IMPACT OF EDUCATION BUDGET ON POVERTY REDUCTION IN NIGERIA

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ABSTRACT
The study investigated impact of education spending on poverty reduction using annual data from 1980 to 2019. Autoregressive Distributed Lag model and Granger test were adopted for the analysis. The result showed that population growth, inflation, and domestic capital formation negatively affected life expectancy, hence retarded poverty reduction in long and short-run. Government expenditure on education and health services positively correlated with life expectancy, indicating positive impacts on poverty reduction in the long and short -run. On the Contrary, recurrent education expenditure in short-run had negative effect on poverty reduction. Granger causality indicated unidirectional relationship between education spending and poverty reduction in Nigeria.

Keywords: Education Budget, Poverty, Health, Econometrics Model

JEL Code: H52, I1, C58, E6

1. INTRODUCTION
Access to quality education is one of the most effective ways to break the cycle of poverty. Education plays a vital role in poverty reduction through enhanced income and technical know-how(skills). Educated people get better jobs and vision to transform their lives, and they are as well more capable to positively contribute to the society (UNICEF, 2021). The different facets of education that revolve through the formal and informal levels, primary, secondary, and tertiary education, vocational to crafts, artisans, and so on, show the importance of education in the development of skills, or cognitive prowess to compete, and increased earning capacity of individuals (Okwu et al., 2022). Human capital development through education has been considered as an enabler not only to the acquirers but contributes immensely to the economic growth of the nation. Education and poverty are inversely related. The higher the level of education of the population, the lesser will be the number of poor persons because education imparts knowledge and skills which is supportive in higher wages. This is why the association of leaders from the respective international organizations work round the clock to alleviate poverty through strategic poverty programs (Armeanu et al. 2018).

Nigeria is facing problems of endemic poverty associated with low investment on education. In the country, both private and government spend part of their annual budgets on education. This is because of the important of education on poverty reduction. Bharit, (2021) affirmed that more people having access to quality education can help end poverty by means of earning fundamental skills such as reading, writing, and critical thinking which have a proven positive impact on the wages. But unfortunately, education in Nigeria is confronted with myriads of problems. These includes; inadequate implementations as a result of corruption, poor funding and thus poor educational infrastructures, such as classrooms, teaching aids (projectors, Computers, Laboratories and libraries), lack of quality teachers and unconducive learning environment. Considering the percentage trend of five years, from 2015-2019 as depicted thus: 2015-10.79%, 2016-7.9%, 2017-6.13%, 2018-7.14%, 2019-7.12% (NBS, 2021). The ups and downs on the government spending on education, the standard and quality of education deteriorates' while the industrial actions are frequent among places of learning in Nigeria. In view of this disconnect between education financing and education performance, raises serious concerns upon which this work is ancrod and would be addressed.

To addressing the myriad of the macroeconomic challenges such as poverty, and human development deficiency confronting the country, the problem of education should be addressed (Ochinyabo,2021). More so, issues of growth-induced factors have empirically featured in economic discussions. Empirical results generally suggest that countries that invest more in education or human capital development tend to have lower level of poverty and a higher level of growth compared with those with lower levels investment on education. Several empirical research on the relationship between education budget and poverty reduction such as Khan et al., (2019), Oranga et al., (2020) David and Enitan (2021) , Akinbobola et al., (2022), Hofmarcher (2021), Ogunjinmi, (2022), Ojike et al., (2022), have yielded conflicting results based on the nature of data, period covered and methodology adopted. Accordingly, the current study attempts to fill these identified gaps by robustly investigating the long and short- run effect of education budget on the poverty reduction in Nigeria using long period data of forty-years and the Auto Regressive Distributed Lag (ARDL)and Granger causality estimation techniques. Using data driving economic model to explain the relationship between government education budget on poverty reduction in Nigeria, could provide quantitative estimates that can support policy makers in deciding on the relevant stimulus measures to address growing poverty level and lower level of growth in Nigeria. The remaining portions of the study are organized as follows: section two provides the theoretical foundation and empirical reviews. The methodology in section three to steer the study. The part four revealed the results interpretations and analyses, followed by section five's conclusion and policy recommendations.

