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Linkages among Higher Education, Poverty and Economic Growth in Nigeria: An Empirical Investigation

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Abstract
The study has examined the linkages among higher education, poverty and economic growth in Nigeria from 1980-2012 using an Instrumental Variable based Two-Stage Least Square (IV/2SLS) methodology. The Johansen cointegration test supports the existence of a long run relationship among the variables while the negatively signed and significant ECM insinuates a satisfactory speed of adjustment. The results obtained indicate that increases in economic growth do not have significant effect on the level of poverty in Nigeria. Also there is evidence of a positive and significant contribution of higher education to economic growth and poverty reduction, but the magnitude of transmission is lower than what is expected because unemployment has eroded the opportunity cost of the labour force. The study concludes that economic growth, though necessary, is not a sufficient condition for poverty alleviation, unemployment reduction and sustained investment in education in Nigeria. The study recommends a deliberate policy of redistribution.
Keywords: Graduate Turnout, Higher Education, Economic Growth, TSLS, Nigeria.

1. Introduction

There is a general consensus in development policy theorizing that human capital is essential to the achievement of desired level of economic growth irrespective of the regions in the world. Particularly, investment in education is regarded as the first step in human capital development which is a basic instrument for further poverty reduction and economic growth. Education, especially at the higher level, often triggers economic growth through many factors like enhancing the employment opportunities, increasing stock of physical capital, improving health facilities, reducing fertility and poverty level, improving technological development and source of political stability. Investment in education also increases output per worker and GNP per capita; supports wide spread in knowledge and helps to reduce crime rate, terrorism as well as child labour. (Ijaya 1998, Babatunde 2005).

Education is therefore seen as a potent instrument for reducing poverty and enhancing economic growth by empowering people, improving private earnings, promoting a flexible and healthy environment and creating competitive economy. It plays a vital role in shaping the way in which future generations learn to cope with the complexities of economic growth. A well educated population therefore has the potentiality to make meaningful contributions to the economy both at the micro and macro levels and also affects the structure both directly and indirectly. Direct effect takes the form of increase in individual's wage while the increasing externalities associated with education are an indirect effect. (Afzal et al 2010, Dauda 2010).

In Nigeria, attempts to diversify the mono-product economy made the government to give priority to education policy, as reflected in the size and composition of budgetary allocations to the sector. For instance the total national expenditure on education increased from ₦ 112.24 Million in 1980 to ₦196.54 Billion in year 2010. (CBN Statistical Bulletin, 2010). The Nigerian education sector has enjoyed a liberal policy structure such that involves the simultaneous participation of both public and private stakeholders. Private investors in the sector made massive contributions towards the development of higher education in the area of establishment, infrastructure, process and massive addition to labour force. For instance, as at 1980, the total number of public universities was just 16 with no single private university, whereas by 2012, it was 127 in the division of 77 public and 50 private categories, apart from mono and polytechnics as well as colleges of education. The rippling effect of this is an unprecedented increase graduate turnout. Thus, as at 1980, the number of graduates that participated in the one year compulsory national youth service corps (NYSC) scheme was 536, whereas by 2010, the number had jumped astronomically to 118,933. The cumulative effect of this massive addition to the labour force has the prospects of boosting economic growth and development. Interestingly too, regardless of the nature of global economic climate, the frequent movements in world oil prices and the poor performance of the non-oil sector, the real domestic growth still averaged 6.1% in the first quarter of year 2012, which was above the 3.6% global growth rate forecasted (NUC 2012, NYSC 2012 and NBS, 2012).

However, despite the robust expenditure policies on education, proliferation in higher institution and increase in the number of graduate turnout, the impact of higher education on economic growth and poverty reduction is still elusive. Unemployment and youth restiveness in form of militancy in the Niger Delta, the Boko Haram in the North and the kidnapping dotted across the country has continued to increase unabatedly. A worse case of unemployment is graduate unemployment which, apart from inhibiting the prospects of labour as a factor

of production in reflecting its true opportunity costs, makes the economy to continually loose greater percentage of its potential output to wastages. Also, incidence of poverty in the country has continued to increase. Poverty incidence was 69% in year 2010 while the population in poverty was 112.47million, which translated into about 75%. Categorically, rural-poor and urban-poor characterize the dominant poverty dichotomy in the country, with over 70% of the population living below poverty line of $1 per day (NBS, 2012). This high level of poverty rather places skepticism on the linkages between higher education and economic growth in the country. The objective of this paper is to empirically examine the short-run and long-run linkages among higher education, poverty and economic growth in Nigeria with a view to deriving implications for policy direction.

