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Government Spending on Education and Economic Growth in Nigeria

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Abstract
The study investigated the impact of education spending on the economic growth of Nigeria. We applied annual time-series data from 1980 to 2019 and an Autor Regressive Distributed Lag (ARDL) methodology to examine the effect of education spending on economic growth in Nigeria. The empirical findings established that health, capital expenditure on education, recurrent expenditure on education, positively affected GDP growth rate in the long-run and short-run whereas, inflation rate, gross capital formation, and exchange rate retarded economic growth rate in long-run. Contrariwise, inflation rate, gross capital formation and exchange rate retard the economic growth in the short run. The findings proposed that improved capital and recurrent expenditure on education, stabilized inflation and exchange rate, gross national investment would enhance economic growth, improve living standard, and increase government revenue in the long term

Keywords
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Introduction

The importance of human capital development in the economic growth of any country cannot be over-emphasized. This accounts for the reason countries spend a significant part of their budget on education. Similarly, the United Nations Educational, Scientific and Cultural Organization declared that Member states should devote 4 to 6% of their Gross Domestic Product (GDP) or 15 to 20% of their annual budget to education spending (UNESCO, 2015). Adequate government spending on education has ripple effects which cut across self-realization, good governance, and effective service delivery in every sector of the economy. No matter what stage of development a state would be, the educational system must be planned to educate students for careers along the educational path. The planned educational system must be such that they will need to be able to integrate and coordinate the next level of growth. This is only achievable if the nation's strategic vision, which focuses on education advises, the educational

policy, a market economy built on talented teachers, an attractive foundation for education system funding, and a sustained and accelerated rate of human growth by being objective. Therefore, to achieve these objectives, government spending on education, which is a crux to a meaningful life, should not be toiled by any responsible government. In other words, capital formation, quality of labour, accelerated economic growth, peaceful cohabitation, good governance, and quality service delivery are because of quality education, Towah (2019).

In Nigeria, a substantial amount of money is allocated as a budget annually by both private and government specifically for the education sector. Perusing Nigeria's case, a major problem identified lies in implementation and providing infrastructural development to meet the demand of a modern educational environment in which learning and skill development would thrive. This is because of corruption, high-handedness, and lack of political will. Nigeria is currently rated 154 nations out of 180 countries considered to be the most corrupt in the world (Corruption Perceptions Index, 2022). The implementation of the budgeted amount for the education sectoral development and sustainability according to UNESCO's recommendations is a challenge in Nigeria. Given this, when education is poorly funded, the quality of life and productivity would be affected because the productivity of labour depends on the quality of education and other indicators over time (Roser and Ortiz-Ospina, 2020) discoursed that the quality of education, however, depends on the amount invested in Education. Additionally, the GDP percentage intended to be spent on education in Nigeria over the years kept on declining far below the UNESCO declaration. 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%. Given the ups and downs of the government spending on education, the standard, and quality of education deteriorate while industrial actions are frequent among places of learning in Nigeria.

It is argued that unless the root causes of poor performance of education in Nigeria are tackled, education will not contribute successfully towards economic growth in Nigeria. Considering this, however, it bewilders if there is an appropriate allocation and implementation of budgets for the educational sector. Considering all of these factors, the purpose of this paper is to examine and demonstrate, using appropriate macroeconomic indicators, to verify the effect of education spending on the economic growth of the oil-rich nation of Nigeria. The causes of both short-term and long-term growth are differentiated in economic theory. Because of sources of friction, such as a steady rise in the general price level of goods and services, and sticky wages which prohibit the economy from responding instantly, shocks have an impact on growth in the short run and lead the economy to diverge temporarily from its long-run growth track. Long-term economic growth, on the contrary, is frequently fuelled by advancements in

productivity, capital accumulation, employment growth, macroeconomic trends, technological innovation, and structural change. Therefore, to avoid drawing incorrect conclusions about the nature of economic linkages that could lead to bad policy choices, econometric models must distinguish between various periods (Usman and Olivier, 2021).

Given the importance of time in econometric modelling, the current work fills a gap by meticulously assessing the long and short-term link between education expenditure and economic growth in Nigeria using annual time-series data from 1980 to 2019. The random properties of the variables are investigated by completing the standard augmented Dicky-Fuller (ADF), Phillips-Peron (PP) and followed by the Bai-Perron structural break unit root test. Auto-Regressive-Distributed Lag (ARDL) approach was used for testing the existence of co-integration relationships among the study variables. The study contributes to the existing literature in the following research directions. First, it analyses the real effects of economic growth by disaggregated capital and recurrent expenditure on education in Nigeria. Secondly, a long time covering a span of forty-years from 1980 to 2019 was used, as new economic activities have taken place before the current study. Thirdly, in the applications of the econometrics methods to estimating the variations, we also incorporated new and more important variables in the model to comprehensively investigate Nigeria's peculiarity. The rest of the study is structured thus: section two presents the theoretical framework and empirical reviews. Methodology and the procedures that guided the study in section three. The section four of the work dwells on the analysis, interpretation, and results. Section five is on the conclusion and policy recommendations.

