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GOVERNMENT SPENDING IN EDUCATION AND HUMAN DEVELOPMENT INDEX IN NIGERIA

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Abstract: The study examined government spending in education and human development index in Nigeria from 1990-2020. The objectives of the study were to; examine the effect of government capital and recurrent expenditure in education sector on human development index (HDI) in Nigeria. Annual data were collected from CBN statistical bulletins and World Development Index (WDI). The main technique of analysis is the parsimonious error correction method (PECM). Meanwhile, the technique of Augmented Dickey Fuller (ADF) unit root test was used to ascertain the order of integration of the variables before the variables were subjected to the PECM. The empirical results showed that; government capital expenditure in the education sector has positive and significant impact on HDI. Government recurrent expenditure in the education sector has positive but insignificant impact on HDI. The study concluded that, improved HDI in terms of better standard of living and improved literacy level is a function of increase capital spending in the education sector as against the recurrent expenditure. Based on the findings, the following recommendations were made:- Government education spending in Nigeria, should be skewed towards capital component rather than the usual recurrent component. This is because; capital expenditure will help to facilitate better human development index, if they are tailored towards infrastructural development. Government recurrent expenditure in the education sector should be well utilized in prompt payment of workers salary and remuneration. This will serve as a catalyst for improved output.

Keywords: Capital, Catalyst, Development Index, Education, Government spending, Human,

1. INTRODUCTION

Government spending as a component of aggregate demand, include all spending at each level of government to meet the goal of stable and long-run growth and economic efficiency (Gbanardo, 2007). It is essentially an expenditure made by the government of a country on the need of the citizenry, such as pension, education, provision of infrastructures among others. This expenditure is divided into both capital and recurrent expenditure. Recurrent expenditure involves all day-to-day running costs of government on the maintenance of existing or new institutions and services. Such recurrent costs include salaries and wages of public officers, expenses on administration, defense and other social services like education, health and pension scheme. On the other hand, capital expenditure refers to costs of bringing into existence new institutions, services and projects. Specifically, they refer to all government expenses on new buildings, roads, bridges, hospitals, schools, factories, and equipment required for providing social and economic services (Gbanardo, 2007).

According to Keynes (1936), increase in government expenditure can be a powerful tool to revitalize total demand for a dormant economy and to achieve the desired consequences for the private sector. Thus, government could turn around financial downturns by

acquiring cash from the private sector and afterward restoring the cash to the private sector through different spending programs, include; community/social service which include; public education, universal health care, police, fire service, public transportation and housing Consequently, social service investment; especially education spending, is one of the aspects of government spending that brings about growth and development. This is because; investment in education provides quality of life to every citizen of any nation. In the light of this, Cochrane (1986) contends that; a well-educated populace has better life expectancy and lower child mortality rate. As such, "education must be viewed as a procedure whereby an individual is locked in for all intents and purposes from cradle to the grave and not to be assumed as securing requisite skill for the available work" (Kalu, 2001).

Given a precarious economic condition that faces most developing countries, like Nigeria, which is manifested in persistence increase in price level, low level of employment, high rate of poverty, poor standard of living and stunted growth, the need to improve expenditure in the education sector cannot be over-emphasized. This is because education plays prominent role in the attainment of a nation's development. Therefore, Nigeria, like other developing countries of the world, views sustained investment in the education sector as vital for rapid growth and development.

Meanwhile, in Nigeria, public expenditure, which is the basis of education financing, has constantly fallen short of the public expectation. This has hindered the country to launch into the expected human development index such as quality of life or good standard of living, improved health care services and improved literacy level for her citizens. Little wonder did United Nation Human Development Index (HDI) identify Nigeria as a country with low human development in sub-Saharan Africa. Thus, in the year 2020, the Nigeria HDI value was 0.539 points, against the then world average of 0.724 points. Similarly, according to UNDP (2020), in the "low human development" group, countries that ranked higher than Nigeria were: Tanzania, 154 (0.538) and Zimbabwe, 156 (0.535). Nigeria followed at 157 (0.532).

One of the causes of low HDI over the years is inadequate government spending in education. For instance, statistics from the Ministry of Finance and Central Bank of Nigeria (CBN) publications showed that despite the increase in the yearly budgetary allocation in Nigeria, only 7.2 % in 2011, 8.4% in 2012, 8.7% in 2013, 8.4% in 2014, 4.2% in 2016, 4.4% in 2018 and less than 6% in the year 2020 of the Nigerian annual budget was allocated to the education sector (CBN, 2020). This is far lower than the 26 percent UNESCO recommendation. Since the nation cannot appropriate at least 20% allocation to the education sector on the yearly basis, there is no doubt that there will be decrease in literacy level and hence an increase in the illiteracy level (Bosco, Omekwe & Obayori, 2019). Also, the issue of poor funding in the tertiary institution has reduced the quality of research and development. The aftermath effect of this is production of unskillful and unemployable graduates. Similarly, Inimino, Tubotamuno and Shaibu (2017) opined that "the educational sector in Nigeria faces growing deficit when likened with the nation's population, demographic structure and the increasing number of schools". Hence, government's policy aimed at empowering the public with the needed skills to produce goods and services has not received adequate consideration. Also, the issue of poor funding is well identified in the inadequate number of public schools built across the nation as well as the number of teachers and lecturers employed to teach/lecture in those schools. Due to the inadequate learning rooms in all the public institutions of learning, overcrowding in classrooms has characterized the primary, secondary and tertiary education, year-in and year-out. The students-tutor ratio remains very high at the primary and secondary schools