The rest of the paper is structured as follows: Section two discusses the literature/theoretical framework Section three provides the data source and the methodology. Section four presents and discusses the results. Conclusion and recommendations are contained in the last section

2. Literature /Theoretical Framework

The studies on education, poverty and economic growth relationship abound in literature, but many took these variables in pairs or studied them separately and the results of such studies differed significantly in respect to the area of the linkages researchers considered important. However, a common trend in the results of these empirical studies was strong evidence that higher educational inputs increase productivity and economic growth and by extension, causes poverty reduction.

The paradox of education and economic growth in Nigeria was examined by Ayara (2003) using the standard growth-accounting model. Findings suggest that education has not had the expected positive growth impact on economic growth. Babatunde and Adefabi (2005) investigated the long run relationship between education and economic growth in Nigeria between 1970 and 2003. While the Johansen cointegration result establishes a long run relationship between education and economic growth, findings reveal that a well educated labour force appears to significantly influence economic growth both as a factor in the production function and through total factor productivity. Bakare (2006) investigated the growth implications of human capital investment in Nigeria. The study revealed that there is a significant functional and institutional relationship between the investments in human capital and economic growth in Nigeria. It was revealed that 1% fall in human capital investment led to a 48.1% fall in the rate of growth in gross domestic output between 1970 and 2000.

The findings of Chaudhary, Iqbal & Gillani (2009) on their investigation of the causality between higher education and economic growth in Pakistan was viable and permissible. The results of cointegration approach confirm the long-run relationship between education, labour, capital and RGDP (real gross domestic product). Causality results confirm the unidirectional causality from RGDP to higher education. Danacica, Belascu & Llie (2010) used time series data for the span of 1980-2008 to explore the causal nexus between higher education and economic growth in case of Romania. The results of their study have confirmed that there is LR relationship between higher education and economic growth and one way causality *i.e.* running from economic growth to higher education has been observed.

The result of Ishola and Alani (2008) on the empirical evidence of human capital development and economic growth in Nigeria was based on the estimated regression and a descriptive statistical analysis of government commitment to human capital development. The study found out that though little commitment had been accorded health compared to education, empirical analysis showed that both education and health component of human capital development are crucial to economic growth in Nigeria. The study of Adekunle (2011) was on linking human capital development to economic growth in Nigeria. Findings revealed that there is strong positive relationship between human capital development and economic growth. The study concluded that stakeholders need to evolve a more pragmatic means of developing human capabilities as an important tool for economic growth in Nigeria. Proper institutional framework into the manpower need of the various sectors of the economy was also suggested.

Ararat (2007) analyses the role and impact of education on economic growth in the two largest economies of the former Soviet Bloc, namely, the Russian Federation and Ukraine. The study attempts to estimate the significance of different educational levels, including secondary and tertiary education, for initiating substantial economic growth that now takes place in the two countries. The model estimation shows that there is no significant impact of educational attainment on economic growth. The results from the system of equations indicate that an increase in access of population to higher education brings positive results for the per capita GDP growth in the long term. Increasing the number of college-educated specialists leads to sustainable economic growth.

Ijaiya (2011) empirically examined the relationship between economic growth and poverty reduction in Nigeria and found out that the initial level of economic growth is not prone to poverty reduction. In order to improve and sustain the rate of economic growth in Nigeria from which poverty could be reduced, measures

such as stable macroeconomic policies, huge investment in agriculture, infrastructure development and good governance were suggested. Tulus (2006), in establishing relationship between economic growth and poverty while using industry and agriculture as intervening variables in Indonesia, found out that rapid economic growth was attributed to combination of the intensive oriented growth strategy and poverty alleviation measures. It was also found out that agriculture remained central to the Indonesian economy. The study recommended a sustained labour intensive high economic growth and effective agricultural development policy for poverty reduction. Kruger & Maleckova (2003) studied the causal relationship between education, poverty and terrorism. They found out that the micro-economic literature looks at the relationship between different ways of measuring a person's educational achievement and what they earn. Most studies show consistent results for what can be called the private or personal pay-off from education. There was evidence of higher GDP growth in countries where the population has, on average, completed more years of schooling or attains higher scores on tests of cognitive achievement.

