the time series had unit root at levels but became stationary after differencing once.

Table 4.26: Unit Root Test after First Difference

	ADF			PP		
Variables	Constant	Constant and Trend	None	Constant	Constant and Trend	None
LPOV	-7.96*	-8.44*	-8.00*	-7.96*	-8.44*	-8.00*
LGCSCSE	-9.00*	-8.83*	-8.55*	-9.00*	-8.83*	-8.55*
LTER	11.59*	11.38*	11.03*	11.59*	11.38*	11.03*
	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95	5% Critical Value = -2.98	5% Critical Value = -3.56	5% Critical Value = -1.95

Source: Author's Computation using STATA 14
* implies significance at 5% level of significance.

4.3.2 Cointegration Test

Table 4.27: Johansen Test for Cointegration for Poverty Model IV

Null Hypothesis	Trace Stat.	5% Crit. Value	Max. Eigenvalue Stat.	5% Crit. Value
$r = 0$	38.95*	29.68	20.84	20.97
$r \leq 1$	14.11	15.41	13.94	14.07
$r \leq 2$	1.08	3.76	0.08	3.76

Source: Author's Computation using STATA 14

The Johansen test result presented in Table 4.27 shows that the null hypothesis of no cointegration vector cannot be rejected as both the trace and maximum Eigenvalue statistics are mostly less than the 5% critical values and not fulfilling the condition of at least two cointegrating vectors. This result implies that a long run relationship does not exist between government capital expenditure on education, tertiary enrolment rate and poverty rate.
The cointegration results above makes the vector autoregressive (VAR) approach the most appropriate since we have a case of non-stationary time series at levels and no cointegrating vector.

4.4.3 Vector Autoregressive Model Estimation and Testing

4.4.3.1 Lag Selection Criteria

Table 4.28 shows that lag-order selection criteria results. The result shows five (5) criterion statistics. Though the Akaike's information criterion and LR test are our primary concern, the result shows that four of the criteria suggested four lags. We therefore proceed by estimating VAR with two lag.

Table 4.28: Selection Order Criteria Result for Poverty Model IV

Lag	LR	FPE	AIC	HQIC	SBIC	P
0		.014781	4.29915	4.34196	4.44313	
1	81.74	.001404	1.93861	2.10987	2.51454*	0.000
2	23.84	.001165	1.72222	2.02192	2.7301	0.005
3	19.95	.001168	1.65012	2.07826	3.08994	0.018
4	32.99*	.000778*	1.09482*	1.6514*	2.96659	0.000

Source: Author's Computation using STATA

4.4.3.2 Post Estimation Tests

4.4.3.2.1 Autocorrelation Test

Table 4.29: Lagrange-Multiplier (LM) test for autocorrelation (VAR with four lag)

Lag	chi2	Df	Prob>chi2
1	17.90	9	0.04
2	10.91	9	0.28
3	7.95	9	0.59
4	8.02	9	0.65

H0: no autocorrelation at lag order

Source: Author's Computation using STATA

The autocorrelation test is done using the Lagrange-Multiplier (LM) test of residuals. The LM test of autocorrelation result presented in table 4.29 above shows that we can reject the null hypothesis of no autocorrelation in the residuals at 5% level of significance at three lags out of the four lag orders.

4.4.3.2.2 Normality Test

The text for the normality of the residuals was done through the Jarque-Bera test. Table 4.30 shows that we can reject the null hypothesis of normally distribution of residuals for two of the individual equations. Though this test failed, it is worthy of mention that this phenomenon is common and will not necessarily and crucially distort the final results.

Table 4.22: Jarque-Berra test for normality (VAR with one lag)

Equations	chi2	Df	Prob>chi2
D_lpov	0.898	2	0.63818
D_lter	113.015	2	0.00000
D_lgcscse	0.037	2	0.98168
ALL	113.950	6	0.00000

H0: residuals are normally distributed

Source: Author's Computation using STATA

4.4.3.3 VAR Model Estimation

Table 4.31 below shows the short run VAR result. The column labelled *Dlpov* is the estimated poverty rate model IV. The coefficient of lag 4 of *lter* (tertiary enrolment rate) has a positive sign as reported to be 0.06. The result shows that a 1% increase in four lag of tertiary enrolment

rate led to 0.06% increase in poverty rate during the study period. The p-value in parentheses shows that the coefficient of *lter* is not statistically significant at even 10% level of significance. Moreover, the coefficient of *lgcscse* (government capital expenditure on education) has a positive sign as reported to be 0.04. The result shows that a 1% increase in four lag of *lgcscse* led to 0.04% increase in poverty rate during the study period. The p-value in parentheses shows that the coefficient of *lgcscse* is also not statistically significant at even 10% level of significance.

Moreover, table 4.24 also shows a column labelled *Dlter* as the estimated tertiary enrolment rate model. The coefficient of lag 4 of *lpov* (poverty rate) has a positive sign as reported to be 1.38. The result shows that a 1% increase in four lag of poverty rate led to 1.38% increase in tertiary enrolment rate during the study period. The p-value in parentheses shows that the coefficient of *lpov* is statistically significant at 5% level of significance. Moreover, the coefficient of *lgcscse* (government capital expenditure on education) has a negative sign as reported to be -0.04. The result shows that a 1% increase in four lag of *lgcscse* led to 0.04% decrease in tertiary enrolment rate during the study period. The p-value in parentheses shows that the coefficient of *lgcscse* is statistically significant at 5% level of significance.

