

## Investigating the Nonlinear Impact of Government Educational Expenditure on Economic Growth in Nigeria

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### **Abstract**

*It is unarguable that in Nigeria government expenditure in education has been dwindling which is caused by many factors. The study was carried out to investigate the asymmetric impacts of educational expenditure on economic growth in Nigeria. Educational expenditure is decomposed into capital expenditure in education recurrent expenditure in education. The researchers employed a non linear Autoregressive Distributed Lag (NARDL) approach for our analysis, using secondary data obtained from CBN statistical bulletin. The researchers observed that positive deviations in capital and recurrent expenditure in education lead to significant increase in gross domestic product, also negative deviations in recurrent educational expenditure lead to insignificant reduction in gross domestic product in both long run and short run. The result also revealed that there is symmetric response of gross domestic product to both capital and recurrent expenditure in both short run and long run. The study therefore recommends that Government should increase expenditure in education (both capital and recurrent) at all levels of education through increase in budgetary allocation to the education sector.*

**Keywords:** Economic growth, Education Expenditure, NARDL

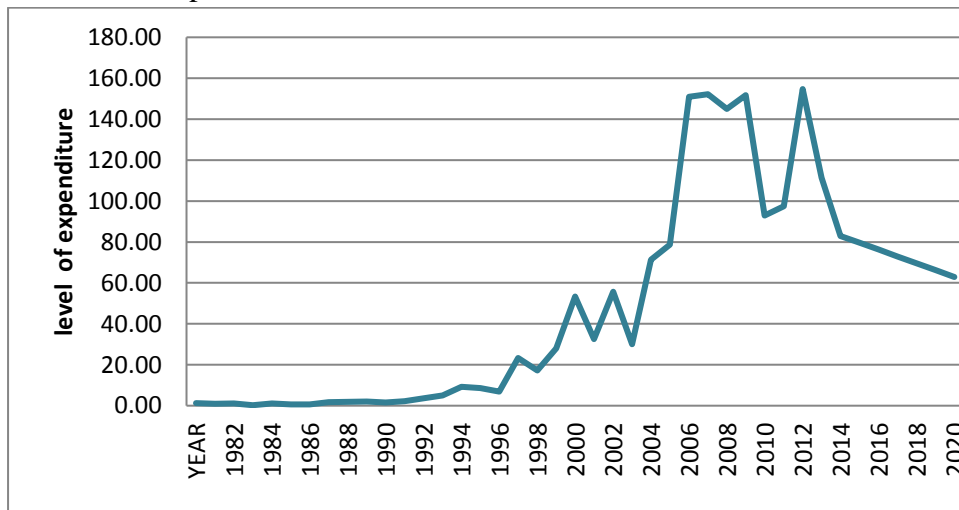
### **Introduction**

Education may be described as a method of leading people out of shackles of ignorance and blindness. It is a means of socializing human beings and helping them to know the world around him, face challenges, overcome them and contribute meaningfully to the development of the society. It involves the bringing up of a child in the community and constantly training him to adjust himself to the changing world around him. It is a lifelong continuous process. The aim of education is dynamic and varies from time to time and geographically specific. Thus, education plays key role in the development and growth of economies of the world and so requires proper and adequate policies to stimulate economic growth and development because no nation can grow above its education system.

The National Policy on Education (FRN, 2016) states that “Education in Nigeria is an

Instrument par excellence for effecting national development". This statement encapsulates the fact that education plays a very vital role in the growth of every facet of the Nigeria economy. Human capital theory stressed that education accelerates productivity, effectiveness and efficiency of workers through enhancing the level of cognitive, affective and psychomotor capabilities making it more economically productive which is a product of innate abilities and investment in human beings. Thus educational expenditure constitute a form of investment, augment human capital and lead to greater output for the country. Education can improve economic growth in a country when nit is allowed to play anti-traditional roles to the extent that it helps, liberates, stimulates, informs and teaches the learner how and why to make demands upon himself/herself. Educationist have believed that investment in education is a surest way the individuals, and countries can escape from poverty, this can be achieved through well targeted way government spending the sector by redefining the role of government in education which has become key issues in development policy. This has led to the recommendation by United Nations Education Scientific and Cultural Organization (UNESCO) to developing countries issues of allocating 26% of the total budget to education sector.