The theoretical foundation for the role of higher education human capital in economic growth is entrenched in endogenous growth theory as increase in research and development (R&D) and knowledge is used to produce more knowledge. The endogenous growth theory predicts positive externalities and spillover effects from development of a high valued-added knowledge economy which is able to develop and maintain a competitive advantage in growth industries in the global economy (Babatunde, 2005). This will lead to increase in productivity and gross domestic product (GDP), and hence increased economic growth. Proponents of endogenous growth theory also believe that improvements in productivity can be linked to a faster pace of innovation and extra investment in human capital, thus emphasizing the key role of knowledge as a determinant of economic growth. Further studies that provided the theoretical basis for human capital as a major factor in economic growth included Romer (1986, 1989, 1990), Lucas (1988), Grossman and Helpman (1991), Rivera-Batiz and Romer (1991) and Babatunde (2005).

In theorizing the link between higher education and poverty reduction, recent debates on pro-poor growth tend to be narrowly focused on direct poverty-targeting measures and an increased awareness of how to generate a dynamic growth process while ensuring social equity. Herrick and Kindleberger (1983) opined that economic growth involves the provisions of inputs that lead to greater outputs and improvements in the quality of life of a people. In its mechanisms, higher education would enhance a quantitative and sustained increase in a country's per capita output or income accompanied by expansion in its labour force, consumption, capital and volume of trade and welfare (Jhingan 1985, Thirlwall 1972, Ijaiya,2010). Welfare is usually determined by the increased and sustained flow of goods and services consumed by the people with the resultant effects of an increase in life expectancy at birth, reduction in infant and maternal mortality, and accessibility to social services including health care services, education and clean water (Thirlwall 1972; World Bank 2005). Higher education would also increase technological capabilities which will permit greater amount of output from any given level of input, while the increase in output permitted by improved technology will go a long way to increase standard of living of the people and thereby reduce poverty. Atoloye (1997) further stated that economic growth enhancing strategies such as import substitution and export-led growth strategies are also important for poverty reduction.

Despite the apparent linkage among higher education, poverty and economic growth, there is no study yet to empirically assess this joint relationship in Nigeria to the best of our knowledge. Many studies took these variables in pairs, such as the relationship between education and economic growth, education and poverty, as well as economic growth and poverty. This study intends to contribute to the existing knowledge on the level of education-poverty-economic growth nexus by analyzing the linkage among higher education, poverty and economic growth in Nigeria using Instrumental Variable Two-Stage Least Square (IV/2SLS) methodology.

3. Data Source and Methodology.

3.1 Data source

The present research made use of time series data on education, real gross domestic product and poverty for the time span of 1980- 2012 in the case of Nigeria. Data sources include various issues of CBN Statistical Bulletin, Nigeria bureau of Statistics (NBS, 2012), National Youth Service Corps (NYSC) and World Bank data index (WDI, 2012). Some of these data, for instance the data on the National Youth Service Corps (NYSC) were disaggregated from the source. Efforts were made to aggregate them before they were used for the analysis.

3.2 Model specification

The specification of the regression models for the variables: economic growth, school education and poverty are given below:

$$RGDP = f(GTOUT, HCI) \quad (1)$$

$$GTOUT = f(RGDP, HCI) \quad (2)$$

HCI = f (RGDP, GTOUT) (3)

For estimation purpose, various functional forms of the above models were experimented, however, only the best possible ones are presented below:

ln (RGDP) = $\alpha 0 + \alpha 1$ In(GTOUT) + $\alpha 2$ (HCI) + εt (4)

ln (GTOUT) = $\beta 0 + \beta 1$ ln (RGDP) + $\beta 2$(HCI) + εt (5)

HCI = $\gamma 0 + \gamma 1$ (RGDP) + $\gamma 2$ (GTOUT) + εt (6)

Where,

ln = Natural logarithm

RGDP = Real Gross Domestic Product as a measure of economic growth. This proxy has been utilized by Afzal et al (2010)

GTOUT = Graduate turnout as a measure of higher education. This represents the aggregate turn-out of graduates in Nigerian. This proxy has been used by Hassan and Ahmed (2008) and Akinyemi (2012).

HCI= Head count index as a measure of absolute poverty. This measure of poverty is widely used by Afzal (2010), Amjad and Kemal (1997), Vu and Baulch (2011).

Et = error term or white noise.