2. LITERATURE REVIEW

2.1 Theoretical framework

Though several research has examined the effect of government spending on education and economic growth using various theoretical approaches, the theoretical basis of this study is anchored on the human capital induced growth and Keynesian growth model. Human capital-induced growth theory, as proposed by Romer (1986) stated that variations in human capital are responsible for regional and international variances in economic performance and growth rates. The human capital driven growth approach, on the other hand, expands the frontier by splitting public education spending into capital and recurrent expenditures, which provides a more coherent

framework for studying the effect of public spending on education on economic performance and. Keynes on the other hand introduced Keynesian growth model in (1936) which viewed government spending as exogenous factor that can be used as a policy tool to encourage strong and considerable economic growth. The Keynesian argued that government expenditure of any type, capital or recurrent, can positively stimulate growth by increasing aggregate demand. Therefore, increasing government spending on education contributes to a decrease in poverty. Keynesians believed that when individuals are gainfully employed, the economy will generate income that will aid in reducing poverty. Given that Keynesian favored the government's strong intervention in the economy, this theory is pertinent to the study.

3. DATA AND METHODOLOGY

This study used ex post facto and quantitative research designs to provide empirical answers to the research problems using already available data. The data which are secondary in nature were drawn from various sources namely: Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), and World Bank (WB) data base using the desk survey approach. The macroeconomics variables on which data were collected are life expectancy as the average period of years one may live in Nigeria used as a proxied for poverty is the dependent variable(LF), Government Capital Expenditure on Education in billions of naira (CE), Government Recurrent Expenditure on Education in billions of naira (RE), Government Expenditure on health in billions of naira (HT), total Population in millions of people (PO), Inflation Rate (IN) and Gross Fixed Capital Formation as a percentage of GDP (CF). Annual time series data of Nigeria covering a period 1980 to 2019 were used in the study. Data on LF, HT, CE, and RE and PO which were taken in nominal form were log transformed to minimize their variance and to make the interpretation in percentage term. Whereas IN, and CF retained their percentage forms. EViews 12 statistical package was used for the data analysis. The dependent and independent variables utilized in this analysis were chosen after considering fundamental economic theories, relevant empirical literatures and the study's objectives. The exclusion of relevant variables in a regression model has been demonstrated in econometric studies to cause bias the size of which relies on the interaction between the omitted variable, the other explanatory factors and the dependent variable (Gujarati and Porter 2009). In order to be properly guided, the study modelled LF as a function of the above-mentioned potential drivers of poverty reduction using a broad formulation of Khan et al., (2019), Jones (2019) and Lawanson and Umar (2021) endogenous growth model. The multivariate model adopted in this study emphasizes the short and long-term effects of government education spending on poverty reduction of Nigeria. The researcher, therefore, devised and specified an Auto-regressive-Distributed Lag (ARDL) model, in an Error Correction (ECM) form as follows:

$$\Delta LnLFt = \beta_0 + \beta_1 LnLFt_{-1} + \beta_2 LnCEt_{-1} + \beta_3 REt_{-1} + \beta_4 LnHTt_{-1} + \beta_5 LnPOt_{-1} + \beta_6 LnINt_{-1} + \beta_7 CFt_{-1} + \sum_{i=0}^{q} \emptyset 1^{\Delta} LnLF_{t-1} + \sum_{i=0}^{q} \emptyset 2^{\Delta} LnCEt_{-i} + \sum_{i}^{q} \emptyset_3 \Delta LnREt_{-i} + \sum_{i=0}^{q} \emptyset_4 \Delta LnHTt_{-i} + \sum_{i=0}^{q} \emptyset_5 \Delta LnPOt_{-i} + \sum_{i=0}^{q} \emptyset_6 \Delta INt_{-i} + \sum_{i=0}^{q} \emptyset_7 \Delta CFt_{-i} + ECTt_{-1} + \mu_t$$

where all variables remain as already defined, Δ denotes the first differences of the respective variables and 1 is the lag length selections accord to each variable. t=time trend consisting of years from 1980 to 2019. β0=Intercept.β2, β3, β4, β5, β6, and β7, are the coefficients of the long-run impact of the explanatory variables to be estimated. Ø 1, Ø 2, Ø 3, Ø 4, Ø 5, Ø 6, and Ø7, are the coefficients of the short-run impact related to the model's convergence to long-run equilibrium, whereas ECT is the speed of adjustment parameter that transmits the pace of convergence or how swiftly the variables returned from disequilibrium in the short-run to long-run equilibrium. In the

event of a disturbance, it reveals how quickly the system returns to equilibrium. The variables are expected to interfere or correlate with one or more of the endogenous variables in the model.