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(far above 40:1) and in the universities (far above United Nations Educational, Scientific and Cultural Organization-UNESCO‟s 8:1) and available academic staff, particularly in the university system, is completely insufficient (Inimino, Tubotamuno & Shaibu, 2017). It is this worrisome situation that necessitated a research into "government spending in education and human development index in Nigeria". Thus, the objectives of the study were to; analyze the trend in government spending in education and HDI in Nigeria from 1990-2020; examine the effect of government capital expenditure in education sector on HDI in Nigeria; and determine the effect of government recurrent expenditure in the educational sector on HDI in Nigeria.

2. REVIEW OF RELATED LITERATURE

2.1 Conceptual Clarification on Public Expenditure

According to Obayori (2016), public spending is an aspect of the economy which manages government income and expenditure to achieve a desirable effect from the unwanted ones. So also, Jurgen and Wagner (2005) maintain that public-expenditure is the investigation of how the administration gathers and spends income and genuine assets. It is the field of economics that is worried about how an administration's fund is raised, how that cash is spent, and the impacts of these exercises on the economy and on the general public.

According to Ekine (2014), government spending is the annual expenditure by central government to accomplish large scale economic goals which among others incorporate; employment rate, increase in output, decrease in price level and equilibrium BOPs. So also, Ajie, Akekere and Ewubare (2014) opined that; government spending is the total costs which government acquires for; (i) its own upkeep, (ii) the general public and the economy, and (iii) helping different nations. In like manner, Abu and Abdullah (2010) averred that government spending has kept on ascending because of the enormous receipts from generation and offers of unrefined petroleum, and the expanded interest for public goods. Additionally, there is increasing need to give both inward and external security for the individuals and the country.

The importance of government spending in national development cannot be over underscored. Government expenditure includes purchases of goods and services as well as on final products plus the cost of living the services of government employees and transferred payments (Ekine, 2014).Okoh (2015), government expenditure is categorized as those costs and spendings acquired by government over the period of looking after herself, the general public and improving economy. Furthermore, the elements that decide government consumption and spending are; urbanization, population, financial development, devaluation, mechanical change and decrease in imbalance. Consumption refers to the circumstance of how spending is or ought to be created

2.2 Theoretical and Empirical Evidence on Government Spending

Theoretically, the study is anchored on Wiseman and Peacock theory of public expenditure. Peacock and Wiseman in their study of public spending considered the public-expenditure of United Kingdom from 1891 to 1955. The fundamental consequence of the theory is that public-spending does not increase in a smooth and nonstop way but however in a jerk. On occasion, some social or other unsettling influence happens making a requirement for increased public-spending which the current public income cannot meet. Thus, the insufficiency of the income as compared with the required public-spending creates a check-up effect. Government and the people survey the income position and the need to discover answers for the significant issues that have come up and consent to the expected change in accordance with financing the increase.

Empirically, various studies have concentrated on the connection between government education expenditure

and economic growth in developed, underdeveloped and developing countries. The results of such studies differ. For instance, Bosco, Omekwe and Obayori (2019) investigated the impact of public expenditure on education on economic growth in Nigeria from 1980-2017. The study used data from the Central Bank of Nigeria statistical bulletin and applied the econometrics methods of OLS and Granger Causality Test. The OLS results showed that the coefficients of government capital and recurrent expenditure on education were statistically significant and positively related to real gross domestic product. Also, the pairwise granger causality results showed unidirectional causation between government capital expenditure on education and real gross domestic product as well as government recurrent expenditure on education and real gross domestic product.

Charles, Nenbee and Krama (2018) analyzed the impact of social investment on employment in Nigeria ranging from 1980-2016. The Dynamic OLS system of investigation was used for the analysis. The result revealed that expenditure on training has a direct link with employment while expenditure on health and other social community administrations were negatively linked with employment. Inimino, Tubotamuno and Shaibu (2017) analyzed the effect of government funding in education on economic growth in Nigeria with the utilization of ECM and Granger Causality test. The ECM result uncovered that government capital education expenditure and government recurrent education expenditure have significant relationship with economic growth. But a unidirectional causation exists between government capital education expenditure and GDP, government recurrent education expenditure and GDP as well as gross capital formation and GDP.