3.3 Estimation Technique

In our estimation, simultaneous equation models were developed. Although simultaneous equations are built to enable variables serve the dual purpose of both endogenous and exogenous dimensions, there is high probability that some explanatory variables from the multivariate equations are correlated with the error terms. Hence, the estimation method to be employed must possess quite strong assumptions about no endogeneity and no autocorrelation. In this case, OLS becomes deficient since its estimates are not consistent and biased. We thus employed two-stage least square (2SLS) in order to solve the endogeneity problem. 2SLS can control for country specific shocks which enter the reaction function as error terms and which can be correlated with the explanatory variables. Also, there is a causality issue leading to a simultaneous bias: besides the fact that the economic growth may be shaped by education and poverty, it can also influence these variable, though with a certain lag. Hence, without using instrumental variables, the OLS estimated parameters may be biased and inconsistent. In order to solve this issue, both determinants of economic growth (higher education and poverty) would enter another reaction functions and will be estimated as endogenous variables, being determined inside the system with the help of additional exogenous variables. So, instead of univariate regression, simultaneous equation models will be employed with the lagged values of economic growth, education and poverty serving as instrumental variables.

3.4 The Identification Problem

Since the estimation of the linkages among higher education, poverty and economic growth is based on a system of equations in which the endogenous variables are defined within additional structural equations, it is necessary to check whether the system is identified or not. This is essential for simultaneous equation models because an unidentified system may cause perfect multicollinearity when running 2SLS and/or 3SLS (Kelejian and Oates, 1989). Also, an under-identified model generates less meaningful results, thus any scientific conclusion drawn on the basis of such arbitrariness are both unfounded and baseless. In order to correctly perform these estimation methods therefore, we need at least several excluded exogenous variables from the main (first) equation, which can be found in the 2nd and the 3rd equations (Bekker and Wansbeek, 2001),

Following Gujarati (2004), a necessary condition for identification of any structural equation is that the number of excluded exogenous variables from this equation are greater than or equal to the number of right hand side included endogenous variables.

Let K be the number of exogenous variables in the system, then this condition requires $k_2 \geq g_1$ where k_2= K–k_1, where k_1 stands for the number of RHS exogenous variables and g_1 stands for the number of endogenous variable in the equation.

In our case, the endogenous variables $g_1$are; real gross domestic product (rgdp), graduate turnout (gtout) and headcount index (hci). The exogenous variables are lagged value of real gross domestic product (rgdp-1), lagged graduate turnout (gtout-1) and the lagged value of headcount index (hci-1), with each standing separately in each of the equations. Let us check, based on the **order condition of identification,** whether the equations included in our system satisfy the requirement.

ln (rgdp) = $\alpha 0 + \alpha 1$ in(gtout(-1)) + $\alpha 2$ (hci(-1)) + εt : (7)

ln (gtout) = $\beta 0 + \beta 1$ ln(rgdp(-1)) + $\beta 2$ (hci(-1)) + εt : (8)

hci = $\gamma 0 + \gamma 1$ In(rgdp(-1)) + $\gamma 2$ In(gtout(-1)) + εt: (9)

Table 1: Specification of order condition of identification.

Equations	No of predetermined Variable Excluded (K-k_1)	No of endogenous variables included less one (k_1-1)	Identified?
Equation (7)	4	2	over-identified
Equation (8)	4	2	over-identified
Equation (9)	4	2	over-identified

Source: Author's computation

Hence, we conclude that our system is over-identified. However, the order condition of identification is necessary but not sufficient condition for identification. Thus, it is useful only if the condition is not satisfied. In our case, we have to continue with **rank condition for identification** in order to be sure whether our system is identified.

In order to compute the rank order condition for identification, we re-write our simultaneous equation model in the following form:

$$Ky_t + \Gamma x_t = \varepsilon_t$$

where K represents endogenous variables and Γ stands for exogenous variables. The detail of the modified simultaneous equations model is presented below:

$$-\ln(rgdp) + 0\,(hci) + 0\,\ln(gtout) + 0\,\ln(rgdp(-1)) + hci(-1) + \ln(gtout(-1)) = \varepsilon_t \quad (10)$$

$$0\,\ln(rgdp) - (hci) + 0\,\ln(gtout) + \ln(rgdp(-1)) + 0\,hci(-1) + \ln(gtout(-1)) = \varepsilon_t \quad (11)$$

$$0\,\ln(rgdp) + 0\,(hci) - (gtout) + \ln(rgdp(-1)) + hci(-1) + 0\,\ln(gtout(-1)) = \varepsilon_t \quad (12)$$

Then, we write out the coefficients of the variables in the system in a tabular form as below:

Table 2: The Coefficients of the Variables in the System.