3.1 Estimation Procedure

The study applied the Auto-Regressive-Distributed Lag (ARDL) technique for testing the existence of co-integration relationship among the variables as developed by (Pesaran et al., 2001). This procedure is recommended over traditional cointegration approaches Engle and Granger (1987); Johansen (1988, 1991); Johansen and Juselius (1990), which necessitate a long sample time and all variables to be I (1). Firstly, endogeneity problems and inability to test hypotheses on the estimated coefficients in the long-run associated with the Engle-Granger (1987) method are sidestepped. Secondly, the model's long- and short-run parameters can be estimated concurrently, as the speed of adjustment to long-run equilibrium caused by any short-run external shocks, thereby removing the issues associated with omitted variables and the occurrence of autocorrelation.

Thirdly, the econometric methodology is relieved of the responsibility of determining the order of integration among variables and pre-testing for unit roots. Because the variables are assumed to be stationary at levels (I (0)), first difference (I (1)) or fractionally integrated, pre-testing for unit roots in time-series variables and determining first-order integration or I (1) behavior are not necessary for this technique (Ewetan et al., 2020). However, to assure the relevance of the co-integrating relationship, Pesaran et al. (2001) stated that, the dependent variable should be first difference stationary. Rahman and Islam (2020) also believe that the presence of any I (2) variable(s) may dislodge the system. As a result, it is preferable to perform some efficient unit root tests to check that no I (2) variable(s) is/are included in the model. Furthermore, while the results from the estimation process derived from the Engle and Granger and Johansen and Juselius methods are not efficient and consistent for studies with small sample size, Pesaran et al. (2001) indicated that the short and long-run parameters estimated using the ARDL methodology are reliable and efficient for small sample analyses that can be related to what we have in this study. According to Nguyen (2020), the ARDL bounds testing methodology has considerably superior small sample.

4. RESULTS AND DISCUSSION OF FINDING

The study evaluated the key characteristics of the study variables to determine their dependability and suitability for running OLS regression. These preliminary tests were performed on the nominal data set used in the research. An overview of the descriptive statistics for each study variable are shown in table one.

Table 1 Descriptive statistics of the Variables

	Mean	Median	Maxi	Mini	Sta.Dev.	Skewness	Kurtosis	J.B. Prob	Obs
LF	48.01051	46.12500	54.18000	45.33100	2.829563	0.95	2.38	0.057	39
CE	1067.274	380.8000	4491.700	127.9000	1346.183	1.42	3.35	0.08	39
RE	123.4662	43.61000	593.3300	0.160000	162.6774	1.25	3.40	0.00	39
HT	70.12615	8.220000	388.3700	0.040000	100.6183	1.49	4.34	0.00	39
PO	124.7287	119.2600	1958700	73.42000	36.27756	0.37	1.96	0.269	39

| IN | 19.06733 | 12.21700 | 72.83600 | 5.382000 | 17.09116 | 1.78 | 4.99 | 0.02 | 39 |
| CF | 37.47821 | 3658000 | 89.39000 | 14.17000 | 20.84596 | 0.95 | 3.30 | 0.04 | 39 |

Source: Authors computation using E-views

From Table 1, the Jarque–Bera probability values of LF, CE, and PO are greater than the 5% significance level indicating that these variables are normally distributed. The Jarque–Bera probability values of the other variables demonstrated a distinct lack of normality in their residuals, as evidenced by the significant Jarque–Bera probability values of less than 0.05. The residual non-normality could be explained by the fact that these variables are susceptible to economic shocks and instability, which may have resulted in outliers and residual non-normality. The application of ARDL co-integration method does not dependent on the normality of the data distribution (Rahman and Islam 2020). This leads to the conclusion that the study's estimated results are extremely effective.