Ojewumi and Oladimeji (2016), empirically examined the effect of government funding on the growth of education in Nigeria. The data used spanned from1981 to 2013, and were obtained mostly from the publications of World Bank and Central Bank of Nigeria. OLS econometrics technique was used to analyze the data. The major finding showed that the impact of both capital and recurrent expenditure on educational growth were negative in Nigeria for the studied period.

Gylych, Modupe and Semiha (2016) used OLS to analyze education and economic growth in Nigeria. The study revealed statistically significant relationship between GDP and the explanatory variables (capital expenditure on education, recurrent expenditure on education, primary school enrolment and secondary school enrolment) exception of primary school enrolment.

Ehimare, Ogaga-Oghene, Obarisiagbon and Okorie (2014) reviewed government spending on human capital improvement and economic exercises in Nigeria. The study utilized ex post facto procedure based on ordinary least square test. The study uncovered that proficiency rate as caught by education enrolment has negative association with human capital advancement, which could be clarified by the low productivity of government consumption in the education sector, suggesting that such government spending on education decreasingly affects learning performance. Onyeagba and Eze (2013) used OLS to examine the impacts of public investment in education on development in Nigeria over the period 1997 2012. The outcome demonstrated that legislature recurrent expenditure is statistically not significant with GDP but rather government capital investment is directly and essentially significant with GDP.

Imoughele and Ismaila (2013) examined the impact of government spending in education on economic growth in Nigeria from 1980 to 2010 with the utilization of Johansen cointegration and ECM tests. The observational outcomes demonstrated that in the long-run, there is a connection between government spending and economic growth in Nigeria. Also, the study showed that Nigeria's recurrent and capital educational expenditure had a direct and insignificant effect on Nigeria economic growth.

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Meanwhile, numerous theories identifying with public spending and the economy have been formulated by renowned economic analysts. Notwithstanding, this study is tied to Wiseman-Peacock theory of government expenditure. Furthermore, empirical studies on the effect of government spending on the economy have been painstakingly reviewed as well. In particular, the empirical works of Bosco, Omekwe and Obayori (2019); Inimino, Tubotamuno and Shaibu (2017); Ehimare were pertinent. However, study is motivated to fill the following gaps in the literature; first, to digress from the over flogged government education spending and economic growth/development to government education spending and human development index. Also, most of the empirical works have looked at the sectoral aggregated government spending on growth or unemployment or employment. The present study deviates from others by using sectoral disaggregation of government expenditure in order to solve the problem of HDI in Nigeria. Secondly, a study of the dimension of human development index in study of this nature will help to address the Sustainable Development Goal (SDG). Thus, it is on the above content and dimension gaps noted, that incited this study.

3. METHODOLOGY.

The data for the study is essentially sourced from secondary sources from 1991-2020. This includes relevant publications of the Central Bank of Nigeria (CBN) statistical bulletin and annual reports of world development indicator for relevant years. This study adopts both descriptive statistics and econometrics approaches. The econometrics method is the parsimonious error correction method. The essence of the Error Correction Mechanism (ECM) is to establish the dynamic relationship (Iyoha & Ekanem (2011). Thus, the coefficient of the error correction term is theoretically expected to be negatively signed and have a value between zero and one. This is to ensure that equilibrium error correction within the system over time is at least meaningful. Therefore, the greater the co-efficient of the parameter of the error correction term, the higher the speed of adjustment of the model from the short-run to the long-run. Lastly, the post estimation tests were carried out to ascertain if the statistical criteria of the estimated model are met, authenticate if parameters are reliable and as well as certain if the general model is good for policy recommendation. The various types of diagnostic tests are; stability test via CUSUM (cumulative sum), heteroskcedasticity test via ARCH, normality test via Jarque-Bera and Wald test.

Model Specification

Theoretically, the study is anchored on the Wiseman-Peacock theory of government expenditure. Empirically, the study is cast in line with the work of Bosco, Omekwe and Obayori (2019) who investigated the impact of public expenditure on education on economic growth in Nigeria from 1980-2017. But the current study expanded the scope of study and examined government spending on human development index rather than over flogged economic growth. Thus, the estimated is stated as

$$HDI = f(GCX, GRX) \quad (1)$$

The linear form of the model is stated thus;

$$HDI = \alpha_0 + \alpha_1 GCX + \alpha_2 GRX + e \quad (2)$$

The study tried the log-linear specification in order to put all the variables on the same scale and reduce the problem of multicollinearity. Thus, the equations are;

$$LnHDI = \alpha_0 + \alpha_1 LnGCX + \alpha_2 LnGRX + e \quad (3)$$

The estimated model can be represented in an error correction form that allows for inclusion of long-run information. Thus, the ECM can be formulated as follows:

$$LnHDI_t = \alpha_0 + \Sigma\alpha_1 LnGCX_{t-1} + \Sigma\alpha_2 LnGRX_{t-1} + \pi_1 ECM_{t-1} + e_1 \quad (4)$$