Variables	rgdp	hci	gtout	rgdp(-1)	hci(-1)	gtout(-1)
Equation (10)	-1	0	0	0	1	1
Equation (11)	0	-1	0	1	0	1
Equation(12)	0	0	-1	1	1	1

Source: Author's computation

Next, we construct the matrix A which comprises the coefficients of the endogenous and exogenous variables. A more detailed description about the methodology is provided by Gujarati (2004).

$$\text{For equation (10), } A = \begin{pmatrix} -1 & 0 & 1 \\ 0 & -1 & 1 \\ -1 & 1 & 1 \end{pmatrix}$$

We can deduce that the determinant of the above equation is nonzero.

$$\text{Det } A = \begin{vmatrix} -1 & 0 & 1 \\ 0 & -1 & 1 \\ -1 & 1 & 1 \end{vmatrix}$$

The rule of the thumb for rank condition for identification states that; if at least one non-vanishing or non-zero determinant can be found, the equation in question is just or over-identified. Since our simultaneous equations model satisfy this condition (i.e. it is identified), which means that this specification is appropriate and we can continue with its estimation.

4. Results and Discussion

4.1 Unit Root Test Results

Prior to the estimation of the empirical models, the unique characteristics of the data have to be examined. Testing the stationarity of economic time series is important since standard econometric methodologies assume stationarity in the time series while in the real sense they may not be stationary. Hence the usual statistical tests are likely to be inappropriate and the inferences drawn are likely to be erroneous and misleading. The study employed the augmented Dickey-Fuller (ADF) and Philip-Peron (PP) techniques which are based on the McKinnon critical values. The unit root tests results for stationarity for ADF and PP at levels and at first difference are presented in tables 3 and 4 respectively below;

Table 3: Unit Root Tests Results for Stationarity: ADF and PP at levels

Variables	ADF		PP		Order of Integration
	Intercept	Intercept And trend	Intercept	Intercept And Trend	
RGDP	6.0408 (1.0000)	0.5391 (0.9989)	1.3246 (0.9982)	0.0229 (0.9948)	Non-stationary
GTOUT	-0.2546 (0.9210)	-2.8730 (0.1847)	-0.2968 (0.9147)	-2.0198 (0.5687)	Non-stationary
HCI	-1.5957 (0.4731)	-2.2928 (0.4256)	-1.5832 (0.4793)	-2.2929 (0.4256)	Non-stationary

Note: significance at 1% Level and * at 5% Level. Figures within parenthesis indicate p-values.
MacKinnon (1991) critical value for rejection of hypothesis of unit root applied.

Table 4: Unit Root Test for Stationarity: ADF and PP at First Difference.

Variables	ADF		PP		Order of Integration
	Intercept	Intercept And trend	Intercept	Intercept And Trend	
RGDP	-6.9517 (0.0000)	-12.4216 (0.0000)	-6.0227 (0.0000)	-11.0155 (0.0000)	I~I(1)
GTOUT	-5.1149 (0.0002)	-5.0993 (0.0014)	-5.1416 (0.0002)	-5.1067 (0.0013)	I~I(1)
HCI	-5.6478 (0.0001)	-5.5771 (0.0004)	-5.6509 (0.0001)	-5.5868 (0.0004)	I~I(1)

Note: significance at 1% Level and * at 5% Level. Figures within parenthesis indicate p-values.
MacKinnon (1991) critical value for rejection of hypothesis of unit root applied.

The ADF and PP results in Tables 3 and 4 show that all the variables are non-stationary at their levels. However, with their first differences, they become stationary. That is, the real gross domestic product (RGDP), headcount index (HCI) and graduate turn-out (GTOUT) becomes stationary as indicated by the ADF and PP values of each of these variables. Hence, integration of the variables occurred at order one [I (1)].

4.2 Cointegration Test Results

With the stationarity of each of the series achieved, the next step is to search for the cointegration between the variables. For this purpose cointegration tests were conducted by using the reduced rank procedure developed by Johansen (1988) and Johansen and Juselius (1990). This method produces asymptotically optimal estimates since it incorporates a parametric correction for serial correlation. The nature of the estimator means that the estimates are robust to simultaneity bias, and it is robust to departure from normality (Johansen 1995). The cointegration test results are presented below:

Table 5 Summary of Johanson Cointegration Test Results.