The Nigerian government has been making good effort to ensure that the educational sector produce required results through different educational policies such (as)free and compulsory primary education in all states, including nomadic schools, establishment of Nigerian educational research development council (NERDC) etc. The trend in government educational expenditure as shown below



**Figure 1:** Trend in the Nigerian educational expenditure from 1981 to 2020

From the Figure 1 above, it is evident that over time there has been fluctuation in the government expenditure in educational sector, but regrettably this expenditure is currently below the expected need of the immediate society as can be seen in dilapidation of facilities in

public schools at all levels, lecturers/workers strikes, domination of private sector in the educational activities etc. This calls for a review of the current level of expenditure in the educational sector to reflect the current reality in the economy and produce the expected objectives of stimulating economic growth and development.

Interestingly, the issue of government expenditure and its relationship has attracted the attention of scholars such include Urhie (2013), examined public education expenditure and economic growth in Nigeria, Akindele (2015), investigated financial allocation to education, Obi and Ogugua (2013) studied the impact of education expenditure on economic growth as a means of achieving the desired socio-economic change needed in Nigeria. Njoku et al. (2014) also did a study to determine the effect of public expenditures on economic growth in Nigeria from 1961 to 2013 by adopting a quantitative research methodology. Anyanwu and Uguru (2021) took an empirical investigation of impact of government educational expenditure on economic growth in Nigeria, educational expenditure and economic growth nexus in Nigeria was studied by Abiodun and Osagie (2018). Akaakohol et al, (2019) examined the asymmetric effects of government spending on economic growth in Nigeria. All studies reviewed found that increase in government educational expenditure has positive effects on economic growth in Nigeria.

Considering the fluctuating trends of government education expenditure, it is quite misleading to believe that increase and decrease in government educational expenditure will yield the same effect on economic growth. Correcting this anomaly is the thrust of this present study although Akaakohol et al, (2019) made attempt to this but they used Government spending, household consumption, Capital investment, Current account balance, Foreign Direct Investment, Exchange rate and Inflation rate as explanatory variables, this is more misleading because these variables are not really educational expenditures. The present study decomposed educational expenditure into government capital expenditure in education and recurrent expenditure in education while using expenditure on social and community services (health and education) as control variable. The foregoing forms the introduction, remaining part of this paper is organized as follows; literature review in section 2, Methodology is presented in section 3 while section 4 analysis and discussion of empirical results, Section 5 deals with conclusion and recommendations.

## Theoretical Review

The study adopts the Keynesian theory which explains the relationship between the variables of interest. Keynes theory asserts that increases in government spending leads to high aggregate demand and rapid growth in national income. Keynes (1936) built a system that focuses on stabilization of government policy, he encouraged government to spend on public goods such as education, health and other infrastructural facilities that is beneficial to all members of the society especially in difficult times like recession. Keynes stated that aggregate

level of government spending improves and control aggregate demand. The importance of government active involvement in the economy can arise from the need to provide public goods, enforce contracts, protect lives and properties, and develop infrastructure (Ifarajimi & Oluwole, 2017). However, the role government plays in economic activity has received much concern or attention since the 1930s stemming from the works of John Maynard Keynes who opined that government expenditure enhance growth through injecting purchasing power. This suggests that the position of government expenditure in simulating economic growth is still a debatable matter or issue among scholars to establish whether increasing government expenditure accelerates economic growth or otherwise. However, most studies have the affirmation that government expenditure contributes positively to economic growth this has turn out to be an accepted ground in most economies (Prasetyo & Zuhdi, 2013). This implies that when government spending increases, it is believed to support strong and sustainable growth.

Unarguably, changes in government spending either increase or decrease especially government educational spending and its impact on economic growth in developing countries like Nigeria has not received full empirical attention. It is also true that most of the works done on this topic only paid attention on the symmetric impact's government educational spending on economic growth while the asymmetric effect has not been established. This forms the novelty of this study. This becomes necessary because the growth effect of decrease in government expenditure is expected to vary significantly from that of increase in government spending suggesting presence of asymmetric effect.