Theoretical Framework

Though some 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 model as discussed below:

Human Capital Growth Theory

According to Romer's (1986) human capital-induced growth theory, the source of divergence in economic performance and the rate of growth between countries is human capital. According to the human capital idea, acquiring more education and training in specific abilities can boost a person's capacity for production. According to Claudia Goldin (2016), the foundation of the human capital concept is the notion that investments in people—like education—increase productivity and skill sets among employees. This theory is relevant to the knowledge economy because it emphasizes the widely held belief that an individual's human capital will increase and their demand for specialized knowledge will increase as they become more educated. Human capital-induced growth theory; however, spreads the frontier by disaggregating public spending on education into two components. Splitting public spending

on education into capital and recurrent expenditures provides a more coherent and wide-ranging apparatus for examining the role of public spending on education in economic performance. Furthermore, technology and information, which are the end products of discovery, are the indirect effects of conscious human endeavour (Romer,1986, 1994).

Nigeria, like many other nations around the globe, spends a huge amount of its budget on education annually. There are reasons behind such practice. Education could play a vital role in the economic development of countries' or it might be to meet the expectations of the international community's treaty, of which they are a member.

Thus, research and development(R&D) is part of education spending which trickles down its effects to other segments of the societal development. One thing is found common in Nigeria's education budget: the problems of implementation and execution. The resultant effects of poor funding and implementation of education spending are Poverty, low productivity, unemployment, lack of access to quality and compulsory education, social and dilapidated services on the infrastructural contours (World Bank report, 2019), and (Ehikioya, 2019). It is no doubt such conditions could be harmful and detrimental to economic growth.

In recent times, it is evidenced that social vices such as insurgence, corruption, and political instability are on the rise in Nigeria. This is a result of poverty, unemployment, and inflation and exchange rate fluctuations which are centred on poor standards of education and low productivity which decline the gross domestic product. Education spending is considered an investment in human capital since it aids in skill building and increases the ability to work and creates more skilled workers. Countries invest in education to elevate their human resources, which will increase growth (Suwandaru et al. 2021).

Empirical Review

Literature on the government spending on education and economic growth relationship has largely been inspired by seminar papers and article publications. To understand what category of education contributes more to economic growth, Lawanson & Umar, (2020), belief that education fosters growth by disintegrating the different levels of education: primary, secondary and tertiary. The outcomes of the studies indicated that there is a cointegration between total government education expenditures and economic growth. The outcomes of the study also revealed that all levels of education expenditure contribute to economic growth positively. Similarly, Shaliza et al. (2022), conducted a study on the impact of government expenditures on the economic growth in Malaysia using independent variables such as-development expenditure, education, healthcare, and gross fixed capital formation from 1980 to 2020 as guidelines. The findings of this study show development expenditure is positive and significantly affecting Malaysia's economic growth, while education, healthcare, and gross fixed

capital formation are negatively significant. Theoretical model explaining the channels through which human capital accumulation impacts on economic growth are presented by Bucci, (2014), on the economic determinants of the inter-sectoral allocation of skills within an R&D-based growth model with human capital accumulation. The research finds that steady-state growth is driven only by incentives to accumulate skills and its independent of scale effects. In the model, imperfect competition has a positive growth effect, while influencing the allocation of human capital to the different economic activities.

The work of Raghupathi & Raghupathi (2020), shows that an increase in healthcare expenditure has a positive relationship with economic performance. Similarly, Esen & Çelik Keçili (2022) using time series data of forty-three years period from 1975 to 2018 with the application of the VAR model investigated the effects of health expenditure on economic growth in Turkey. The results indicated that the Granger causality test results showed a unidirectional causality from health expenditure to economic growth in the short term. The existence of a long-term relationship among related variables and a short-term relationship between health expenditure and economic growth displays the importance of investments in healthcare services in Turkey. Similarly, Torruam et al. (2014), investigates the Impact of public expenditure on tertiary education and economic growth in Nigeria using time series data for the period 1990-2011. A cointegration analysis and error correction technique was applied. The study concludes that public expenditure on tertiary education has a positive impact on economic growth in Nigeria.

Furthermore, Armeanu et al., (2018) investigated the empirical studies towards the drivers of sustainable economic growth in EU-28 countries. Panel data regression models, in the form of fixed and random effects models, alongside system generalized method of moments were used. The result from the finding as regards higher education, shows that expenditure per student in higher education and traditional 18–22-year-old students are positively linked with sustainable economic growth, whereas science and technology graduates negatively influence real GDP growth.

On the contrary, in another study investigated in eleven formers communist - Central and Eastern Europe by Nuţă et al., (2022) an ARDL with a structural break model was adopted for the study and mixed-up research findings were dictated. The public education expenditure-economic growth relationship is mixed in the long term; for five countries, there is no such thing; for six countries, there is one in the long term. In the short term, also, mixed results manifested for four countries are positive, and for two negatives.