Hypothesized No of CE(s)	**Eigenvalue**	**Trace Statistics**	**0.05 Critical Value**	**Prob****
None*	0.776973	55.17721	29.79707	0.0000
At Most 1	0.199377	8.662828	15.49471	0.3975
At most 2	0.055482	1.769493	3.841466	0.1834
Hypothesized No of CE(s)	**Eigenvalue**	**Max-Eigen Statistics**	**0.05 Critical Value**	**Prob****
None*	0.776973	46.51438	29.79707	0.0000
At Most 1	0.199377	6.893335	14.26460	0.5018
At most 2	0.055482	1.769493	3.841466	0.1834

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

As evident in Table 5 above, the result of the Johanson cointegration test between real gross domestic product, graduate turnout and headcount index indicates that there exists long run relationship among education, poverty and economic growth. The dependent variable RGDP is cointegrated with GTOUT and HCI, since the test statistics strongly rejects the null hypothesis of no cointegration in favour of one cointegration relationship between the variables. In more specific terms, the trace test statistics indicate 1 cointegrating equation at 5 per cent level among the series in the model. In addition the MacKinnon P-values are significant at 1 percent level.

Thus the results show that the dependent and independent variables are both cointegrated and have long-run relationship with one another.

The establishment of presence of cointegration among the variables avails us the opportunity to separate long-run equilibrium relationship from the short-run dynamics.

4.3 Parsimonious ECM Results

The short-run adjustment dynamics is specified by the error correction mechanism (ECM). Best fitting or parsimonious error correction model was selected. The results are presented in Table below:

Table 6: Summary of Parsimonious ECM.

Variables	Coefficients	Std. Error	t-Statistics	Prob.
D(RGDP(-1))	0.4327	0.1666	2.5956	0.0165
D(RGDP(-2))	-0.0444	0.0236	-1.8767	0.0739
D(HCI)	0.0494	0.0591	0.8358	0.4122
D(HCI(-1))	-0.0739	0.0572	-1.2914	0.2099
D(HCI(-2))	-0.0644	0.0563	-1.1435	0.2651
D(GTOUT)	0.0073	0.0292	0.2509	0.8042
ECM(-1)	-0.4880	0.0296	-1.6456	0.0141
C	0.0377	0.0128	2.9353	0.0077

R^2 = 0.68, AIC = -3.34, SC = -2.97, LL = -58.14, Prob (F-Statistic) = 0.02,
DW= 2.36.

The result of parsimonious error correction model is reported in Table 6. The result was gotten by deleting the insignificant variables from the overparameterize ECM. The Akaikes Information criterion, Schwarz criterion and log-likelihood were used to select the appropriate lag-length. The parsimonious result indicates that some of the variables are significant at their levels or current values, while others were significant at their lags. The current value of GTOUT and lagged value of RGDP rate are statistically significant in explaining the behaviour of economic growth in Nigeria, particularly during the period under consideration. This is an indication that economic growth in Nigeria is not only influenced by current economic environment, but also predicated upon its past behavior. The lagged value of RGDP has positive and significant effect on economic growth in Nigeria. The coefficient is significant at 1 percent. The result indicates Nigeria economic growth is greatly influenced by its past values. The coefficient of headcount index (HCI) at its current value has correct sign but not statistically significant. The HCI at its lag does not have the correct sign and not statistically significant. The coefficient of graduate turnout (GTOUT) has the correct sign but not statistically significant.

The coefficient of the error correction terms carries the correct sign (negative) and is statistically significant at 5% with t-statistics of -1.6456 and its corresponding probability value of 0.0141. The speed of adjustment of economic parameters to equilibrium is approximately 48.8 percent to real gross domestic product growth rate in the short run. Hence, the ECM is able to correct about 49 percent of the deviations in the relationship between RGDP growth rate and the explanatory variables. The R^2 is 0.68 in the error correction model showing that the explanatory variables explain about 68 percent of changes in the dependent variable. It remained strong even after adjusting for the degree of freedom and stood at 0.618. To be precise, the adjusted R^2 is 62 percent. By implication, this shows that over 60 percent of the variations in RGDP growth can be explained by the three variables taken together. The remaining 38 percent variations can be attributed to other forces outside the model. These results show a goodness of fit of the regression. The f-statistic which measures the joint statistical influence of the explanatory variables in explaining the dependent variable was found to be statistically significant at 1% level. The f-statistic figure of 2.946 shows that the explanatory variables are important determinants of the economic growth in Nigeria. The Durbin-Watson statistics of 1.96 rules out auto-correlation.