## Empirical Review

Empirical studies on this topic are rich though not comprehensive as expected, however most findings suggest a positive relationship between educational spending and economic growth. Some of the important literatures to this present study are presented below chronologically. Measuring the impact of public expenditure on education on economic growth in North Macedonia, Ziberi, Rexha, Ibraimi and Avdiaj (2022) used secondary data derived from the World Bank Indicators for the period 1917–2020 and their two-stage least square (2SLS) analysis revealed that that a one-percent rise in public expenditures on education has significant positive effect economic growth in the North Macedonia. Anyanwu and Uguru (2021) took an econometric analysis of government educational expenditure and economic growth in Nigeria. Using ARDL model for analysis, they observed that government educational expenditures symmetrically and significantly explained variations in economic growth in Nigeria within the period of the research.

Ayeni and Osagie (2018) investigated the nexus between educational expenditure and economic growth in Nigeria with secondary time's series data. Applying bound test and autoregressive distributed lag model, they observed recurrent educational expenditure has

momentous connection with economic growth; on the other hand, capital expenditure in education was insignificant. Akindele (2015) examined financial allocation to education, trends, issues and way forward in Nigeria. Tracing the financial allocation to education sector from the pre-independence period through the 1<sup>st</sup>, 2<sup>nd</sup> and third republic and observed that the financial allocation to education reveals fluctuating and low allocation. He found that the trend even fell short of the recommendation of the United Nations Educational Scientific and Cultural Organization (UNESCO) that the developing countries should allocate at least the 26% of their total annual budget to the education sector. He identified issues such as political interference in the allocation to education, allocation in preference to higher education, poor accountability of funds allocated to education as well as the delay in the release of funds allocation to education as some of the causes of the fluctuation of trends.

Examining the effects of government investments in education on Nigerian economic growth, Ifionu and Nteegah (2013) Employed the ordinary least square technique and found that government recurrent expenditure in education had significant effect on economic growth. They further recommended government to increase her national budgetary allocation to the education sector using United Nations Development Programme (UNESCO) standard of 26% allocation to the education sector. All these studies revealed the symmetric effect or impacts of government educational spending on economic growth and none was done to ascertain the asymmetric impact of government educational spending on economic growth in the country. This study is carried out to fill this gap. Considering the importance of economic growth to every economy, it becomes pertinent to avoid anything that might hamper or impair the objective of a sustained economic growth.

## Methodology

The study adopted and applied non-linear Autoregressive Distributed L model as recently developed by Shin et al. (2014). The NARDL model is an asymmetric modification of the linear ARDL model of Pesaran, Shin, and Smith (2001).

The functional form of the model can be specified as follows

$$GDP = f(CEXP, REXP, EXPSS) \quad (3.1)$$

The econometric form of the two equations in the linear form is specified:

$$GDP = \alpha_0 + \alpha_1 CEXP + \alpha_2 REXP + \alpha_3 EXPSS + \mu_1 \quad (3.2)$$

To check the robustness, we proceed to estimate another aggregative model which captures asymmetric effects of educational expenditure on economic growth as proxy by gross domestic product (GDP).

$$GDP_t = \alpha_0 + \alpha_1 CEXP_t^+ + \alpha_2 CEXP_t^- + \alpha_3 REXP_t^+ + \alpha_4 REXP_t^- + \mu_t \quad (3.3)$$

GDP = gross domestic Product

CEXP = capital expenditure on education

REXP = recurrent expenditure on education

EXPSS= expenditure on social service (Health and Education)

$\mu$  = Stochastic error term

$\alpha$  economic parameters to be estimated.

The above models explain that economic growth are influenced by capital expenditure on education, recurrent expenditure on education and expenditure on social service (Health and Education). On a priori, capital expenditure on education and recurrent expenditure on education are expected to be an increasing or decreasing function of decreasing function of economic growth as the case may be. Equally, expenditure on social service (Health and Education) is expected to show positive relationship with gross domestic product although is not a direct function of economic growth; hence they serve as control variables to avoid variable omission.