Ülger (2020) endeavoured to analyse the relationship between education expenditures and growth via graphics for the period of 2000-2018 in Turkey. As a result of studies on the effect of educational growth in Turkey, it stands out statistically insignificant. In

this context, it is necessary to make investments to improve the quality of education and training in Turkey. For this, unproductive resources devoted to education should be used and should support economic development by increasing education expenditures.

However, from the existing empirical studies, the use of panel based was common and is unable to cover the country's specific data cauterizations of Nigeria. Thus, even though there are several empirical studies on the relationship between government spending on education and economic growth in Nigeria, such existing literature used a short time frame which is not long enough, and tremendous changes have occurred since then in Nigeria. Moreover, some other literature related to Nigeria suffered from variable omission. This study attempts to fill these identified gaps by interpreting the country-specific characteristics of the linkages between government education spending on economic growth in the oil-rich nation.

Data and Methodology

This study draws on secondary data from various sources, namely: the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), and World Bank (WB) database using the desk survey approach. Annual time series data of Nigeria covering the span of 40 years from 1980 to 2019 were used in the study. The macroeconomics variables on which data were collected are Real Gross Domestic Product (RGDP), Government Expenditure on Health as a percentage of GDP (HEX), Inflation Rate (INF), Government Capital Expenditure on Education as a percentage of GDP (CEX), Government Recurrent Expenditure on Education as percentage of GDP (REX) Gross Fixed Capital Formation as a percentage of GDP(GCF), Exchange Rate (EXR). Data on RGDP, HEX CEX, and REX which were taken in monetary terms were log-transformed to stabilize the variance of the series. Whereas INF, GCF and EXR retained their percentage form. 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 literature, 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). To be properly guided, the study modelled RGDP as a function of the above-mentioned potential drivers of economic growth using a broad formulation of Jones (2019), and Jalil (2008), endogenous growth model.

The multivariate model adopted in this study emphasizes the short and long-term effects of government education spending on the economic growth of Nigeria. The researcher, therefore, devised and specified an Auto-regressive-Distributed Lag (ARDL) model, in an Error Correction (ECM) form as follows:

$$\Delta LnRGDPt = \beta_0 + \beta_1 LnRGDPt_{-1} + \beta_2 LnHEXt_{-1} + \beta_3 INFt_{-1} + \beta_4 LnCEXt_{-1} + \beta_5 LnREXt_{-1} + \beta_6 LnGCFt_{-1} +$$

$$\beta_7 EXRt_{-1} + \sum_{i=0}^{q} \emptyset 1^{\Delta} LnRGDP_{t-1} + \sum_{i=0}^{q} \emptyset\, 2^{\Delta} LnHEXt_{-i} + \sum_{i}^{q} \emptyset_3 \Delta LnINFt_{-i} + \sum_{i=0}^{q} \emptyset_4 \Delta LnCEXt_{-i} + \sum_{i=0}^{q} \emptyset_5 \Delta LnREXt_{-i} + \sum_{i=0}^{q} \emptyset_6 \Delta EXRt_{-i} + \sum_{i=0}^{q} \emptyset_7 \Delta GCFt_{-i} + ECTt_{-1} + \mu_t$$

Where:

RGDP is adopted as a precise gauge of economic growth and the dependent variable of the model. It is an inflation-adjusted measure that represents the value of all final products and services produced each year, expressed in a base year price.

INF is measured in rate and determines the general price levels of goods and services in Nigeria. Rising prices deplete disposable income, which increases poverty among the people. As consumers' income improves because of the decreasing general price level, their general capabilities to demand goods and services improve, leading to an increment in their living standard.

Therefore, a controlled inflation rate is appropriate for macroeconomic stability. CEX in billions of Nigerian Naira measures the amount which the government spends on developing infrastructures for the education sector. Annually, the Nigerian government spends a huge amount from its national budget on education in terms of training the workers and providing infrastructures for the education sectors. REX in billions of Naira, measures government spending on education as a result of wages and salaries for the employed workers. It is a catalyst and the engine wheel for motivation for the services rendered. GCF is an investment in fixed assets funded with money raised via the stock market. Following the IMF report (2018), the GCF was adopted as a proxy for the level of private investment. EXR measures the rate at which one currency measures with another currency. Most exchange rates are said to be floating and will rise or fall with the interaction between supply and demand by the market forces. Some exchange rates are pegged or fixed to the value of a specific country's currency. Nigeria's naira, exchanged at the time of this research, stands at 418 naira per US dollar as an official rate. It is the selling price of the national currency in Nigeria since 2022.

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. B1, 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. The dependent variable is expected to interfere or correlate with one or more of the endogenous variables in the model.