4.4 IV/2SLS Regression Results

Table 7 below reports the regression results using Instrumental Variable based Two-Stage Least Squares (IV/2SLS) technique. The choice of our instrumental variables was based on the need to check the performance of the current and lagged values of the variables under consideration. Thus, the instrumental variables include the lagged value of real gross domestic product (RGDP(-1)), the lagged value of graduate turnout (GTOUT(-1)) and the lagged value of headcount index (HCI(-1)).

The coefficient of GTOUT is found to be positive and statistically significant at 1% with t-statistic of 0.1283 and its corresponding probability value of 0.0002. By this, 1% increase in graduate turnout raises the level of RGDP by 56%. This, therefore, indicates that graduate turnout plays pivotal role in the growth performance of Nigerian economy.

Table 7: **Regression Results**
Method: Two-Stage Least Squares
Included observations: 32 after adjustments
Instrument specification: C RGDP(-1) HCI(-1) GTOUT(-1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.976839	0.774955	7.712500	0.0000
GTOUT	0.558481	0.128325	4.352174	0.0002
HCI	0.151143	0.348347	0.433886	0.6676

R-squared	0.715729
Adjusted R-squared	0.696124
F-statistic	39.36490
Prob(F-statistic)	0.000000
Durbin-Watson stat.	0.935171

The coefficient of headcount index is also correctly signed (i.e., positive) but no sufficient evidence for its significance as indicated by the t-statistic of 0.4338 with corresponding probability value of 0.6676. This result signals the need for poverty alleviation program that will empower people since growth in Nigerian economy does not translate into the living standard of the people. The R^2 of 0.7157 indicates that about 72% of total variation in the dependent variable (RGDP) is accounted for by the explanatory variables (i.e. GTOUT and HCI). This result remains robust even after adjusting for the degrees of freedom (df) as indicated by the value of adjusted R^2, which is 0.6961 (i.e. ≈ 70%). Thus, the regression has a good fit. The F-statistic, which is a test of explanatory power of the model is 39.36 with the corresponding probability value of 0.017, is statistically significant at 10%. Therefore, this implies that the two explanatory variables (GTOUT and HCI) have joint significant effect on the economic growth of Nigeria using RGDP as a proxy. The Durbin-Watson statistic of 0.9351 indicates we cannot completely rule out autocorrelation.

5. Summary and Conclusion

This study has provided evidence on the linkages among higher education; poverty and economic growth in Nigeria using error correction mechanism (ECM) and an Instrumental Variable based Two-Stage Least Square (IV/2SLS). It is clear from the analysis that increases in economic growth do not have significant effect on the level of poverty in Nigeria. This implies that while the real gross domestic product in Nigeria continues to grow, it leaves majority of people in abject poverty. Also, economic growth does not affect graduate turnouts. Although there are evidence of a positive and significant contribution of graduate turnout to economic growth and poverty reduction, the magnitude of transmission is low in contrast to what is expected. The high growth rates could not be channeled appropriately towards generating enough employment opportunities for these teeming school leavers. Unemployment has eroded the opportunity cost of this labour force since the government is yet to get a robust policy prescription that is potent enough to combat graduate unemployment in Nigeria, once and for all. Hence, economic growth seems to be a necessary but not sufficient condition for poverty alleviation, unemployment reduction and sustained investment in education in Nigeria.

6. Policy Recommendation.

- For growth to be an effective strategy, it has to be accompanied by political will and a deliberate policy of redistribution.
- There is need for an employment strategy that is potent enough to increase the absorption capacity of the economy, increase the potential for job creation and drastically reduce graduate unemployment.
- Stringent measures should be ensured by NUC in the establishment of higher institutions in the country to avoid the proliferation of mushroom higher institution which turns out half baked graduates that are not employable.
- An appraisal of higher education curriculum is essential in order to increase the employability, relevance and contribution of the huge number of graduate turnout to economic growth and development in the country.
- An infrastructural development strategy that would revive the economy, boost foreign direct investment and limit the crowding out of the manufacturing companies with their absorption capacity is also essential.
- A deliberate redistribution policy that would increase the participation rate of an average Nigerian in the growth process is essential for poverty reduction in the country.

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