## Estimation Procedures

If we specify a simple static models which express the relationship between gross domestic product (Y) and educational expenditure (X):

$$y_t = \phi_0 + \phi_1 X_{1t} + \mu_{1t} \quad (3.4)$$

$\phi_1$  are the educational expenditure elasticity's of gross domestic product which are expected at a priori to be positively signed. These Equations implies that an increase or decrease in educational spending triggers a contraction or rise in gross domestic product. Specifically, in symmetric and linear framework, the responses of gross domestic product to periods of educational spending are a reflection of what is obtainable during periods of decrease in educational spending. Considering the trend and fluctuating movement of educational expenditure in Nigeria, we employed a nonlinear ARDL which decomposes the normal or conventional ARDL to capture long-run and short-run positive and negative (asymmetries) in the transmission mechanism simultaneously. According to Shin et al. (2013), the asymmetric cointegrating relationship in NARDL framework starts by splitting the exogenous variables in Equations (3.4) into a partial sum process as presented below:

$$y_t = \phi_0 + \phi_1^+ X_{1t}^+ + \phi_1^- X_{1t}^- + \mu_{1t} \quad (3.5)$$

Where  $y_t$  is  $k \times 1$  vector of gross domestic product at time  $t$ ;  $X_t$  is a  $k \times 1$  vector of multiple regressors specified such that  $X_t = X_0 + X_t^+ + X_t^-$  indicating natural logarithm of educational expenditure;  $\phi^+$  and  $\phi^-$  are the corresponding asymmetric cointegrating parameters, which shows that gross domestic product respond asymmetrically as educational expenditure shows fluctuating movement;  $\mu_1$  is the stochastic error terms. Conversely,  $X_t^+ + X_t^-$  portrays the partial sum processes of positive (+) and negative (-) innovations in  $X_t$  such that  $X_t$  is defined as:

$$X_t^+ = \sum_{i=1}^t \Delta X_i^+; \quad X_t^- = \sum_{i=1}^t \Delta X_i^- \quad (3.6)$$

$$\text{And } \Delta X_i^+ = \sum_{i=1}^t \text{Max}(\Delta X_i, 0), \quad X_t^- = \sum_{i=1}^t \text{Min}(\Delta X_i, 0) \quad (3.7)$$

Where  $\Delta X_i$  represents variations in the regressors  $X_t$ , The (+) and (-) are superscripts showing the negative and positive reactions circulating a zero threshold, which defines and sets boundaries for the regressors, implying that the first difference of the series is assumed to be normally distributed with zero mean. A nonlinear model which exhibits both long run and short run asymmetries can be modeled as follows:

$$y_t = \sum_{i=0}^q \psi_i y_{t-i} + \sum_{i=0}^r (\partial_i^{+1} X_{t-i}^{+1} + \partial_i^{-1} X_{t-i}^{-1}) + \mu_t \quad (3.8)$$

We proceed to specify the conditional error correction model for equation (3.8) which contain the negative and positive partial sums as:

$$Y_t = \pi y_{t-1} + \lambda^+ X_{t-1}^+ + \lambda^- X_{t-1}^- + \sum_{i=1}^{q-1} \gamma_i \Delta y_{t-i} + \sum_{i=1}^{r-1} (\sigma_i^+ X_{t-i}^+ + \sigma_i^- X_{t-i}^-) + \mu_t \quad (3.9)$$

Shin et al. (2013) noted that equation (3.9) adequately corrects for the potentially weak endogeneity of non-stationary explanatory variables adequately in a nonlinear ARDL model.

The relationship  $-\phi_i^+ = \lambda^+ / q$  and  $-\phi_i^- = \lambda^- / q$  are applied while determining the long run coefficients. The null hypothesis which states that no long run relationship exists within the levels of  $y_t, X_t^+$  and  $X_t^-$  this gives  $q = \lambda^+ = \lambda^- = 0$  will be tested using the bound testing technique proposed and used by Pesaran et al. (2001). This approach is valid no matter the time series properties of  $X_t$ . The Wald test which has the null hypothesis of no asymmetry