Estimation Procedure

The study applied the Auto-Regressive-Distributed Lag (ARDL) technique for testing the existence of a 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) behaviour 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 qualities than multivariate co-integration. Likewise, in distinction to vector autoregressive (VAR) models, the ARDL model will accommodate a larger range of variables and additionally, versatile in terms of lag structure; in this case, it can settle for multiple optimum lag structures for distinct variables (Babu et al., 2020)

Preliminary Analysis of Study Variables

The study conducted series of preliminary tests on the nominal data set used in the analysis by characterizing the key properties of the study variables to assess their dependability and quality for running OLS regression.

Table 1 Descriptive statistics of the variables

	Mean	Median	Maxi	Mini	Std. Dev	Skewness	Kurtosis	J.B Prob	Obs
DP	34793346	23068845	84064360	13779256	21372676	0.83	2.31	0.06	40
HEX	71.75350	15.9300	388.3700	0.040000	102.4985	1.42	3.99	0.10	40
INF	18.87565	12.15350	72.83600	53.82000	16.91412	1.82	5.15	0.23	40
CEX	7.757576	8.076546	10.78505	4.935193	1.649010	-0.08	2.03	0.45	40
REX	2.960378	3.917520	6.471960	-1.832581	2.821333	-0.51	1.84	0.13	40
GCF	37.17675	35.31500	89.39000	14.17000	20.66511	0.99	3.39	0.03	40
EXR	94.44025	103.7250	306.5000	0.600000	91.57079	0.80	2.91	0.11	40

Results and Discussions

An outline of descriptive statistics for every study variable is provided in Table 1.

From Table 1, the Jarque–Bera likelihood values of RGDP, HEX, INF, CEX, REX and EXR are larger than the 5% significance level, indicating that these variables are normally distributed. The Jarque–Bera probability value of the differing variable indicated a definite lack of normality in its residual, as proven by the Jarque–Bera probability value of lower than 0.05. The non-normality of residual might be, since this variable is significantly prone to oil value shocks and other economic instabilities, which would have caused outliers, leading to residual non-normality. However, in exception to INF, GCF and EXR that were in percent, the Jarque-Bera probability of the nominal values of HEX, CEX, and REX, were estimated to be normally distributed. Furthermore, the normality of the data distribution is not required for use in the ARDL cointegration technique used in this study (Rahman and Islam 2020). Accordingly, the reportable estimated results within the study are considered relatively efficient.

Table 2 The Pearson correlation analysis

	HEX	INF	CEX	REX	GCF	EXR
HEX	1.00					
INF	-0.15	1.00				
CEX	0.62	-0.26	1.00			
REX	0.57	-0.10	0.61	1.00		
GCF	-0.60	0.11	-0.61	-0.47	1.00	
EXR	0.33	-0.11	0.61	0.52	-0.61	1.00

Furthermore, the correlation analysis became necessary as performed 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 is stated to be enormously collinear (Babu et al. 2020).

Table 2 shows the Spearman rank-order correlation check for the explanatory dependents. From Table 2, there may be no proof of any tremendous multi-collinearity or linear dependency among the explanatory variables of the estimation model.

Table 3 Summary of unit root test

Variables ADF	PP Test		Bai-Perron						
	Level	1st Diff	Level	1st Diff	Rmk	Break Date	Level	1st Diff	Rmk
LnRGDP 0.9833[n]	-4.0302[a]	1.5776[n]	-3.9273[a]	I (1)	1999	-1.8526[n]	-4.8391[a]	I (1)	
LnHEX	-2.8789[c]	-0.2198[n]	-0.8541[n]	-19.0867[a]	I (0)	1999	-0.9302[n]	-9.7873[a]	I (1)
INF	-2.4357[n]	-6.2739[a]	-2.8617[c]	-11.7637[a]	I (1)	1995	-5.2587[a]	-7.6186[a]	I (0)
LnCEX	-1.3634[n]	-6.7939[a]	-1.3188[n]	-6.7939[a]	I (1)	1992	-3.3640[n]	-9.0945[a]	I (1)
LnREX	-2.8434[c]	-5.2065[a]	-1.3349[n]	-10.8350[a]	I (0)	1992	-5.0811[a]	-7.3345[a]	I (0)
GCF	-3.8106[a]	-4.5538[a]	-3.2924[b]	-4.6390[a]	I (1)	2018	-2.6510[n]	-10.402[a]	I (1)
EXR	0.7291[n]	-7.2876[a]	0.6541[n]	-7.0736[a]	I (1)	2014	-1.2868[n]	-4.9364[b]	I (1)

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.

The maximum correlation between any paired regressors was valued to be 62%, which is within the generally acceptable threshold of 80%. Thus, even though the ARDL bounds testing methods does not rely on prior knowledge about the order of integration of the series under review, it is sensible to test for the stationarity properties of all variables to assure that none of the examined variables is I (2) stationary to obtain reliable results. To avoid a wrong application of the ARDL technique, the study implemented the traditional Augmented Dickey-Fuller (1979), Phillips-Perron, (1988) and the Bai and Perron (1988) structural breaks unit root tests to be sure that unobserved heterogeneity in 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 Table 3 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 in theory to justify the pertinences of an ARDL approach to test for co-integration.