Where;

HDI = Human Development Index, GCX = Government Capital Spending in Education, GCX = Government

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Recurrent Spending in Education, π_1 = the coefficient of ECM, e_1 = The Error Term, t = Time Frame, $t\text{-}_1$ = Lag Period, α_0 = Autonomous component HDI, α_{1}- α_2= slopes of Government Spending in Education

A priori Expectation: It is expected that $\alpha_1 > 0$, and $\alpha_2 > 0$

4. RESULTS AND DISCUSSION

This section presented the data and analyzes the findings. This was done in two sections. The first section presented the trend analysis and the descriptive statistic of the data used in the study. The second segment presented the analysis of results and discussion. The essence of this is to test the both the short-run and long-run relationship between the dependent and independents variables in the estimated model.

4.1 Trend Analysis and the Descriptive Statistic of the Data

4.1.1 Trend Analysis for all the Variables

This research examined education spending and human development in Nigeria during the period 1990-2020. An estimated model for the Nigerian economy has HDI as the dependent variable. While government capital expenditure on education (GCX) and government recurrent expenditure on education (GRX) were the set of explanatory variables. All the aforementioned independent variables are in billion Naira (₦ m), while the dependent variables were measured in percentage (%). See appendix 1. The trends which showed the historical movement of the annual data from 1990 to 2020 are presented in Figures 1, 2 and 3 below;

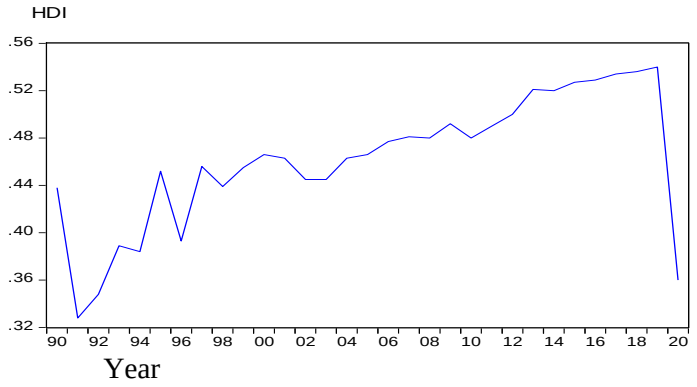

Figure 1: Trend in Human Development Index (HDI) in Nigeria, 1990-2020

Figure 1 showed that Human Development Index (HDI) in Nigeria between 1990 and 2020 is between 0.328 and 0.54. This is an indication that on the average, Nigeria is low in term of human development countries. This is because HDI matrix showed that countries with index of 0.436 indicated such countries are low in term of per capita income, literacy level and health status (measured by life expectancy and access to health care).

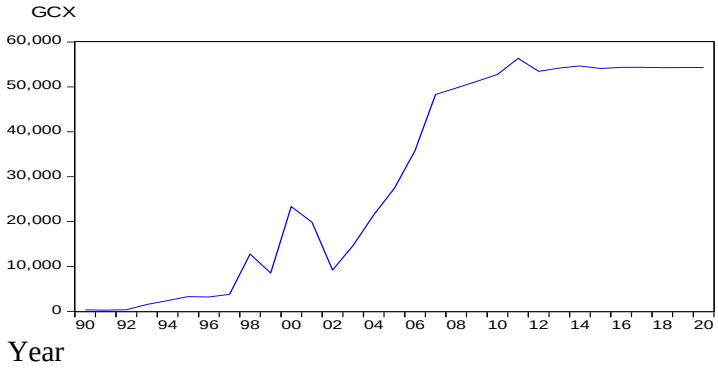

Figure 2: Trend in Government Capital Expenditure in Education (GCX) in Nigeria, 1990-2020.

The graph showed that government capital expenditure in the education sector was very low between 1990 and 1992. A spiral increase then occurs over the period of 1993 and 2012. It recorded a stable increase between 2013 and 2020. The capital component of the education expenditures got to its maximum in 2011,

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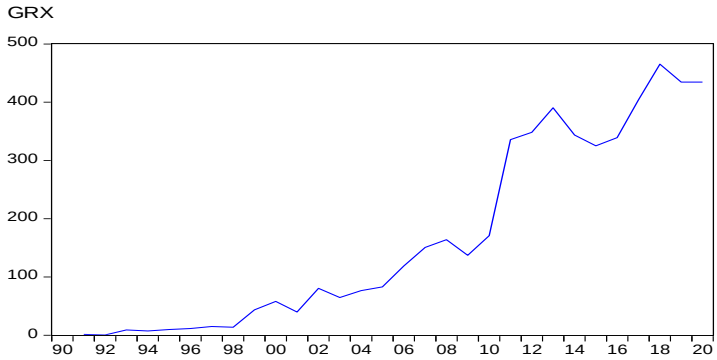

Figure 3: Trend in Government Recurrent Expenditure in Education (GRX) in Nigeria, 1990-2020

The graph showed that government's recurrent expenditure in the education sector has been on the increase between 1990 and 2020. Though, it was relatively low between 1990 and 1998. A steady increase occurs over the period of 1999 and 2020. The recurrent component of the education expenditures got to its maximum in the years 2019 and 2020. The analysis on the figure above denoted that, consistence increase in recurrent expenditure during the studied. Meaning that over the years, government expenditure in Nigeria has been skewed towards the recurrent component; and this is not healthy for an economy that, aspire to be an industrialized economy.