in the long run coefficients ( $\phi_1^+ = \phi_1^-$ ) for model as well as ( $\sigma_i^+ = \sigma_i^-$ ) for the short run coefficients will be estimated. If the result proves otherwise, we reject the null hypothesis. The researchers proceed to ascertain the time series properties of the data using Augmented Dickey Fuller unit root test also we relied on descriptive statistics to establish the basic statistical properties of the data; we proceed to estimate the NARDL model. In order to confirm the reliability of the NARDL estimates, Post-estimation or diagnostics tests such as normality, linearity, serial correlation, and heteroskedasticity tests of the estimated model were carried out. Wald test for asymmetry (for short-run and long-run) which is crucial to this study is tested. This test is based on the null hypothesis that positive and negative variations in educational expenditure has direct opposite influence on gross domestic product in Nigeria. The decision rule states that if the probability of the Wald test is above conventional significance level of 1% or 5% significant level, conclusion of no asymmetry is accepted. Conversely, if the probability is below the 1% or 5% significant level, we reject the null hypothesis and conclude that there exists asymmetric effect of educational expenditure on gross domestic product or economic growth in Nigeria.

## Results and Discussion



**Table 1: Unit Root Test Results**

Augmented Dickey-Fuller Unit Root test						
Variables	Level	1 <sup>st</sup> Difference	Critical Values	Order of Integration	Prop Value	Decision
GDP	-3.9161*		1% -3.6617 5% -2.9304* 10% -2.6192	<i>I</i> (0)	0.0415	Reject H <sub>0</sub>
CEXPE	-1.5104	-7.2498*	1% -3.6056 5% -2.9369* 10% -2.6068	<i>I</i> (1)	0.0000	Reject H <sub>0</sub>
REXPE	3.1308	-4.6628*	1% -3.6329 5% -2.9484* 10% -2.6129	<i>I</i> (1)	0.0005	Reject H <sub>0</sub>
INTR	3.2432	-5.6699*	1% -3.6105 5% -2.9390* 10% -2.6079	<i>I</i> (1)	0.0000	Reject H <sub>0</sub>

**Source:** Author’s computation (\*shows the variable is stationary at 5% level of significant)

Table 1 presents the unit root stationarity test, it shows that all the variables are stationary at distinct order (i.e *I*(0) and *I*(1)). From the table below, economic growth proxied by gross domestic product (GDP) is stationary at level *I*(0), since their ADF values is less than the critical values at 5% level of significance while capital expenditure in education (CEXPE), recurrent expenditure in education (REXPE) and recurrent expenditure on social services (REXPSS) were found to be stationary after the first difference since their ADF values were less than the critical values at 5% level of significance.

Null hypothesis of no unit root was accepted form GDP at level form but was rejected after 1<sup>st</sup> difference. Also, null hypothesis of no unit root was rejected for, CEXPE, REXPE and REXPSS after the 1<sup>st</sup> difference. Thus, it is concluded that the variables under investigation are integrated at level (*I*(0)) and after first difference (*I*(1)). Thus, we have a combination of order of integration.

Next, the cointegration relationship is tested among the variables using NARDL bound test for model as shown in the Table 3 below;

**Table 2:** NARDL Model Bounds Test for GDP, CEXPE, REXPE and REXPSS

Test Statistic	Values	K	Lower bound(I0)	Upper bound(I1)	Significant level
F-statistic	47.34342	6	2.45	3.61	5%

*Source: Author's computation*

From Table 2, the result obtained indicated that although the variables were found to be integrated of mixed order, there is evidence of cointegration between gross domestic product, capital expenditure in education, recurrent expenditure in education and expenditure on social services because the calculated F-statistic value (**47.34342**) is above the upper bound critical value (**3.61**) at 5% level of significance.

### Result NARDL

**Table 4:** Estimated NARDL short & long run results (1, 2, 0,1, 0, 0,1)

<b>Panel A- Short Run Analysis</b>					
<b>Dependent Variable: GDP</b>					
Variable	Coefficient	Std. Error	t-Statistic	Prob	
D(CEXPE_POS)	38.663329	10.021663	3.857975	0.0009	
D(CEXPE_POS(-1))	30.778187	11.317952	2.719413	0.0128	
D(CEXPE_NEG)	31.769924	43.148746	0.736288	0.4697	
D(REXPE_POS)	17.242122	12.629670	1.365208	0.1866	
D(REXPE_NEG)	-36.684949	32.875678	-1.115869	0.2771	
D(REXPSS_POS)	43.645135	6.021449	7.248278	0.0000	
D(REXPSS_NEG)	-42.354188	28.277076	-1.497828	0.1491	
CointEq(-1)	-0.480822	0.070086	-6.860444	0.0000	
<b>Panel B -Long Run Analysis</b>					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
CEXPE_POS	101.454091	18.563482	5.465251	0.0000	
CEXPE_NEG	66.074187	86.438876	0.764404	0.4531	
REXPE_POS	10.910418	17.451720	0.625177	0.5386	
REXPE_NEG	-76.296317	64.186028	-1.188675	0.2478	
REXPSS_POS	90.771913	12.772050	7.107075	0.0000	
REXPSS_NEG	-241.833141	84.683846	-2.855718	0.0095	
C	806.783821	383.899047	2.101552	0.0478	