Correlation analysis became necessary to performed in order to scrutinize the magnitude and severity of multi-collinearity of most of the explanatory variables in the empirical model. A correlation coefficient among any pair of explanatory variables whose value is more than ± 0.80 are stated to be enormously collinear (Babu et al. 2020). Table 2 shows the Spearman rank-order correlation check for the explanatory dependents.

Table 2 Pearson correlation analysis

	CE	RE	HT	PO	IN	CF
CE	1.00					
RE	0.54	1.00				
HT	0.55	0.61	1.00			
PO	0.56	0.59	0.64	1.00		
IN	-0.31	-0.09	-0.11	-0.14	1.00	
CF	-0.56	-0.65	-0.57	-0.46	0.11	1.00

Source: Authors computation using E-views

From Table 2, there is no serious problem of multi-collinearity or linear dependency among the explanatory variables of the estimation model as their correlation coefficients values are within the threshold of plus or minus 80% (Yusuf, 2022), and (Rahman and Islam , 2020) .

Thus, even though the ARDL bounds testing methods does not rely on prior knowledge about the order of integration of the series under reviews, it is sensible to test for the stationarity properties of all variables to assure that none of the examined variables is I (2) stationary in order to obtain reliable results and the result is shown in table three.

4.1 Unit Root Test

Table 3 Summary of unit root test

Variables	*ADF*		*PP Test*			*Zivot-Andrews Test*			
	Level	*1ˢᵗ Diff*	*Level*	*1ˢᵗ Diff*	Rmk	*Break Date*	*Level*	*1ˢᵗ Diff*	Rmk
LnLF	-1.0701^n	-3.9267^a	1.9446^n	-1.2648^a	I (1)	1998	-4.305005^a	-3.636520^n	I (1)
LnCE	0.0924^n	-6.8081^a	-1.6461^n	-11.0915^a	I (1)	2009	-6.526185^a	-11.32469^a	I (0)
LnRE	-2.8434^c	-5.2065^a	-1.3349^n	-10.8350^a	I (1)	1994	-5.324490^a	-5.937312^a	I (0)
LnHT	-2.9466^c	-0.2437^n	-0.9800^n	-18.5569^a	I (0)	2010	-2.962797^n	-5.996189^a	I (1)
LnPO	0.5284^n	-6.0475^a	0.4920^n	-10.4970^a	I (1)	1993	-1027687^n	-9669846^a	I (1)
IN	-2.4357^n	-6.2739^a	-2.8617^c	-11.7637^a	I (1)	1995	-5.581405^a	-6.112354^a	I (0)
CF	-3.8106^a	-4.5538^a	-3.2924^b	-4.6390^a	I (0)	1999	-4.735803^b	-5.020098^a	I (1)

Source: Authors computation using E-views

Notes a, b, and c denote the rejection of the null hypothesis at 1%, 5% and 10% significant levels, respectively, while n denotes not significant

To avoid a wrong application of the ARDL technique, the study implemented the traditional Augmented Dickey-Fuller (1979), Phillips-Perron, (1988) and the Zivot and Andrews (1995) structural breaks unit root tests to be sure that unobserved heterogeneity of the variables studied and show how sensitive the estimated results are to structural changes. The unit root test results of the study variables are summarized in Table 3. From the study, it can appropriately deduce from the results in that none of the study variables are integrated of order two. The explanatory variables were detected to be either level or first difference stationary while the dependent variable achieved stationarity only after first differencing. The combination of I (1) and I (0) variables is the prerequisites theory to justify the pertinences of an ARDL approach to test for co-integration.

