Education Financing: An Impetus for Achieving Inclusive Growth and Sustainable Development in Nigeria

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A b s t r a c t

The study seeks to examine the nexus between higher education financing, inclusive growth and sustainable development in Nigeria usin`g annual time series data from1990 to 2021 fiscal year. It employs auto-regressive distributed lag (ARDL) model and granger causality test to ascertain the long-run impact and causal relationship between higher education financing, and inclusive growth. GDP per capita was regressed on higher education expenditure (HEDU), unemployment rate (UNM), human capital proxy by gross tertiary education enrolment, population growth rate (POPGR) and corruption perception index (CORR). Results indicated that higher education expenditure exerted positive and insignificant impact on inclusive growth, but corruption perception index negatively influenced growth. The results of Granger causality test showed evidence of bi-directional causal relationship between GDPPC and HEDU. The study concludes that higher education financing is vital for the attainment of inclusive growth and sustainable development in Nigeria. The paper recommends that government in partnership with private organizations should remain committed to the funding of higher education and allocation to education sector be increased from the current less than 15 per cent to 26 per cent to meet the international standards stipulated by UNESCO.

Keywords: *Higher Education Financing, Inclusive Growth, Sustainable Development, ARDL, Granger Causality*

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Background to the Study

Higher education is the engine room of the county's development because it provides the needed manpower resources. Any country aspiring for development must make concerted efforts at developing her education sector, particularly university education by investing heavily in it so as to improve the quality of education (Ndubisi, 2013). Scholars like Aloysius and Augustine (2021) believe that this level of education equips human resources with the needed knowledge, skills and competencies, which would make citizens, contribute to economic development of the country. According to Todaro and Smith (2011), higher education helps to supply the essential human capital which is a necessary key to poverty reduction. Ndubisi (2013) posited that advanced and emerging economies such as China, India, Singapore, South Korea, Taiwan, Hong Kong and Malaysia that have achieved high level of global competitiveness was as a result of huge investment in education and human capital. It is however unfortunate that Nigeria despite her abundant human and material resources could not invest heavily in education which has serious implication on educational quality and infrastructural development.

As part of effort to revamp education sector, United Nations Economic, Scientific and Cultural Organization (UNESC0) recommended that African countries must allocate at least 26 per cent of the national budget on education sector. Undoubtedly, education financing in Nigeria is far below her contemporaries in other countries.
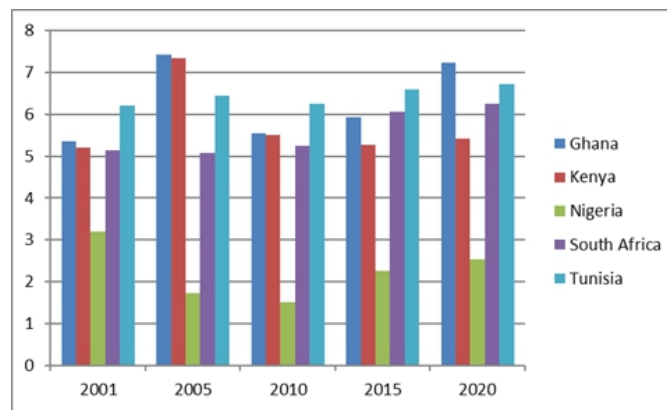

Figure 1: Allocation to Education (% of GDP) 2001- 2020: A Comparative Analysis
Source: Own Evaluation based on data from World Development Indicator.