*Author's computation using Eviews statistical package*

NARDL estimated results (the short and long-run) for the model. The optimal lag length of the model (1, 2,0,1,0,0,1) was automatically selected via the Akaike Information Criterion (AIC). Results of the analysis indicate that in the short run, increase in Capital expenditure in education (D(CEXPE\_POS) ) and decrease in capital expenditure in education (D(CEXPE\_NEG) ) for all the periods is positively related to gross domestic product. Specifically, we observed that increase or positive deviations in capital expenditure in education (D(CEXPE\_POS) and (D(CEXPE\_POS(-1) lead to significant acceleration of gross domestic product, also negative deviations (D(CEXPE\_NEG) in capital expenditure in education lead to a insignificant increase in gross domestic product (GDP). The researchers also observed that increase in recurrent expenditure in education (D(REXPE\_POS) has positive and insignificant impact on gross domestic product while its decrease (D(REXPE\_NEG) also exhibits negative impact on gross domestic product (GDP). However, increase in recurrent expenditure on social services (D(REXPSS\_POS) has positive and significant impact on economic growth. Interestingly, the error correct term (CointEq(-1)) is appropriately signed and significant implying that about 48% of movement into disequilibrium in economic growth is corrected by educational expenditure within a year period.

From Panel B, the long run estimated results indicate that unit increase in capital expenditure in education (CEXPE\_POS) will on an average trigger about 39% increase in gross domestic product in the long run, significantly, the probability value is greater than 0.05. While a decrease of capital expenditure in education (CEXPE\_NEG) by 1.00% will also on the average cause gross domestic product to increase by about 66% in the long run. We also observed that in the long run, increase in recurrent expenditure in education (REXPE\_POS) has positive and insignificant impact on gross domestic product while its decrease (REXPE\_NEG) also exhibits negative impact and insignificant on gross domestic product (GDP). We also observed that increase in recurrent expenditure in education (REXPE\_POS) has positive and significant impact on gross domestic product while its decrease (REXP\_NEG) also exhibits negative and insignificant impact on gross domestic product (GDP).

This result reveals that increase in government expenditure in education will positively increase the production capacity of the country while decrease will generate a retarding effect

on the production capacity of the country. These findings supports the study of Ifionu and Nteegah (2013), Ayeni and Osagie (2018) and also Anyanwu and Uguru (2021) who observed that government educational spending both capital and recurrent have positive and significant impact on economic growth in Nigeria.

**Table 4:** Test of Asymmetry of gross domestic product Model

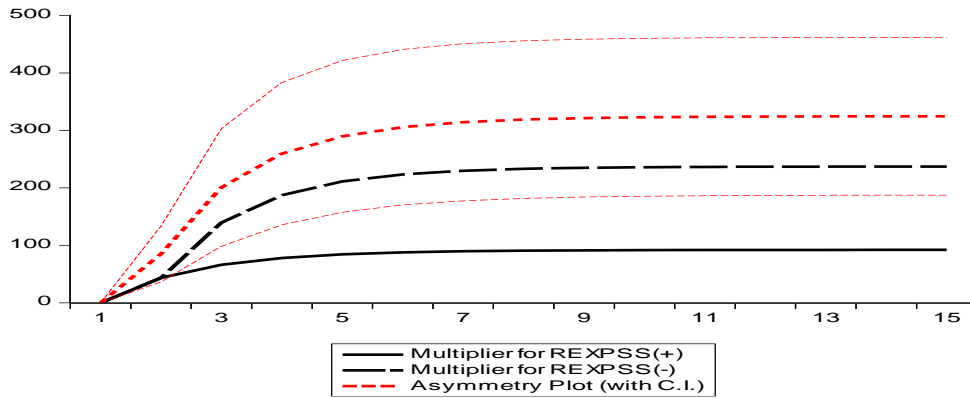
Variable	Coefficient	Prob
$\phi_1^+ = \phi_1^-$	6.893405	0.7099
$(\sigma_i^+ = \sigma_i^-)$	3.129366	0.0882
Jarque-Bera normality test	376.7607	0.0000
Breusch-Godfrey serial correlation LM test	0.760189	0.4781
Breush-Pagan-Godfrey heteroscedasticity test	1.918513	0.1056