4.1.2 Descriptive Statistics of the Variables

The descriptive statistics helps to determine the characteristics and nature of the variables under consideration by considering the measure of central tendency, measure of dispersion and measure of symmetry.

Table 1: Result of the Descriptive Statistics for the Variables

Measurement	HDI	GCX	GRX
Mean	0.461967	31153.19	169.2220
Std. Dev.	0.057392	22560.25	162.6066
Skewness	-0.705045	-0.156826	0.564413
Kurtosis	2.784238	1.277459	1.713021
Jarque-Bera	2.543631	3.831905	3.663206
Probability	0.280322	0.147202	0.160157
Observations	30	30	30

Source: Computed by the researcher's from E-Views 10.

Note: HDI=Human development index, GCX=Government capital expenditure in education and GRX= Government recurrent expenditure in education

The analysis of descriptive statistics of the series in Table 2 indicated that; the approximate mean of human development index (HDI) is 0.4620%; while the corresponding standard deviation is 0.0574%. The mean of government capital expenditure in education is ₦31153million while the corresponding standard deviation is ₦22560million. Similarly, the approximate mean of government recurrent expenditure in education is ₦169billion while the corresponding standard deviation is ₦162billion. Based on the analysis above, the standard deviation of all the variables were not higher than their respective mean. Thus, they converged around their respective mean.

The Skewness test result showed a mixture of positive and negative values for the variables. Specifically, HDI and GCX were negatively skewed. While, only GRX is positively skewed. Moreover, based on the analysis of the kurtosis; HDI, GCX and GRX were platykurtic relative to normal, since the approximate values for kurtosis which are; 2.7842, 1.2774 and 1.7130 respectively, were less than 3. This suggested that the variables have short and thin tails. However, the probability of Jarque-Bera statistics suggested that the null hypotheses of normal distribution for all the variables

were accepted at 5% level. Therefore, it was concluded from the statistical properties of the time series that the variables were to some extent not normally distributed, which may have resulted from the problem of unit root. This necessitated stability via ADF unit root test.

4.2 Analysis of Results and Discussion

4.2.1 Stationarity Test Results

This unit root test conducted via the Augmented Dickey Fuller (ADF) established the order of integration or stationarity of the variables. The ADF test was conducted based on constant and time trend; at level and first difference at 5 percent critical values. The stationarity status of the data series are presented in Table 2.

Table 2: Results of ADF Unit Root Test for the Model

Variables	Unit Root Test @ Level		Unit Root Test @ First difference		Order of integration
	ADF Statistics	5% Critical Value	ADF Statistics	5% Critical Value	
PVT	-3.316413	-2.963972	Stationary @ level		1(0)
HDI	-1.995312	-2.963972	-5.967767	-2.967767	1(1)
GCX	-0.842015	-2.963972	-5.351886	-2.967767	1(1)
GRX	0.021908	-2967767	-4.834740	-2.971853	1(1)

Source: Computed by the researcher's from E-Views 10.

Note: HDI=Human development index, GCX=Government capital expenditure in education and GRX= Government recurrent expenditure in education

The test of stationarity via the Augmented Dickey Fuller (ADF) unit root test for the variables in the estimated model showed that none of the variable was stationary at level or order zero. This is because the ADF test statistic value is less than the critical value at 5%. However, variables such as HDI, GCX and GRX which were not stationary at level were differenced once and became stationary at first differences; 1(1).

4.2.2 Co-integration Test

The Johansen co-integration test was used to examine the long run relationship among the variable at 5% level. The result of trace statistics Johansen Co-integration test for human development index (HDI) Model is presented below.

Table 3: Johansen Co-integration Test Result for Model

Eigenvalue K=5, r=2	Trace Statistic	5% Critical Value	Prob.**	Hypothesis of CE(s)
0.821511	67.75120	29.79707	0.0000	None *
0.614656	26.39367	15.49471	0.0008	At most 1*
0.135944	3.506836	3.841466	0.0611	At most 2

Note: r= number of co-integrating vectors and k = number of lags in model. * rejection of the H0

Source: Computed by the Researcher's from E-Views 10.