Figure 1 shows allocation to education sector by five countries from 2001-2020.In 2001, government expenditure on education as a percentage of GDP was 3.2 per cent as against 5.35 per cent in Ghana, 5.15 per cent in South Africa, 5.21 in Kenya and 6.20 per cent in Tunisia. The percentage allocation to education was consistently higher in all countries than Nigeria. This indicates that tertiary education in Nigeria is grossly under-funded compared to her counterparts in other countries and this has posed serious challenges to growth prospect.
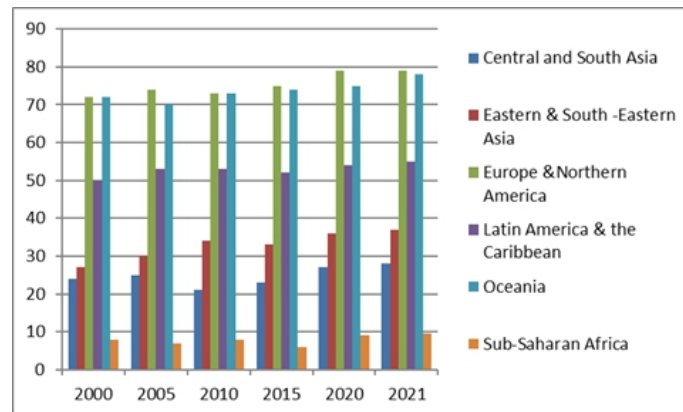
Figure 2: Tertiary Education Enrolment ratio by Region, 2000-2021
Source: UNESCO Institute for Statistics database, 2022

Figure 2 shows the trend of tertiary education enrolment across the regions from 2000-2021. From the graph, the highest gross enrolment rate was in Europe and Northern America (79 per cent) followed by Oceania (75 percentage point). In 2020, gross enrolment rate in higher education stood at 54 per cent in Latin America and the Caribbean and the lowest was in Sub-Saharan Africa estimated at 9 percentage points on the average.

Despite the tremendous increase in students' enrolments into the Nigerian universities, there is absolutely no corresponding improvement in the quality of education as a result of inadequate funding. Obviously, this has resulted to poor and dilapidated structure in our various institutions of learning, poor welfare packages for lecturers, inadequate research funding and incessant strike actions by academic and non- academic staff.

The main purpose of this study is to examine the impact of higher education financing on sustainable development in Nigeria using dataset from 1990-2021. Following this introductory part, the remainder of the paper is structured as follows. In section two, theoretical and empirical reviews are discussed. Section three and four present methodology used and regression results. The final section concludes and makes policy recommendations.

Literature Review
Conceptual Issues
Jhingan (2010), defines higher education financing as allocation to higher education by the federal government within a financial year. It refers to the amount expended on tertiary education by the federal government within a financial year. In other words, it refers to the outflow of resources from the federal government to the education sector. Higher education encompasses all formal post-secondary education including public and private universities, colleges of education, technical and training institutions and vocational schools. However, this study is restricted to public universities that fall within the ambit of the federal government in terms of funding.

Ndubisi (2013), defines inclusive growth as one in which all economic agents benefit. It refers to growth that helps in reducing absolute poverty; create employment opportunities and allowed citizen unfettered access to basic economic services like education, health etc. It is also referred to as pro-poor growth because it is meant to benefit the poor masses at the grass root. Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (Brunt land Commission,1987).

Theoretical and Empirical Literature

Theoretically, the New Growth theory by Romer (1986) and Lucas (1988) appear to be germane to this study. The theory posited that economic growth and development depends on investment in human capital, through research, innovation and development in knowledge and skills. It emphasizes the strategic role of human capital in the development process. This theory asserted that increase in economic growth was made possible through direct and indirect investment in education by public and private sectors. The theory attributes growth process to key variables such as human capital accumulation, investment in education and number of educated labor force.

Cordelia and Kanalechi (2020), did a study on the impact of public expenditure on higher education in Nigeria. He did not find any significant impact of public expenditure on higher education. However, Ogungbenle and Edogiawerie (2016), use OLS múltiple regresión and found a positive and significant impact. Furthermore Japheth, Moses and Cyprian (2014), used data from 1990-2013 to examine how government expenditure on tertiary education affects growth. They find that public expenditure on tertiary education has significant effects on economic growth in Nigeria during the period of investigation. Ejiogu, Okezie and Chinedu (2013) in their study find supporting evidence of a positive relationship between tertiary education financing and economic growth. Ogungbenle and Edogiawerie (2016) discover similar results. Supporting this view, Odeleye (2012), carried out a study on the impact of education expenditure on economic growth of Nigeria using data from 1985-2007. The study employed Johansen co-integration and error correction model (ECM) techniques of analysis. It was discovered that only recurrent expenditure has significant effects on economic growth during the period of study.