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-term 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 the sample size is forty 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 (1, 0, 2, 2, 1, 2, 1) 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.

The table indicates that the calculated F-statistic value of 17.63716 is larger than the upper bound critical value of 3.99 at the 1% (percent) significance level, evidencing to prove the fact that a significant long-run relationship exists between education spending and the economic growth of the Federal Republic of Nigeria expressly captured in Eq (1). 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.

Table 4 ARDL bounds test for co-integration results.

Model	*F*-statistics	K	Critical values			Decision
% Lower	Upper					
			Bound 1(0)		Bound 1(1)	Reject H_0 and Accept H_A. Cointegration exist
LnRGDP=f (LnHEX, LnINF, LnCEX, LnREX, GCF, EXR)	17.63716	6	1%	2.88	3.99	
			2.5%	2.55	3.28	
			5%	2.27	3.61	
			10%	1.99	3.9	

To validate the long-run impact of education spending on the economic growth in Nigeria, the research estimated the conditional ARDL long-run approach for Eq.1. Therefore, the long-run estimated results are displayed in Table 5.

Table 5 Estimated ARDL long-run Coefficients Result

Regressors	Variables	Coefficient	Std. Error	*t*-Statistics	*P*-Value	
LnHEX	0.229821	0.080334	2.860828	0.0091		
INF	-0.003024	0.001779	-1.700352	0.1032		Estimated ARDL long-run coefficients. Dependent variable: LnRGDP
LnCEX	0.067035	0.025762	2.602098	0.0163		
LnREX	0.15323 4	0.090815	-1.687312	0.1057		
GCF	-0.002157	0.004614	-3.307839	0.0032		
EXR	-0.002157	0.000547	-3.945185	0.0007		
C	18.316143	0.253160	72.350094	0.0000		

Long-run Effects of Education spending on Economic Growth in Nigeria

From Table 5, the estimated coefficient of government spending on health (LnHEX) indicated a significant positive relationship with long-term economic growth at one percent probability level. Based on the result, a percentage increase in the health spending will, if other variables remain unchanged, produce an increase of about 0.22% in the long-run economic growth. The result stress that health is fundamental to economic growth. This is because healthy people can live longer, work for more available time and increase output for economic growth. The importance of health workers in a nation would be further appreciated during the pandemic outbreak like Coronavirus in Nigeria as the economic activities were put to halt. ‘’Indicating that a healthy nation is a wealthy nation”. The low coefficient value is as a result of multi economic problems facing the country. Nigeria is suffering from high insecurity, inflation, and exchange rate which affect the quality of health and labour. Furthermore, the country's major source of revenue is from the sales of crude oil. The oil prices dwindle in the international markets, which will have a resultant effect on the capital expenditure on health, as Nigeria's budget depends majorly on the sales of crude oil. The result is in line with the *a priori* expectation and previous empirical studies of Esen and Keçili (2021), and Raghupath and Wullianallur (2020), who in their works on Turkey and United States of America respectively, affirmed that investing carefully in various healthcare aspects would increase Income, GDP, and productivity, and alleviate poverty.

The estimated long-run coefficient of Inflation Rate poised a significant negative relationship with the long-run economic growth at ten percentage probability level. In view of the result, a percentage decrease in the general price level will produce a decrease of about 0.01% in long-term economic growth. Rising prices depletes disposable income, which increases poverty among the people. As consumers income improves because of the decreasing

general price level, their general capabilities to demand for goods and services improve, leading to an increment in their living standard. High inflation rate can lead to frustration and discontent among the people, which would cause the breakdown of law and order. Therefore, a controlled inflation rate is appropriate for macroeconomic stability. The result is akin to the *a priori* expectation which suggests that a decline in the general price level of goods and services will stimulate a long-term economic growth as demonstrated in the findings of Michael et al. (2019), Nguyen (2020), Mandeya and Sin-Yu-Ho (2021) and Kusumatrisana et, al., (2022). They all reported a significant negative relationship between inflation rate and long-term growth in Nigeria and Vietnam, respectively.

The estimated coefficient of Capital Expenditure on Education (LnCEX) Indicated a significant positive relationship with long-term economic growth at one percent probability level. Based on Table 5, a percentage increase in capital education spending will generate an increase of approximately 0.06% in long-run economic growth. This may be as a result of the important role which education spending plays on human capital development and economic growth. The coefficient level of the variable reflects economic shocks and dwindling crude oil prices at the international market as the major source of revenue for Nigeria. To improve economic growth through education spending, there is a need to look out on selected programs and courses of study in education that are capable of contributing towards growth. One major problems of Nigeria's capital spending on education in terms of human capital development is that it is hinged on political bases, ethnic bias, and most importantly, on many irrelevant courses of study. For example, the Tertiary Education Trust Fund (TETFund) spends billions of naira yearly on capital projects and training of staff of higher education in Nigeria.