4.2 ARDL Bounds Test for Co-Integration

The application of an ARDL bounds test method relies on the F-test for deciding the presence of long-run relationship between the variables within purview investigation, and it tests for the joint significance of lagged level variables enclosed within the model. Thus, the selection of the right lag length is essential for the connection of the F-test results. The study's observations are annual, and also the sample size is forty years with seven parameters. Because of the range of observations and the necessity to take care of degrees of freedom, a perfect lag length of 2, 2 was chosen and obligatory on the variable quantity and the regressors exploitation through the Akaike information Criterion (AIC). The study, therefore, measured Eq. (1) with the lag structure (2, 2, 0, 1, 2, 2, 0) being the most efficient of the estimated models. The results obtained from the ARDL bounds testing approach and therefore the estimated F-test are contained in Table 4.

Table 4 ARDL bounds test for co-integration results

Model	F-statistics	K	%	Critical values		Decision
				Lower Bound I (0)	Upper Bound I (1)	
LnLF=f (LnCE, LnRE, LnHT, LnPO, IN, CR	14.55124	6	1%	2.88	3.99	Reject H_0 and accept H_A. Co-integration exists
			2.5%	2.55	3.61	
			5%	2.27	3.28	
			10%	1.99	2.94	

Source: Authors computation using E-views

The study results indicate that the calculated F-statistic value of 14.55124 is larger than the upper bound critical value of 3.99 at the 1% (percent) significance level, evidencing to proven the fact that a significant long-run relationship exists between education spending and the poverty reduction during the review period. This means that these variables move along within the long run, which any short-run departure in their interactions can make a comeback to equilibrium in the long-run. The study will now proceed to estimate the long-run effects of government education spending on poverty reduction in Nigeria.

4.3 long-Run Effect of Education Spending on Poverty Reduction in Nigeria
The research calculated the conditional ARDL long-run approach for Equation 1 in order to validate the long-run influence of education spending on poverty reduction in Nigeria. As a result, Table 5 shows the outcomes of the long-run estimated model.

Table 5 Estimated ARDL long-run coefficients. Dependent variable: LnLF

Regressors	Coefficient	Std. Error	*t*-Statistic	*P*-Value
LnCE	-0.012028	0.002548	-4.720321	0.0001
LnRE	0.000712	0.004523	0.157435	0.8764
LnHT	0.014326	0.005104	2.806651	0.0106
LnPO	-0.254669	0.032149	-7.921474	0.0000
IN	-0.000123	0.000096	-1.284665	0.2129
CF	-0.000509	0.000194	-2.629700	0.0157
C	2.570262	0.143827	17.870453	0.0000

Source: Authors computation using E-views

According to Table 5, the long-run coefficient of (LnCE) is negatively correlated with poverty level and significant at one percent probability level. The result suggest other things remains equal that a percentage increase in government capital spending on education will lead to a one percent decrease on the poverty level. The finding is in accord with the a priori expectation and conformed with Keynesians theory and Romer (1986), and Armeanu et al. (2017), who affirmed that Increasing investment in education has a positive link with poverty reduction.

The long-run coefficient of Recurrent Expenditure on Education (LnRE) indicated a positive influence on poverty reduction that is statistically insignificant. The positive sign of the

coefficient affirmed that increased government recurrent spending on education can positively affect knowledge and skills which is essential for enhanced wages and living condition ultimately reducing poverty level.

The estimated long-run coefficient of Government Expenditure on Health (LnHE) indicated a significant positive relationship with life expectancy at one percent probability level. Based on Table 5, a percentage increase in health spending will, other things remaining equal, stimulate an increase of about 0. 01% in life expectancy. The result suggests that improved access to quality health care services can positively affect life expectancy and consequently results in the decrease in Poverty level. The result conforms with the a priori expectation and human capital growth model and extant studies of (Alina et al., 2022)

The estimated long-run coefficient of population growth (LnPO) indicated a significant negative relationship with poverty level at one percent probability. Based on the result in the table 5, a percentage increase in the total population will stimulate a decrease of 0.25% in long-term on poverty level. Population growth will have an adverse effect on Nigeria economic growth. This is because Nigeria population growth has increased faster than GDP growth rate and this has tendency to worsen the poverty level in the country. The result is in line with the a priori expectation and in accord the Malthus theory, Solow -Swuan model (1956) and empirical evidence of Klasen & Lawson, (2007) and Peterson, (2017), Ogunjinmi, (2022) who agreed that high fertility exacerbates poverty or, better put, that high population makes poverty reduction more difficult and less likely' in Uganda and Europe and Nigeria respectively.