Lawal and Wahab (2011), assessed the relationship between education expenditure and economic growth in Nigeria using time series data from 1980-2008. The study adopted ordinary least squares (OLS) technique and discovered that investments in education have direct and significant impact on economic growth in Nigeria. Omojimite (2010), also examined the impact of education expenditure in accelerating economic growth in Nigeria from 1980-2005. The study employed co-integration and granger causality test as technique of analysis. Results indicated the existence of long-run relationship between public expenditures on education and economic growth. The study also revealed uni-directional causality running from education expenditures to economic growth.

In South Asia, Hussaini (2020), conducted a study on the link between public expenditure on higher education and economic growth from 1990 to 2018. Using the multivariate causality test, the results revealed the existence of bi-directional causality between public expenditure on education and economic growth. Mallick, Das and Pradhan (2016), investigated the relationship between educational expenditure and economic growth in selected 14 major Asian countries (Bangladesh, China, Hong Kong, India, Japan, Nepal, Pakistan, Malaysia, The Philippines, Saudi Arabia, Singapore, Sri-Lanka, Thailand and Turkey) using panel data from 1973-2012. Employing Panel Vector error-correction model (PVECM), results revealed expenditure on education had significant effect on economic growth in all 14 major Asian countries.

Wasif and Idrees (2013), analyzed panel data for fourteen (14) countries using data set from 1990 to 2006. The authors find that the impact of public education expenditure on economic growth was stronger in developing countries than the developed countries. It concludes that public financing of education is an important determinant of economic growth in developing countries.

Research Gap
Empirical evidence has shown that very few empirical works on the impact of higher education financing on economic growth have been carried out with divergent results, which may be as result of varying methodology used and variable measurement. Scholars like Cordelia and Kanalechi (2020) did not find any significant impact of higher education spending on economic growth. However other scholars (Lawal & Wahab,2011; Odeleye ,2012; Ejiogu, Okezie & Chinedu, 2013) discovered positive and significant impact of higher education expenditure on economic growth. More so, the direction of causality has not been comprehensively investigated by most scholars and this requires further empirical investigation. This is the major research gap that the current study is poised to address. Unlike prior research, in current paper, granger causality was employed to ascertain the direction of causation among the variables. In addition, diagnostic/robustness checks were carried out to avoid spurious regression results that are likely to be associated with time series data.

Methodology
The theoretical link between education and sustained growth can be found in New Growth theory by Romer (1986) and Lucas (1988). The new growth theory posited that human capital is an important determinant in the growth process in addition to physical capital (K) and labour (L). The model is represented in equation [1].

$$Y = f\ (K^{\alpha}L^{\beta}H^{\lambda}) \qquad [1]$$

The model in equation [1] can therefore be re-specified in a linear form as follows;
$$Yt = \beta o *\ \alpha K^{\beta 1} *\ \beta L^{\beta 2*}\ \lambda H^{\beta 3*}\ [2]$$

Estimating in logarithmic form, the model is re-specified as;
$$lnYt = \beta_{o} + \beta_{1}lnK + \beta_{2}lnL + \beta_{3}lnH + \varepsilon_{it}\ [3]$$

Where Y is measured using real GDP as a proxy for economic growth, K denotes capital stock L represents labour supply measured by numbers of workers and H is human capital. β_1-β_3 represent elasticity of output with respect to labour, physical and human capital stock, *ln* denotes the natural log and $\mathcal{E}_{it}$ is stochastic error term.