Specifications should be made in relative to meet the current global development standard in education and development. It should not be in every project, every vehicle, and every course of study because credentials and number of years spent in education does not entail skill acquisition and may mislead the employer. The study result in line with the *a priori* expectation indicating evidence of a positive relationship between government capital spending on education and economic growth in accord with the Keynesians theory, (Wilson and Briscoe, 2004) and (Rasa and Simona,2016) who concluded that, overall, the impact of investment in education and training on national economic growth is positive and significant.

The long-run coefficient of Recurrent Expenditure on Education (LnREX) proved to be negative impact on the economic growth. From Table 5, a percentage increase in the total education recurrent expenditure holding other explaining variations constant propels an increase of about 0.15% in the long-term economic growth. There is no doubt that there could be a relationship between wages, salaries, compensation, inflation, unemployment rate and economic growth. Moreover, it

is imperative to note that recurrent expenditure on education is for consumption and the general households spending and will have a significant impact on education. Prolonged increase in general price level of goods and services would keep depleting the real wages of the workers in Nigeria, combined with high level of family dependency. The effect is witnessed on the business circle on one hand and on the students as the money received as wages and salaries are spent by the workers on business activities which will have a multiplier effect on growth. Nigeria currently witnesses general economic shocks in which unemployment and inflation are on steady rise. As a result of the economic shock, raising from corruption to insecurity could be the result of low value of the coefficient. The finding is in line with the *a priori* expectation and in accord with classical economist marginal productivity theory that a relationship exists between wage rate and the productivity of labour. Furthermore, Torruam, Chiawa, and Abur (2014), and Ayeni and Omobude, (2018), who affirmed that recurrent educational expenditure exhibited a significant relationship with economic growth.

The estimated coefficient of Gross Capital Formation (LnGCF) depicted a significant negative relationship with the long-term economic growth at 1% significant level. In respect to the Table 5, a percentage increase in gross capital formation, will ceteris paribus, generate a decrease of about 0.001% in long-run economic growth. This is possible as a result of Insecurity, economic shocks, dwindling oil price and continuous up surge of inflation and political violence which can distort the equilibrium resource allocation in Nigeria by changing individuals 'savings, investment and consumption patterns. The contentious rise of the general price level in Nigeria has adverse economic consequences. One of them is destabilizing individual and public savings patterns, which will affect investment at large. To the banking institutions, contractionary policy will make less money available for the business establishments. This will certainly pressurise the standard of living as the cost of living will rise. The rising living costs would cause lack of economic opportunities, which will lead to frustration and break of law and orders. Nigeria is prone to political violence and persistent attacks by bandits in more recent time. These attacks by bandits and terrorists' groups destroy infrastructure, thereby affecting the entire businesses cycle in the country. The results are the decline in profits and thus, smaller economic return on investment (ROI). Insecurity drags the country's economic progress backwards. Recently, the Nigerian government borrowed to finance challenging security problems facing the country. In this, huge amounts meant to develop capital projects are channelled to purchase firearms to fight insecurity. The education sector, like every other one, is badly affected to the extent that schools in the northeastern part of the country are no longer functional. All these impediments stifle domestic capital formation and private investment, thereby becoming an impediment to long-term economic

growth in Nigeria. The finding contradicts a' priori expectation and is extant in the studies of Menon (1995) but in line with Onyinye et al. (2017), and Ajose and Oyedokun (2018), who reported that gross capital formation has no significant impact on economic growth in Nigeria within the period of study.

The long-run coefficient of Exchange Rate (EXR) showed a negative relationship with the long-run economic growth at 1% significance level. From the Table 5, a percentage point increase in exchange rate other explanatory variables held constant, decreases growth by about 0.01% in long-term economic growth. Declining exchange rate will surely improve the economic conditions of the people of Nigeria. As the rising exchange rate depletes the economy, Nigeria, is a consumption nation where virtually every commodity is imported. The major source of FX is through the exports of crude oil. When imported finished goods are directly consumed by consumers, the goods' price level change will have a direct effect on domestic price changes. Second, if the imported goods are semi-finished goods used to produce domestic products, the price increases of the imported goods will lead to increased production costs in the country. The effect is that output prices will rise. Meanwhile, the implication on the wage level is that exchange rate depreciation would lead to cheaper domestic products, so exports and aggregate demand will rise and lead to increased domestic prices. However, the real wage offered in long term is fixed wage so that in long term it would cause the price rises and output falls. The result confirmed the a priori expectation and finding of (Ehikioya,2019) who affirmed that exchange rate volatility has a negative and significant effect on the economic growth of Nigeria.