Table 4.31: VAR Estimation Results for Poverty Model IV

		Equations (N = 45)		
Elements (I.e. exogenous)		Dlpov	Dlter	Dlgcscse
Lpov	L4	0.23 (0.18)	1.38** (0.04)	2.58*** (0.00)
Lter	L4	0.06 (0.26)	-0.04 (0.87)	0.48** (0.05)
Lgcscse	L4	0.04 (0.26)	0.30** (0.02)	0.42*** (0.01)

P-values in parentheses (*** significant at 1%; ** significant at 5%; and * significant at 10%)
Source: Author's Computation using STATA 14

Summary, Conclusion and Recommendation
Summary of Findings
The following findings were made:
i. Government recurrent expenditure on education had a positive but insignificant impact on primary school enrolment rate in Nigeria during the period covered by the study.
ii. Primary school enrolment rate had a positive but insignificant impact on poverty rate in Nigeria during the period covered by the study.
iii. Government recurrent expenditure on education has a positive but poor significant impact on poverty rate in Nigeria during the period covered by the study.
iii. Government recurrent expenditure on education slightly granger cause poverty rate in Nigeria during the period covered by the study.
iv. Government recurrent expenditure on education and primary school enrolment rate did not jointly granger cause poverty rate in Nigeria during the period covered by the study.
v. Government capital expenditure on education had a positive but poor significant impact on primary school enrolment rate in Nigeria during the period covered by the study.
vi. Capital expenditure on education had a positive but insignificant impact on poverty rate in Nigeria during the period covered by the study.

vii. Government capital expenditure on education did not granger cause poverty rate in Nigeria during the period covered by the study.
viii. Government capital expenditure on education and primary school enrolment rate did not jointly granger cause poverty rate in Nigeria during the period covered by the study.
ix. Government recurrent expenditure on education had a positive and strong significant impact on tertiary enrolment rate in Nigeria during the period covered by the study.
x. Government recurrent expenditure on education had a positive but insignificant impact on poverty rate in Nigeria during the period covered by the study.
xi. Government recurrent expenditure on education and tertiary enrolment rate jointly granger cause poverty rate slightly in Nigeria during the period covered by the study.
xii. Government recurrent expenditure on education and poverty rate jointly granger cause tertiary enrolment rate in Nigeria during the period covered by the study.
xiii. Government capital expenditure on education had a positive and strong significant impact on tertiary enrolment rate in Nigeria during the period covered by the study.

Conclusion

This study presented the empirical investigation of the dynamic relationship between government expenditure on education and poverty rate through in Nigeria between 1980 to 2015. The study applied unrestricted vector autoregressive (VAR) approach and granger causality, test to establish the dynamic linkage relationship between government expenditure on education, educational outcome, and poverty rate in Nigeria. From the findings, the study concluded that government recurrent spending in the education sector did not impact on poverty rate through primary school enrolment rate. Government recurrent expenditure on education directly impacted on poverty rate without increasing primary school enrolment rate. In fact, government recurrent expenditure on education has not succeeded in reducing poverty rate in Nigeria; as result shows that despite increase in government recurrent expenditure on education, poverty rate is still increasing. Government recurrent expenditure on education was also ineffective in increasing primary school enrolment rate and reducing poverty. This study also conclude that government capital expenditure on education, though couldn't reduce poverty, increased primary school enrolment rate during the period covered by the study. Increase in primary school enrolment rate was not sufficient for poverty reduction. Moreover, government recurrent expenditure on education directly impacted on increase in tertiary enrolment rate but not reduction in poverty rate. The demand for tertiary education has been on the increase as employees of the Federal Ministry of Education are also sending their children to study for higher degrees in a bit to secure a well-paying jobs in the future. A linkage relationship exists between government recurrent expenditure on education, tertiary enrolment rate, and poverty rate. Lastly, this study concludes that government capital expenditure increased tertiary enrolment rate but did not reduce poverty rate. Government capital expenditure on education and tertiary enrolment rate have contributed to poverty rate in Nigeria during the period of the study.

Recommendations

Policy recommendation

i. Expansionary Fiscal Policy in Educational Financing: There is strong evidence to showing that government spending on the educational sector has proven to be inadequate in reducing poverty through channels such as high school enrolment rate and capacity building. Hence, this study recommends an expansionary fiscal policy on education financing to meet the United Nation's 26% benchmark. An expansionary policy of this sort may improve quality of education and enrolment rate capable of producing entrepreneurs in the society that are not "half-baked" graduates who only wait for blue collar jobs.

ii. Institutional Improvement Policies: Poor performance of a nation's educational sector are more often caused by the weak institutions for managing resources, structures of ownership and control, notably state-owned or state controlled monopolies. High-quality institutions that promote development are at the heart of good governance, including a regulatory apparatus in curbing fraud and promoting commitment on the part of teachers and administrators of schools. A strategic thinking regarding economic development is that the quality of institutions is the deep fundamental factor that determines which countries experience good performance and which do not.

iii. Education Quality Review Policies: The quality of education provided by a nation's educational sector goes a long way to determine the innovative and enterprising ability of its workforce. Policies aimed at building skills at every level of education will be capable of producing graduates (not necessarily in higher degrees) that will be able to engage in some form of small business or the other without having to wait for a blue collar jobs.

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