This study employs Autoregressive Distributed Lag (ARDL) model and granger causality test to assess the impact of higher education financing on sustainable development. This technique was chosen because ityields consistent results irrespective of whether the variables are stationary at level I(0) or first difference I(1) or a combination of both. Granger causality was employed to test the direction of causation among variables, while bounds test was used to examine the long-run relationship. To ensure robustness of the results, the study employs some pre- and post-diagnostic checks.

Model Specification
The model for this study was adopted from the work of   Aloysius   and Augustin (2021) but with some modifications in terms of variables employed and methodology used. These scholars used OLS estimation technique in their analysis. As a departure from prior studies, current study employed ARDL model and Granger causality test.

GDP per capita used as proxy for sustainable development was regressed on higher education expenditure (EDU), unemployment rate, and human capital proxy by gross tertiary education enrolment. Other control variables include population growth rate and corruption perception index. The extended version of model for the study is specified as follows:

GDPPC= f (HEDU, UNM, HUK, POPGR, CORR)   [1]

The model in Equation [1] is re-specified as in Equation [2]

RGDP= β_o +β_1HEDU + β_2UNM +β_3*HUK*+ β_4POPGR + β_5CORR+μ [2]

The ARDL model specification is as follows:

$$\Delta lnGDPPC_t = \alpha_0 + \sum_{j=n}^{p} \alpha_1 \Delta HEDU_{t-j} + \sum_{j=k}^{p} \alpha_2 \Delta UNM_{t-j} + \sum_{j=1}^{p} \alpha_3 \Delta HUK_{t-j} + \sum_{j=1}^{p} \alpha_4 TPOPGR_{t-j}$$
$$+ \sum_{j=1}^{p} \alpha_5 CORR_{t-j} + u_t \qquad [3]$$

where GDPPC is the annual growth rate of real GDP per capita. HEDU denotes higher education expenditure, UNM represents unemployment rate, HUK is human capital, POPGR and CORR denote population growth rate and corruption perception index.α_0 is constant parameter,α_1-α_5 are the coefficients whileα_0 denotes constant intercept and μ_t is the stochastic error term.

Empirical Results and Discussion
Trend Analysis
The trend of federal government allocation to education in Nigeria is presented in graphical form to show their growth pattern for various years.
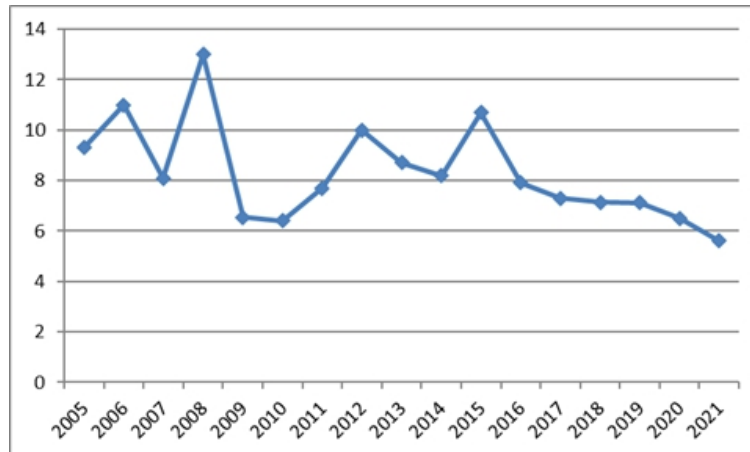
Source: Own Evaluation based on data from CBN Statistical Bulletin

Figure 3 shows the trend of federal government allocation to education in Nigeria from 2005-2021. As shown above, in the year 2021, percentage allocation to education sector in Nigeria stood at **5.6 per cent. In** 2020, it was 6.5 per cent, and in 2019 percentage allocation to education increased to 7.12,   In 2018, it rose slightly to 7.14 per cent and then in 2017 allocation to education sector was 7.3 per cent. In2016, it rose to 8 per cent and then increased to 10.7 per cent in 2015. From all indications, the percentage allocation to education sector is far below15- 26% recommended by United Nations Educational Scientific and Cultural Organization (UNESCO).