Short-Run Effects of Education Spending on Economic Growth in Nigeria

Regressors	Coefficients	Std. Error*t*	-Statistics	*P*-Value
D(LnHEX)	0.051796	0.006113	8.473380	0.0000
D(INF)	-0.001064	0.000292	-3.651661	0.0014
D (INF (-1))	0.000848	0.000279	3.039544	0.0060
D(CEX)	0.10881	0.005813	1.871845	0.0746
D (CEX (-1))	-0.014783	0.005258	-2.811567	0.0102
D(REX)	0.000375	0.006680	0.056205	0.9557
D(GCF)	-0.001755	0.000810	-2.165834	0.0414
D (GCF (-1))	0.003738	0.000897	4.166923	0.0004
D(EXR)	-0.001047	0.000217	-4.826598	0.0001
CointEq (-1)	-0.243645	0.017269	-14.108436	0.0000***

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

Cointeq=LnRGDP-(0.2298*LnHEX -0.0030* INF -0.0670*LnCEX -0.1532* LnREX -0.0153* GCF +0.0022* EXR +18.3161)

After estimating the long-run coefficients result, the ARDL model makes use of the lagged values of all variables within the Eq (1) (a linear mixture denoted with using the error-correction term (ECT) to estimate the model's short-run dynamics as related to the long-run relationship were revealed. Table 6 shows the results of the estimating model.

According to the results, the model's error-correction term is particularly significant and correctly signed. The error-correction period has a coefficient of – 0.243645, inferring that around 24% of the deviations from the long-run growth rate in output caused' via the past years' shocks converge to long-run equilibrium in the present year. The result supports the existence of a long-run relationship between economic growth and the analysed enabler of education spending in Nigeria, suggesting that health spending, a stable exchange rate and strong economy enterprise foster long-term growth.

From table 6 current level of health spending D(Lannex) in agreement with the long-run result has a significant positive impact on economic growth. With increasing spending on health in Nigeria, the level of development continues to improve. Inflation rate D(LnINF) is also in agreement with the long-run result while its one-year lag value D (LnINF (-1) also indicated a significant positive impact on growth, and both are significant at one percent. This shows that stable general price levels will improve on the saving, which will improve investment and promote economic growth. Nigeria is currently suffering from a high inflation rate, which has surged to 19.64% at the time of this research. The implication is that, as long as the general price levels keep rising, investment in the critical infrastructures like education and health will remain difficult. This will keep on with low growth rate as a percentage increase in the current level improves growth at about 1% while a percentage increase in the one-year lag value of the variable decreases the current rate of growth by about 1%.

Furthermore, the coefficient of the precent level of Capital expenditure on education D(LnCEX) in compliance with the long-run result indicated a significant positive impact on the current rate of economic growth. However, the coefficient of the one-year lag of capital expenditure on education D (LnCEX (-1)) shows a negative significant impact on the current level of growth. Accordingly, a percentage increase on the capital spending on education, increased economic growth by about 0.01% in the current level of growth while a percentage increase in the previous level of capital expenditure on education spending generated a decrease of around 0.01% in the current level of economic growth.

However, the percentage level of Recurrent expenditure on education D(LnREX) is in conformity with the long-run results generated a positive relationship impact on the current rate of economic growth. Thus, a percentage increase in the government spending on education salary and remuneration motivate an increase of approximately 0.01% in the current level of economic growth. This is because, money paid as

salaries and wages to workers stimulates the economy, reduces poverty, and improves the living standard of the people.

Similarly, the coefficient of the present level of Gross Capital Formation D(GCF) in line with the long-run results exhibited a significant negative relationship with the current rate of economic growth that was significant at 0.04% probability level. Moreover, the coefficient of the one year-lag of the gross capital formation D (GCF (-1) shows a positive, significant impact on the current level of growth. Considering this, a percentage increase in the gross capital formation or national investment decreases economic growth by 0.01 percent while, a percentage increase in the rate-gross capital formation produces an increase of about 0.01% in the current level of economic growth. The unproductive result in the national investment is as a result of the high inflation rate and the level of insecurity currently facing Nigeria.

From the Table 6, the estimated coefficient of the current rate of Exchange D(EXR) value is in conformity with the long-run results elicited a significant negative impact on the current rate of economic growth at 0.01% probability level. Indicating that a percentage increase in the exchange rate decreases the current rate of growth by 0.001%. The high exchange rate affects Nigeria's economy and consumption pattern as it has a linkage with the inflation and commodity price of goods and services. This has a direct impact on the wages and salaries while there is a price shoot up.