The long-run coefficient of inflation (IN) demonstrated a negative influence on life expectancy in Nigeria. Based on the result in the table 5, a percentage increase in the general price level, will produce a decrease of about 1% on the life expectancy of the citizens. Price increases reduce disposable income and make individuals poorer. Consumers' ability to purchase products and services declines as a result of income erosion brought on by price increases, which results in a decline in standard of living and will ultimately increase the level of poverty. The result is in accord with the a priori and consistence with (Nguyen, 2020) who reported a significant negative relationship between inflation rate and long-term growth in Nigeria and Vietnam, respectively.

The estimated long-run coefficient of Gross Fixed Capital Formation (CF) displayed a significant negative relationship on poverty level at one percent probability. Based on Table 5, a percentage increase in domestic capital formation will ceteris paribus, generate a decrease of about 0.001% in long-run poverty level. The finding sanctions a priori expectation but contradicts extant studies of (Korankye et al., 2020), who reported a significant positive relationship between domestic capital formation and poverty level in Rwanda and African countries, respectively.

4.4 Short-Run Effects of Education Spending on Poverty Reduction in Nigeria

A careful review upon the estimation of the long-run coefficients through the application of ARDL model using lagged values of all the regressors as depicted in the Eq. (1) (a linear combination of the error- correction term (ECT) to investigate the linkage between short and long-run dynamics of the model was employed. Table 6 showed the results of the short-run effects of the education spending on poverty level in Nigeria.

Table 6 Error correction Representation for the selected ARDL model. ARDL (2, 2, 0, 1, 2, 2, 0)

Regressors	Coefficients	Std. Error	t-Statistics	P-Value
D(LnCE)	0.000161	0.000127	1.269933	0.2180
D (LnCE (-1))	-0.000482	0.000125	-3.842779	0.0009
D(LnRE)	-0.000196	0.000276	-0.701630	0.4851
D(LnHT)	0.000556	0.000271	2.051905	0.0529

D(LnPO)	-0.102547	0.017417	-5.887843	0.0000
D (LnPO (-1))	-0.072473	0.015514	-4.671458	0.0001
D(IN)	-0.000017	0.000006	-2.799195	0.0107
D (IN (-1))	-0.000026	0.000006	-4.733959	0.0001
D(CF)	-0.000039	0.000018	-2.182414	0.0406
CointEq (-1)	-0.083321	0.006707	-12.422834	0.0000***

Cointeq=LnLF-(0.0120*LnCE0.0007*LnRE-
0.0143*LnHT+0.2547*LnPO-0.0001*IN-0.0005*CF-2.5703)

Based on table 6, the lagged error term coefficient (CointEq (-1)) which measures the adjustment speed as expected is negative and strongly significant at one percent level. The coefficient of the error correction term is -0.083321, implying that the annual rate of adjustment is around 8.33%. This value indicates that the adjustment rate of a short run disequilibrium in poverty level is relatively low as around 8% of the divergence in poverty level induced by previous year shock in government education spending converges back to long-run equilibrium in the current year. It was also negative, significant, and less than one, which further affirm the existence of a long-run relationship between the predictors of poverty level and education spending in Nigeria.

From table 6, the current level of capital spending on education D(CE) in violation with the long-run result indicated a non-significant positive impact on poverty level. whereas the previous year capital spending on education lag D (CE (-1)) is negatively correlated with the poverty level and significant at one percent level. Implying a percentage increase in the one-year lag value of capital education spending, generate a decrease of one percent in the current level of poverty.

Recurrent government expenditure on education in the current period D(RE) is not in agreement with the long-run result indicated a non-significant negative impact on poverty level. The analysis shows that government education recurrent expenditure is non-significant both in long and short-run. It is suggested that there are numerous issues with education in Nigeria. These include insufficient implementations caused by corruption, inadequate funding and consequently teachers are not adequately motivated as government spend less than expected percentage of her budget on education based on UNESCO recommendation.