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The Johansen co-integration test results in the model as reported in Table 3 showed that there are two co-integrating equations at 5% level of significance. This is because the Trace Statistic is greater than critical values at 5%. The reason for the existence of co-integrating equation is not far from the existence of a unit root test at orders one. Therefore, there exists a long-run relationship among the variables. Given the existence of co-integrating equations, the requirement for fitting in a parsimonious error correction model is satisfied.

4.2.3 The Error Correction Model (ECM)

According to Iyoha and Ekanem (2011), established the dynamic relationship amongst the variables in an estimated model. In the meantime, a parsimonious model, which is data admissible, theory consistent and interpretable for the HDI model is presented in Table 4.

Table 4: Parsimonious Error Correction Mechanism for Model I (HDI Model)

Variable	Coefficient	t-Statistics	Prob.
C	0.004237	0.233746	0.8171
DLOG(HDI(-1))	-0.347152	-0.943500	0.3557
DLOG(HDI(-2))	0.392112	2.133227	0.0263
DLOG(GCX)	0.025441	2.638510	0.0289
DLOG(GRX)	0.010936	0.476247	0.6380
ECM(-1)	-0.580406	-2.722922	0.0116
R-squared	0.578507	Akaike info criterion	-1.928318
F-statistic	3.216787	Schwarz criterion	-1.739726
Prob(F-statistic)	0.039896	Durbin-Watson stat	1.538214

Note: HDI=Human development index, GCX=Government capital expenditure in education and GRX= Government recurrent expenditure in education

Source: Computed by the Researcher's from E-Views 10

The results of the parsimonious error correction model for model I as presented in Table 4 showed that the coefficient of ECM has the estimated negative sign and statistically significant at 5% level. Thus, the speed of adjustment (correction) in the long-run depicted by the coefficient of ECM is 0.0.5804% per year, which implies that about 58% of the disturbance in the short-run is adjusted each year. Also, the R^2 of 0.5785% showed that the model is a good fit. Thus, about 58 percent variation in the level of HDI is explained by the systematic changes in the two independent variables. The Durbin Watson statistics value of 1.5382 which is very close to 2.0 bench mark for DW-test, suggested that the model is free from positive first order correlation. Thus, the explanatory variables in the model are not serially correlated (dependent). Also, the f-statistic value of 3.2167 with probability value of 0.03698 which is less than 0.05 critical value showed that, the two explanatory variables (Government capital and recurrent expenditure in the education sector) are significant in explaining increase in the level of HDI in Nigeria during the period of study.

In the meantime, the coefficient of government capital expenditure education sector (GCX) is positively signed and statistically significant with human development index (HDI) at 5 percent level. Thus, a proportionate rise in capital-expenditure in the education sector will increase the level of HDI by 2.5441per cent. Also, given that the said variable is statistically significant with HDI, the alternative hypothesis was accepted. What this suggested is that public capital spending in education has a positive relationship with level of HDI as well as has implication in spurring the level of HDI. The finding is instructive, as it corroborated Abu and Abdullahi (2010) who studied government expenditure and posited that total capital expenditure on training and research has a significant effect on output and development. Also, Bosco, Omekwe and Obayori (2019) averred that government capital expenditure on education has significant impact on economic development. Muhammad Mukaramah and Mohd (2017) utilized input-output to study the impact of government spending on education. They opined that spending play a significant

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role to build skilled worker, and decrease financial issues, for example, joblessness and poverty. At the end of the day, education is considered as wellspring of riches in the public arena.

The coefficient of government recurrent expenditure in the education sector (GRX) is positively signed but statistically not significant with HDI at 5 percent level. Thus, a percentage increase in government recurrent expenditure in the education sector will increase the level of HDI by 1.0936per cent. But, given that recurrent expenditure in the education is statistically not significant with HDI, the null hypothesis was accepted. The finding is in line with the work of Fasoranti (2012) who examined government expenditure and the Nigerian economy, and opined that recurrent expenditure does not impact on the economy. Similarly, Imoughele and Ismaila (2013) examined the impact of government spending in education on monetary development in Nigeria from 1980 to 2010 and showed that Nigeria recurrent educational expenditure had a direct and insignificant effect on Nigeria economic growth.

4.2.4 Post Estimation Tests Results

The study employed the Breusch-Godfrey (B-G) Lagrange Multiplier (LM) test for serial correlation and normality test, heteroschedasticity test, stability test and normality test as the post-estimation tests to validate the short and long run estimations tests. See appendix II for the full results.