Descriptive Statistics
Descriptive statistic test was conducted to ascertain if the variables in the model (i.e. GDPPC, HEDU, UNM, HUK, POPGR, and CORR) are normally distributed or not. The results are shown in Table 1.

Table 1: Results of Descriptive Statistics

Variables	GDPPC	HEDU	UNM	HUK	POPGR	CORR
Mean	22.63419	49.95516	14.59452	9.530645	18.26452	12.71161
Median	18.70000	50.42200	12.50000	9.010000	18.90000	12.68000
Std. Dev.	15.65612	3.186862	7.022089	4.265079	6.136044	1.578297
Skewness	-0.124448	0.136253	1.077575	1.045730	1.184300	1.073824
Kurtosis	3.457257	1.816045	4.402595	4.616682	5.491976	4.032421
Jarque-Bera	0.350085	1.906512	8.540425	9.025998	15.26777	7.334455
Probability	0.839421	0.385484	0.013979	0.010966	0.000484	0.025547

Source: Author's computation (2023)

The results indicate that the values for all the variables [HEDU, UNM, HUK, POPGR, and CORR] are positively skewed except GDPPC. This means that there is asymmetry in the distribution of the series.

Stationarity Test
The paper conducted stationarity test using Augmented Dickey-Fuller (ADF) unit root test. The essence of conducting stationarity test was to avoid spurious regression. The results are presented in Table 2.

Table 2: Results of Stationarity
ADF calculated in ( ) & ADF critical value

Variable	ADF @ Level	ADF @ First Difference	Order of integration	Decision
GDPPC	(-0.143) -2.963	(-6.786) -2.967	1(1)	Stationary
HEDU	(-2.113) -2.963	(-7.409) -2.971	1(1)	Stationary
UNM	(-5243) -2.963	NA	1(0)	Stationary
HUK	(-4271) -2.967	NA	1(0)	Stationary
POPGR	(-2.777) -2.963	(-5.145) -2.971	1(1)	Stationary
CORR	(-1.762) -2.971	(-9.025) -2.971	1(1)	Stationary

NA = Not applicable
Source: Author's computation (2023)

The analysis shows that the series UNM, HUK are stationary at level 1(0) while GDPPC, HEDU, POPGR and CORR are stationary at first difference 1(1). This implies that the variables exhibit mixed order of integration, thereby lending support for the use of ARDL model.

Table 3: Results of Bounds Test

Test	Critical val.	Sign.Level	I(0)	I(1)
F-Statistic	5.631018	10%	2.08	3.00
k	6	5%	2.56	3.49
		2.5%	2.70	3.73
		1%	3.06	4.15

Source: Author's computation (2023)

The results of bounds test indicated that the F-statistic is 5.631018 which is higher than the lower and upper bounds critical values of 2.56 and 3.49 at 5% level of significance. This indicates the variables have long run association.

Table 4: Long-Run Estimated Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-188064.3	141442.1	-1.329620	0.1940
HEDU	0.326954	0.293157	1.115289	0.2739
UNM	-34.79344	1636.070	-0.021266	0.9832
HUK	1.336951	0.315572	4.236593	0.0003
POPGR	-0.162944	0.350109	-0.465409	0.6462
CORR	-0.266750	0.140817	-1.894306	0.0714
R-squared	0.702542			
Adjusted R-squared	0.660048			
S Durbin-Watson stat	1.759782			

Source: Author's computation (2023)

The estimated long run results in Table 4 indicate that HEDU has positively impacted growth. This result shows that a unit change in HEDU would decrease GDP growth by approximately 0.32 per cent. The finding of this study is in keeping with previous studies by scholars like Cordelia and Kanalechi (2020).