Also, the present level of total government spending on health D(HT) is in concur with the long-run results showed a significant positive relationship at 1% probability level. This indicated that a percentage increase in government spending on health will produce an increase of approximately 1% on the life expectancy.

Furthermore, the current level of population growth D(LnPO) complied with the long-run result showed a significant negative relationship on poverty level. On the other hand, the previous year population growth lag D (LnPO (-1)) also conformed with the poverty level and significant at one percent probability level Indicating that, a percentage increase in the present and previous year level of population growth will generate a decrease of about 0.10% and 7% respectively in the current poverty level. Raising population growth in Nigeria expose more people into poverty.

The coefficient of Inflation rate at the current level D(IN) in agreement with the long-run result indicated a significant negative impact on poverty level. However, the previous year general price level D (IN (-1)) is also negatively aligned with the poverty level and significant at one percent probability level. Indicating that a percentage increase in the one-year-lag value of inflation rate, produce a decrease of one percent in the current level of poverty.

The coefficient of gross fixed capital formation D(CF) in support with the long-run result prompted a negative and significant impact on poverty level in its present value at 5% probability

level. Consequently, an increase in the gross fixed capital formation will produce a decrease of 1% in percent level of poverty.

## 4.5 POST ESTIMATION DIAGNOSTICS TESTS

In order to validate the results of this study, different econometrics diagnostics tests ranging from data normality to serial correlation, heteroscedasticity, functional form and stability checks were applied. Table 7 below shows the result.

Table 7 ARDL model diagnostics test indicators

Test	Null hypothesis	F-statistics	P-value
Jarque-Bera	Normally Distributed	0.249447	0.8827
Breusch Godfrey LM Test	No Serial Auto-Correlation	0.522125	0.6015
Breusch-pagan-Godfrey	No Heteroscedasticity	0.625817	0.8452
Ramsey RESET	No misspecification	0.182999	0.6734

Source: Authors computation using E-views

From the table 7, the diagnostics test revealed that the model's residuals are normally distributed, with no significant evidence of multi-collinearity, serial correlation, heteroscedasticity, or model misspecification error. The above-mentioned attributes are desirable qualities of OLS models, the model was properly specified. The CUSUM and CUSUM of squares tests (Figs. 1 and 2) suggests that the estimated model parameters are within the 5% critical value, accepting the null hypothesis that all coefficients and the ECM are dynamically stable and the estimated findings are reliable and adequate for forecasting and policymaking.
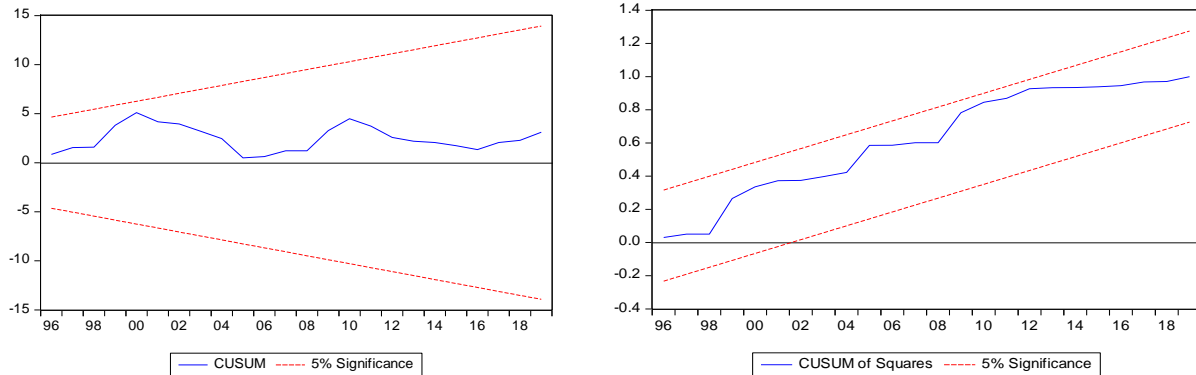
4.6 PAIRWISE GRANGER CAUSALITY TESTS

Given that education expenditures or human capital development could address the problems of poverty and improve longevity and growth, the Pairwise Granger Causality test was carried out to determine the directional causal relationship. Of course, many tests of Granger-type causality have been derived and implemented to test the direction of causality – (Granger, 1969) and (Gwekes et al., 2014).