Table 5: Post-Estimation Tests Results

Test type	**Test Stat.**	p-value	Critical value @ 5%
Serial Correlation	Chi Square (X^2)	0.3559	0.05
Heteroscedasticity	Chi Square (X^2)	0.8109	0.05
Stability	t-Statistics	0.8732	0.05
Normality Test	Jaque-Bera-Stat	0.07798	0.05

Source: *Researchers' Computed Result from (E-views 10)*

The various diagnostic test results conducted to validate both the estimated long and short runs PECM and ARDL models are presented in Table 5. Based on the serial correlation using Breusch-Godfrey test LM test, to test the null hypothesis of no serial correlation, against the alternative hypothesis of serial correlation in the estimated model at 5% level. The result showed that, serial autocorrelation does not exist in the estimated models. This is because the chi-square p-values for the model which are; 0.3559 is greater than the critical value probability of (0.05). In the same way, the Autoregressive Conditional Heteroskedasticity (ARCH) result showed that, heteroskedasticity is not a problem in the model. This is because the chi-square p-values for the models which is, 0.8109 is greater than the critical value probability of (0.05). Also, the stability test results showed that the estimated model is stable. This is because the t- statistic p-values in model is greater than the critical value probability of (0.05). The normality test result also showed that, the error term is normally distributed at 5% level of significance. This is because, the probability value of the Jarque-Bera statistic is 0.077982; is greater than 5% critical value. Meaning that, the Jarque-Bera statistic hypothesis of normally distributed residuals in the model is accepted.

5. CONCLUSION AND RECOMMENDATIONS

The study used the parsimonious error correction method (PECM) to examine government spending in education and human development index in Nigeria from 1990-2020. Given the poor and inadequate government spending in education reflected in the area of poor state of the infrastructural facilities. This will reduce the quality of research and development; which in turn results to production of unskillful and unemployable graduates. Based on the empirical results, the study concludes that; improved HDI in terms of better standard of living and increase in literacy level is a function of in capital spending in the education sector as against the recurrent expenditure.

The implication of the finding is that, the Nigerian government can boost human development through increase in capital spending in the education sector. Based on the findings of this work, the following policy recommendations:; (i) Government education spending should be skewed towards capital component rather than the usual recurrent component. This is because, capital expenditure will help to facilitate human development process in terms of better quality of life, better education and good standard of living. (2) Government's recurrent expenditure in the education sector should be well utilized for prompt payment of workers salary and remuneration. This will serve as a catalyst for improved output which will contribute significantly to human development in terms of achieving quality education and reduction in death rate in an environment devoid of insecurity and corruption.

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Appendix I

Research Data on HDI, GCX and GRX for the Period 1990-2020

YEAR	HDI (%)	GCX (₦ million)	GRX (₦ billion)
	HDI	GCX	GRX
1990	0.438	331.7000	2.40.
1991	0.328	289.1000	1.26
1992	0.348	384.1000	0.29
1993	0.389	1563.000	8.88

1994	0.384	2405.700	7.38
1995	0.452	3307.400	9.75
1996	0.393	3215.800	11.5
1997	0.456	3808.000	14.85
1998	0.439	12793.0	13.59
1999	0.455	8516.600	43.61
2000	0.466	23342.60	57.97
2001	0.463	19866.60	39.88
2002	0.445	9215.000	80.53
2003	0.445	14680.20	64.78
2004	0.463	21550.00	76.53
2005	0.466	27440.80	82.80
2006	0.477	35791.80	119.02
2007	0.481	48293.51	150.78
2008	0.480	49742.32	163.98
2009	0.492	51234.59	137.12
2010	0.48	52771.63	170.80
2011	0.49	56360.10	335.80
2012	0.50	53455.44	348.40
2013	0.521	54195.72	390.42
2014	0.520	54670.42	343.75
2015	0.527	54107.19	325.19
2016	0.529	54324.45	339.28
2017	0.534	54367.35	403.96
2018	0.536	54266.33	465.30
2019	0.54	54319.38	434.63
2020	0.36	54317.69	434.63

Source: *CBN Statistical Bulletin (Volume 30, 2019) & World Development Indicator (WDI) Data*

Appendix II
Post Estimation Results

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Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.796793	Prob. F(2,20)	0.4646
Obs*R-squared	2.066374	Prob. Chi-Square(2)	0.3559

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/14/21 Time: 12:08
Sample: 1993 2020
Included observations: 28
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007319	0.026618	0.274966	0.7862
DLOG(HDI(-1))	-0.288367	0.520839	-0.553658	0.5860
DLOG(HDI(-2))	-0.051321	0.352119	-0.145750	0.8856
DLOG(GCX)	-0.001931	0.058903	-0.032778	0.9742
DLOG(GRX)	0.014649	0.038454	0.380949	0.7073
ECM(-1)	1.267525	1.330874	0.952401	0.3523
RESID(-1)	-0.754241	0.919055	-0.820670	0.4215
RESID(-2)	-0.581028	0.843490	-0.688838	0.4988

R-squared	0.073799	Mean dependent var	0.000000
Adjusted R-squared	-0.250371	S.D. dependent var	0.074626
S.E. of regression	0.083446	Akaike info criterion	-1.894270
Sum squared resid	0.139266	Schwarz criterion	-1.513640
Log likelihood	34.51978	Hannan-Quinn criter.	-1.777908
F-statistic	0.227655	Durbin-Watson stat	1.261964
Prob(F-statistic)	0.973821		

Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.285353	Prob. F(3,25)	0.8355
Obs*R-squared	0.960152	Prob. Chi-Square(3)	0.8109
Scaled explained SS	4.293535	Prob. Chi-Square(3)	0.2315

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/14/21 Time: 12:15
Sample: 1992 2020
Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006191	0.004970	1.245644	0.2244
DLOG(GCX)	-0.002101	0.010924	-0.192320	0.8490
DLOG(GRX)	-0.000103	0.006296	-0.016366	0.9871
ECM(-1)	0.135326	0.159134	0.850388	0.4032

R-squared	0.033109	Mean dependent var	0.006460
Adjusted R-squared	-0.082918	S.D. dependent var	0.022808
S.E. of regression	0.023735	Akaike info criterion	-4.516284
Sum squared resid	0.014084	Schwarz criterion	-4.327691
Log likelihood	69.48612	Hannan-Quinn criter.	-4.457219
F-statistic	0.285353	Durbin-Watson stat	1.101442
Prob(F-statistic)	0.835491		

Stability Test

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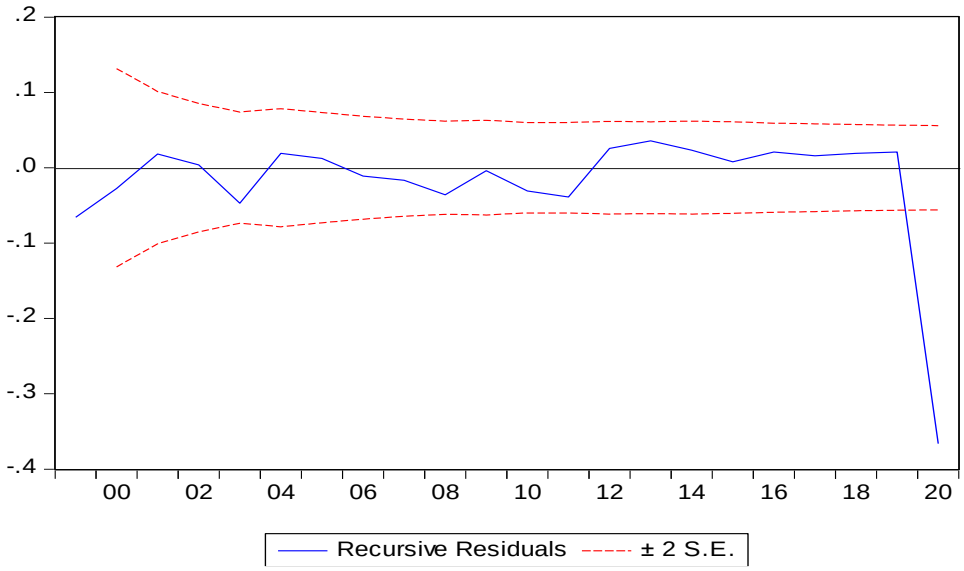

Ramsey RESET Test
Equation: UNTITLED
Specification: DLOG(HDI) C DLOG(HDI(-1)) DLOG(HDI(-2)) DLOG(GCX)
DLOG(GRX) ECM(-1)
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.161538	21	0.8732
F-statistic	0.026095	(1, 21)	0.8732
Likelihood ratio	0.034771	1	0.8521

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000187	1	0.000187
Restricted SSR	0.150362	22	0.006835
Unrestricted SSR	0.150176	21	0.007151

LR test summary:

	Value	df
Restricted LogL	33.44648	22

Unrestricted LogL	33.46387	21

Unrestricted Test Equation:
Dependent Variable: DLOG(HDI)
Method: Least Squares
Date: 09/14/21 Time: 12:10
Sample: 1993 2020
Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001798	0.026213	-0.068603	0.9460
DLOG(HDI(-1))	-0.340814	0.378405	-0.900659	0.3780
DLOG(HDI(-2))	0.413352	0.377571	1.094768	0.2860
DLOG(GCX)	0.092152	0.051737	1.781181	0.0894
DLOG(GRX)	0.014795	0.037347	0.396151	0.6960
ECM(-1)	-1.546620	0.821154	-1.883471	0.0736
FITTED^2	-0.507937	3.144379	-0.161538	0.8732

R-squared	0.414355	Mean dependent var	0.001211
Adjusted R-squared	0.247028	S.D. dependent var	0.097454
S.E. of regression	0.084565	Akaike info criterion	-1.890276
Sum squared resid	0.150176	Schwarz criterion	-1.557225
Log likelihood	33.46387	Hannan-Quinn criter.	-1.788459
F-statistic	2.476320	Durbin-Watson stat	1.326892
Prob(F-statistic)	0.057084		

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Normality Test