Unemployment rate (UNM) was discovered to have inverse association with GDPPC. This means that a small increase in UNM would decrease GDPPC by approximately 34 per cent and this tends to stunt sustainable growth and development. This is in agreement with results obtained by several scholars (Odeleye, 2012; Ejiogu, Okezie & Chinedu, 2013).

In addition, the estimated coefficient of HUK is positive meaning that one percent increase in human capital accumulation would increase economic growth by about 1.33. However, corruption perception index and population growth rate exert negative impact. The implication of this finding is that corruption is detrimental to inclusive growth and development in Nigeria. R-square of 0.70 indicates that about 70% variations in the GDPPC were accounted for by changes in the explanatory variables. This indicates a good fit. The value of adjusted counterpart of 0.66 shows the result is robust. D-W statistic of 1.7 indicates complete absence of serial correlation problem.

Table 5: Short-Run Estimated Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	0.733250	0.140817	5.207118	0.0000
HEDU	2.748254	1.048620	2.620829	0.0156
UNM(-1)	-1.444522	0.696764	-2.073186	0.0501
HUK	2.654196	0.713913	3.717813	0.0012
POPGR	-34.79344	1636.070	-0.021266	0.9832
CORR	-0.162944	0.350109	-0.465409	0.6462
CORR(-1)	-1.556472	0.386498	-4.027110	0.0006
ECM(-1)	-0.266750	0.041441	-6.436944	0.0000
R-squared	0.856200			
Adjusted R-squared	0.790837			
Durbin-Watson stat	2.983137			

Source: Author's computation (2023)

Table 5 shows the short-run estimated results of the impact of higher education financing. in the short-run, higher education expenditure exerts positive and significant impact. Similarly, human capital proxy by tertiary education enrolment had statistically significant impact on economic growth. Ceteris paribus, a unit increases in gross tertiary education enrolment rate results in 2.65% increase in GDP growth rate. However, the lagged value of unemployment rate and corruption perception index negatively influenced growth. This means that an increase in these macroeconomic variables strongly reduced GDPPC. This finding is consistent with studies conducted by Aloysius and Augustin (2021).

The R-square is 0.85 which indicates that about 85 per cent of the systematic variation in the dependent variable (GDPPC) is explained by the explanatory variables. After adjusting the degrees of freedom, the result still remains robust as shown by the adjusted coefficient of 0.79. The Durbin-Watson (D.W) statistic of 2.98 indicates absence of serial autocorrelation. The lagged error correction term (ECM) included in the model to capture the adjustment towards the long-run equilibrium is correctly signed (negative) and statistically significant. Thus, it will rightly act to correct any deviation from its long run equilibrium value. It shows that 26% disequilibrium in the dependent variable in previous years are corrected within a year.

Table 6: Diagnostic/Robustness Check

Tests Statistics	F-values	Probability val.
A. Serial-correlation	4.689883	0.017511
B. Heteroscedasticity	7.009140	0.0002
C. Ramsey Test	0.255292	0.617192

Source: Author's computation (2023)

The results indicate that the model does not suffer serial correlation and heteroskedasticity problem because their corresponding F statistic and p- values are greater than 5%. Ramsey test

result also indicates that the model does not suffer misspecification bias.

Furthermore, CUSUM and CUSUM-SQ indicate the model passed stability test. The residuals are within the two critical lines, meaning that the model was stable as shown below.
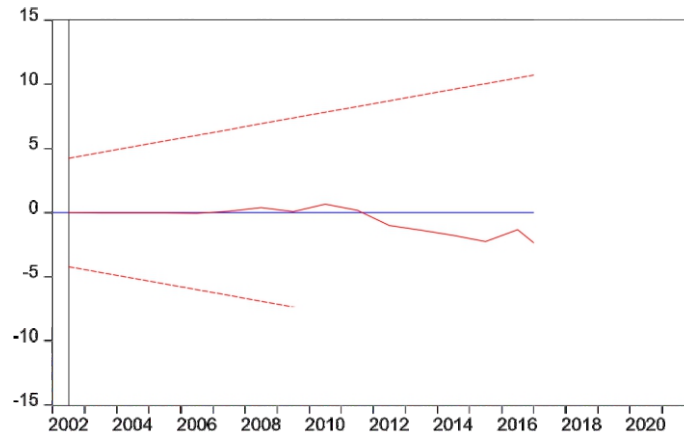