Table 8 Pairwise Granger Causality Tests. Lag: 2

Null Hypothesis:	Obs	F-Statistics	Prob
CE does not Granger Cause LF	35	5.32460	0.0029

LF does not Granger Cause CE		1.16512	0.3490
CF does not Granger Cause LF	36	0.79944	0.5361
LF does not Granger Cause CF		5.79469	0.0017
PO does not Granger Cause CE	35	2.18188	0.0291
CE does not Granger Cause PO		0.49486	0.7396
PO does not Granger Cause RE	36	12.7299	6.3606
RE does not Granger Cause PO		2.47413	0.0582

Source: Authors computation using E-views

The study results indicated that unidirectional relationships flow from government capital spending on education (CE) to poverty, which is agreement with the long-run result that expenditure on education can bring reduction on poverty. The result also established causality from poverty to gross fixed capital formation (CF); population (PO) to capital expenditure on education (CE); recurrent education spending (RE) to population (PO). Thus, indicating all levels of education expenditures cause poverty reduction in Nigeria.

5. CONCLUSION AND POLICY IMPLICATIONS

Provision of the basic needs is a determinant to minimize poverty which education plays a vital role. The essence of education is to tarin citizens to meeting up with the current and future job demands to achieve growth, increase income through potential employment, and alleviating Nigerians from poverty. Nigeria is one of the poverty heads of the world as six of her citizens falls below poverty lines every hourly. As a result of this, lives are cut short as social amenities that makes life meaningful are lacking for major part of the citizens. Obviously, this is the reason behind the investment on education which government spent considerable amount annually, providing services for citizens. Using the ARDL technique, this study undertook an empirical examination of the linkage between the education spending and poverty reduction in Nigeria during a 40-year period from 1980 to 2019. The empirical findings indicated that population growth rate, inflation rate, and domestic capital formation are negatively affected by life expectancy and therefore retarded poverty reduction in the long and short-run. On the contrary, improved government expenditure on education, recurrent spending on education and improved health services were positively correlated with life expectancy and therefore have positive impacts on the poverty reduction in the long and short -run. Whereas, recurrent expenditure on education has a negative impact and retarded life expectancy and poverty reduction in the short-run. Also, the result of the granger causality indicated a unidirectional relationship since the p-values are less than 5%, as we rejected the null hypothesis of no causality and accepted the alternative hypothesis that causality runs from education spending to poverty reduction in Nigeria. The study findings have policy implications for more government spending on education and health care service delivery to improve the quality of life of the citizens to meeting up with current and future job demands in order to build a nation state whose citizens can meet their basic needs to reduce poverty among the teaming growing population. Lack of effective leadership, solid institutions, embellished political irresponsibility and crookedness has been Nigeria's key challenges since independence. Good governance, provision of a safe and secured environment for human capital development, improved access to social and economic services are starting points to inclusive

growth and poverty reduction. Not with standing that the results of this study are regression estimates based on Nigeria data, it is imperative to draw policy recommendations from the results with some degree of caution. The results suggest that the impact of education spending should be aggressively taken into considerations when preparing government budgeting and expenditure plans. From the study findings, it evidenced that an effective spending and implementation of education budgets cum improved health services will go a long way in addressing the poverty issues in Nigeria and improves on economic growth. It is also witnessed from the study results; that stabilized inflation rate and controlled population growth will surely help in reducing poverty in Nigeria. The study, therefore, suggests that policy makers, in order to archive poverty reduction in Nigeria, should focus on providing quality education, health services and socio-economic infrastructures that can improve the dignity and quality of lives, by providing job opportunities through secured environment and capital formation. Although the current research provides remarkable insights on the education spending and poverty reduction on federal republic of Nigeria, it is susceptible to significant limitations, mostly related to data availability and econometric technique. Further research can on the analysis of education spending on food security in Nigeria's geopolitical zones using additional variables

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