*Source: Author's computation*

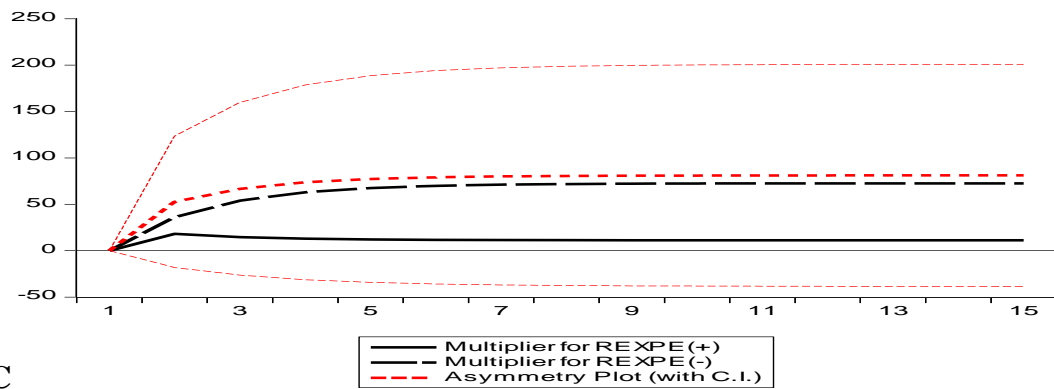
Table 4 shows the Wald test along with other post estimation diagnostic tests that was conducted. Wald test has the null hypothesis that expenditure in education has no asymmetric effect on gross domestic product. From the result the null hypothesis, cannot be rejected at the conventional 5% level of significance both in the short run ( $\sigma_i^+ = \sigma_i^-$ ) and long run ( $\phi_1^+ = \phi_1^-$ ) since the probability values are greater than the conventional 5% level of significant. Results of diagnostics test show that the model residuals are abnormally distributed as indicated by Jarque Bera statistic ( $p = 0.000$ ), it also indicated that the model do not suffer from autocorrelation ( $p = 0.4781$ ) and there is no evidence of heteroscedasticity ( $p = 0.1056$ ).

The researchers were unable to find a study that dealt with asymmetric effects of Nigerian educational expenditure on economic growth to enable us compare or contrast the asymmetric result of this study; this forms the thrust of our research. The graph below depicts further the above findings.

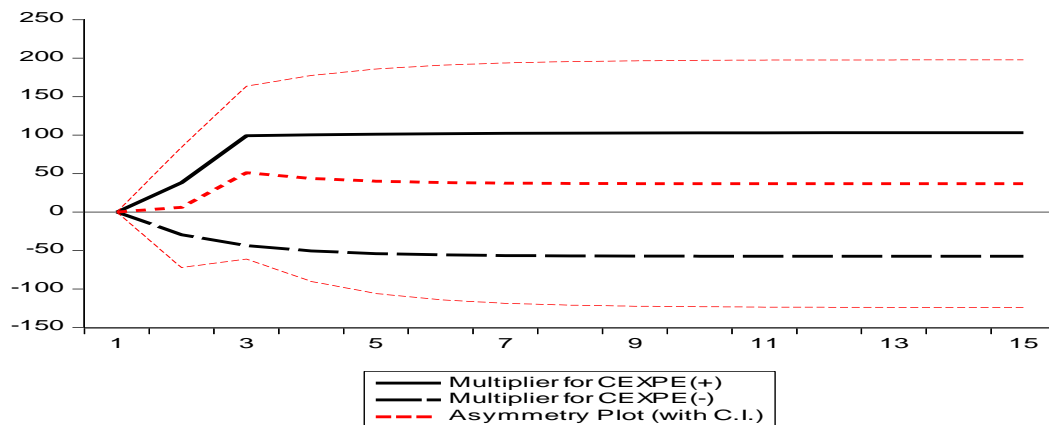
**Fig. 2A**



**Fig.2B**



**Fig.2C**



**Figure:** 2A, B, and C: Asymmetric plot for capital, Recurrent and expenditure on social services

From figures 2A, B and C, it is clear that capital and recurrent expenditure in education including expenditure on social services all have no asymmetric effect on gross domestic product because the multiplier for the variables on both positive and negative are within the dotted red lines.