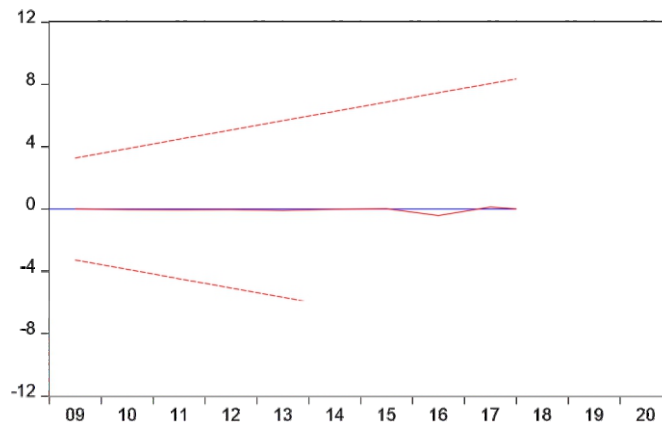**Figure 5a:** Results of CUSUMSQ
Source: Author's computation (2023)

Figure 5a: Results of CUSUM
Source: Authors' computation (2023)

Table 7: Pair-wise Granger Causality Test

Null Hypothesis:	F-Statistic	Prob.
HEDU does not Granger Cause GDPPC	10.0445	0.0005
GDPPC does not Granger Cause HEDU	6.25898	0.0057
UNM does not Granger Cause GDPPC	6.68535	0.0041
RGDP does not Granger Cause UNM	0.74394	0.4841
HUK does not Granger Cause GDPPC	2.63806	0.0886
GDPPC does not Granger Cause HUK	0.21235	0.8099
POPGR does not Granger Cause GDPPC	0.08284	0.9207
RGDP does not Granger Cause POPGR	1.62352	0.2146
CORR does not Granger Cause GDPPC	12.7955	0.0001
GDPPC does not Granger Cause CORR	1.82181	0.1798

Source: Author's computation (2023)

Table 7 shows the result of Pair-wise granger causality test. The result indicates the rejection of null hypotheses that HEDU, UNM and CORR do not granger cause GDPPC. The analysis indicates a uni-directional causality running from these three explanatory variables to the dependent variable GDPPC. However, a bi-directional causation was established between HEDU and GDPPC. This result supports submission of Hussaini (2020).

Conclusion and Policy Implications
The paper investigated the impact of higher education financing on inclusive growth and sustainable development in Nigeria from 1990-2021. This study's contribution to knowledge is its findings of a positive and insignificant impact of educational financing on sustainable development in Nigeria. The possible explanation for the insignificant impact was an indication of low level of financial commitments to education sector which has contributed to the deplorable state of higher education in Nigeria. The policy implication is that higher education financing is vital for the achievement of inclusive growth and sustainable development in Nigeria. The paper recommends the following measures.
1. Tertiary education should be adequately funded by given priority attention in the national budget. In fact, government should increase her budgetary allocation to the education sector from the present less than 15 per cent to 26 per cent recommended by UNESCO. This will help in providing adequate resources for the maintenance of poor and dilapidated structures, building of libraries and laboratory, procurement of laboratory equipment, and procurement of relevant teaching and learning materials in tertiary institutions in Nigeria.
2. Government should ensure strict monitoring of funds allocated to the education sector to ensure effective utilization and to prevent misappropriation or diversion to private accounts.

3. In addition, all key stakeholders including private sectors and non-governmental organizations should be partners in funding of tertiary education. This will help mobilize resources for the development of the sector.

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