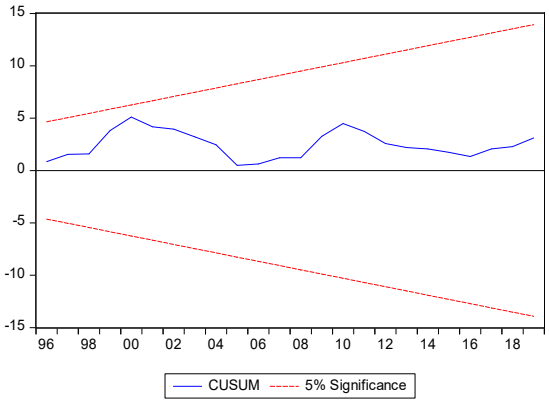
Post Estimation Diagnostics Test

The results of this study were subjected to several econometric diagnostics tests associated with serial correlation, heteroscedasticity, functional form, and stability checks. The Breusch-Godfrey Serial Correlation LM Test, Breusch-Pagan-Godfrey, Specification tests (Ramsey RESET test), CUSUM and CUSUM of Squares tests were the econometric tools employed for these tests. The estimated diagnostic indicators are summarized in Table 7.

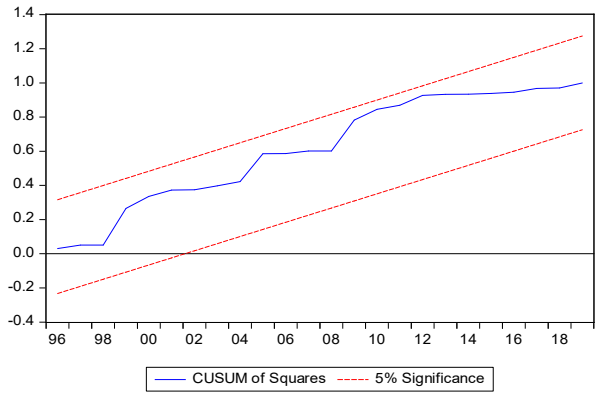
Table 7 ARDL model diagnostics test indicators

Test	Null hypothesis	*F*-statistic	*P*-value
Breusch Godfrey LM Test	No Serial Autocorrelation	2.127904	0.1192
Breusch-Pagan-Godfrey	No Heteroscedasticity	0.93988	0.5393
Ramsey Reset	No Misspecification	0.020447	0.8877

The diagnostics test statistics in Table7 revealed that the model's residuals are normally distributed, with no significant evidence of multi-collinearity, serial correlation, heteroscedasticity, or model misspecification error. As the aforementioned attributes are desirable qualities of OLS models, the model was properly specified.



CUSUM Test



CUSUM of Square

The CUSUM and CUSUM of squares tests (Figs. 1 and 2) suggest that the estimated model parameters are within the critical boundaries at a 5% significance level, 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.

Conclusion and Policy Implementations

Necessary competences and skill acquisitions are the backbones to economic growth and human capital development metered to accelerate a nation's major economic growth. The most modern form of such a process is through education. Formally, education or knowledge acquirer can be formal or informal before now. Modern education is systematic, organized processes needed to develop human capital. Two things are important for the development and growth of a nation: first, the capability and vibrancy of the labour force and secondly, the development of technology, which is the end point of education. There is a clear apprehensive that Nigeria is endowed with human capital owing a population of about two hundred and fifty million of which the youths comprise of the 70%. The level of unemployment in Nigeria is that the able-bodied men (the youths) made up about 69% of the total unemployed persons. As a result of this, energies are channelled towards negative insubstantial matters that rise steeply the crime rates, loss of lives, depletions of population and destruction of private and public investments which exceptionally affect economic growth. Using the ARDL technique, this study undertook an empirical examination of the relationship between the enablers of education spending and economic growth in Nigeria during a 40-year period from 1980 to 2019. The empirical results indicated that inflation rate, exchange rate, gross capital formation negatively affected by the gross domestic product in the long and short run. Inversely, improved health spending, capital expenditure on education, and government recurrent expenditure on education were positively correlated with economic growth and, therefore, stimulated growth in the long and short run. The error-correction term

suggested a 24% speed of adjustment to any disequilibrium.

The study findings have policy implications for proper development of the education sector as a bedrock to the national development and growth. Sustainable economic growth can be achieved through adequate implementation of education spending and skill acquisition. In view of this, lack of effective leadership, embellished political irresponsibility and improper attention to education has been the major factor affecting education in Nigeria.

The results of this study are regression estimates based on Nigeria data; it is important to draw policy implications from the results with some degree of caution. The results suggest that the impact of capital spending on education should be systematically addressed when preparing government budgeting and expenditure plans. From the result of the study, it can be deduced that effective implementation of capital expenditure on education has not been adequately fowled as the government has not met the United Nations Chatter of compulsory 12% of the yearly national budget on education in Nigeria. Unless proper attention is giving to the education sector, it may not archive its spelled objectives for economic growth. The study proposes that policy makers should enhance economic growth, improve on the national investment, stabilize both inflation and exchange rates, which will the living standard and enable investment in education to accelerate economic growth. Although the current study provides remarkable insights on the government education spending on economic growth, it is liable to significant limitations, mostly related to data availability and the econometric technique. Future more, research could investigate a comparative assessment of the effects of insecurity on education and economic growth in Nigeria's various geopolitical zones using additional variables.

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