## Conclusion

In this study, we employed the NARDL to establish if there is the presence or otherwise of asymmetry in the response of Nigerian economic growth proxy by gross domestic product to Nigerian educational expenditure. Our findings revealed that Capital expenditure in education for all the periods is positively related with gross domestic product. Specifically, we observed that positive deviations in capital and recurrent expenditure in education lead to significant increase in gross domestic product, also negative deviations in recurrent educational expenditure lead to insignificant reduction in gross domestic product in both long run and short run. The result also revealed that there is symmetric response of gross domestic product to both capital and recurrent expenditure in both short run and long run.

## Recommendations

The study therefore recommends that:

1. Government should increase capital expenditure in education in Nigeria so as to increase economic growth in the country.
2. Government should increase recurrent expenditure in Nigeria since it has positively impact growth in the country.
3. Government should as a matter of urgency promote the health and education sector which will facilitate the growth of the real sector of the economy
4. Policy makers should outline adequate educational policies that will attract government attention to the sector.

## Reference

Akaakohol, B. M, Akaakohol, I.A & Ijirshar, V. U (2020). An asymmetric impact of government spending on economic growth in Nigeria. *Researchgate*.

Akindele, L. (2015). Financial Allocation to education in Nigeria; *unpublished Ph.D thesis*, Abia State University Uturu

- Anyanwu, N & Uguru, N.E. (2021). Econometric analysis of government educational expenditure and economic growth in Nigeria. *Nigerian journal of interdisciplinary research academy (NJIRA)*,2(03).151-160.
- Ayeni, O.A & Osagie, F. O (2018). Educational expenditure and economic growth nexus in Nigeria. *Journal for the Advancement of Developing Economies*. 7 (1).
- Central Bank of Nigeria (2020) statistical Bulletin, Public finance statistics\_e-copy
- Ifarajimi, G. D. & Oluwole, K. (2017). Government expenditure and economic growth in Nigeria: an analysis with dynamic ordinary least squares. *International journal of academic research in business and social sciences*, 7(5):8-26
- Ifionu, E. P, & Nteegah, A. (2013). Investments in education and economic growth in Nigeria. *West African Journal of Industrial and Academic Research* 9(1), 155-172.
- Keynes, J. M. (1936). The general theory of employment, interest and money. *New York: Harcourt, Brace and Co.*
- Njoku, C. O., Ugwu, K. E. & Chigbu, E. E. (2014). Government public expenditures: effect on economic growth (The case of Nigeria, 1961-2013). *International Journal of Research in Management, Science & Technology*, 2(1), 16–29.
- Pesaran, M.H., Shin, Y. & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16 (3), 289-326.
- Prasetyo, A.D. & Zuhdi, U., (2013). The government expenditure efficiency towards the human development. *Procedia Economics and Finance*, 5: 615–622
- Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In R.C. Sickles and W.C. Horrace (Eds.), *Festschrift in Honor of Peter Schmidt*. New York: *Springer Science and Business Media*.
- Shin, Y. & Yu, B. & Greenwood-Nimmo, M. (2013). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. *Festschrift in Honor of Peter Schmidt, W.C. Horrace and R.C. Sickles, eds., Forthcoming*. Available at SSRN: <https://ssrn.com/abstract=1807745> or <http://dx.doi.org/10.2139/ssrn.1807745>
- Urhrie, J. (2013). Public education expenditure and economic growth in Nigeria. *Owerri; NAEAP publications*.

Ziberi,B. F, Rexha,D., Ibraimi, X, & Avdiaj, B. (2022). Empirical analysis of the impact of education on economic growth. <https://doi.org/10.3390/economies10040089>