

Higher Education and Economic Growth in Nigeria: An Empirical Investigation

*Risikat Oladoyin S. Dauda**

This study is an attempt to provide empirical evidence on the effect of higher education proxied by tertiary school enrolment and graduate turnout on economic growth in Nigeria during the period 1977 to 2007. The data used for the study were obtained from the Central Bank of Nigeria and the Nigerian National Bureau of Statistics. This paper employs co-integration and error correction techniques for the data analysis. The study reveals that higher education does not only have positive impact on growth of the Nigerian economy but such impact is strong and statistically significant. The empirical results indicate that long-run equilibrium relationship exists between higher education development and economic growth in Nigeria. It was revealed that labour force and physical capital exert positive and significant influence on growth while political instability proxied by a dummy variable and inflation rate have negative effect on growth. The policy implication of this study is that government should pay attention to policies that enhance labour productivity and stimulate growth through adequate investment on higher education under stable macroeconomic environment.

JEL Classification: I20; J24; O40.

Keywords: Higher Education, Education, Economic Growth, Economic Development.

1. INTRODUCTION

The key role higher education plays in the economic development and competitiveness of a nation is a topic of increasing public concern. This is more so since the world is facing unprecedented challenges emerging from the convergent impacts of globalization, the increasing importance of knowledge as an engine of growth, and the information and communications technology (ICT) revolution (Brodjonegoro, 2008). Higher education is a critical input into the development of a knowledge economy and is considered to be an important contributor to economic growth. It can contribute to economic growth by making individual workers more productive and indirectly by leading to the creation of knowledge, ideas, and technological innovation.

The role of higher education as a driver of innovation and economic growth is increasing as jobs become more knowledge intensive and the links between labour productivity and economic growth become closer (Larocque, 2008: 133). Most developed and developing countries are vigorously pursuing policies and strategies to shift to the knowledge economy, which is bringing dramatic changes in the nature of work and the role of higher education in nurturing the talents required for this new economy.

* Department of Economics, University of Lagos, Akoka, Lagos, (E-mail: rissydauda@yahoo.com; rdauda@unilag.edu.ng)

In Nigeria, the belief that expanding education particularly, at the higher level promotes economic growth has been a fundamental tenet of development strategy (Adedeji and Bamidele, 2002). This explains the reason why there has been a rapid expansion in higher education since the country gained independence in 1960. Available statistics reveals that from five universities in 1972, higher education facilities rose to 128 in 2005, with an enrolment figure of over 1.2 million students. There has been mammoth development in terms of institutional framework to encourage higher educational institutions to be more innovative and responsive to the need to improve the nation's competitiveness. The Nigerian educational policy has been guided by the fact that the development of higher education has a beneficial direct and indirect impact on the economy. Despite the importance of higher education, successive Nigerian governments spend an almost insignificant proportion of the federal budget on education. In realization of the low education funding profile, the federal government enacted an Education Tax Law in January, 1993. According to this law, companies registered in Nigeria pay 2 per cent of the assessable profit to an Education Tax Board of Trustees which is then disbursed to primary, secondary and tertiary institutions in the proportions of 40, 10, and 50 per cent respectively. Furthermore, to supplement government funding, universities and other tertiary institutions are encouraged to explore other sources of funding such as endowments, consultancy services and commercial ventures. In view of the fact that higher education offers opportunities for Nigeria to promote social and economic development by enhancing economic competitiveness and increasing the stock of knowledge, it is essential to have an understanding of the connection between higher education and economic development in Nigeria within the context of the changing global environment. This provides the motivation for the study.

Arising from the above, the basic questions that are being asked in this paper are: Is there a long-run relationship between higher education and growth in Nigeria? What is the impact of higher education on economic performance in Nigeria? Will demand for higher education increase with the changes in the global environment? This paper will try to address these issues. The objective of this study therefore, is to examine the existing relationship between higher education and economic growth in Nigeria. The paper is organized into five sections, including the introductory section. The section that follows provides the review of literature. Section three contains the analytical framework and model specification while empirical results and discussions are presented in section four. Lastly, section five is the concluding section and it contains the summary and implications of the study's findings.

2. LITERATURE REVIEW

In recent times, there are numerous empirical studies that have investigated the relationship between higher education and economic development in different countries. Some of these studies examine the role of higher education in economic development by focusing on the private and societal benefits of tertiary education (Macerinskiene and Vaiksnoraite, 2006; Adedeji and Bamidele, 2002; Lundvall, 2008). While several other studies have also attempted to empirically determine the growth-higher education linkage, very few studies have investigated the mechanisms through which higher education contribute to the growth of an economy. An attempt will be made here to provide a brief review of these studies.

Macerinskiene and Vaiksnoraite (2006) who examined the role of higher education in economic development concluded that higher education influences economic well-being in

three ways. First, the direct expenditures by the institutions, their employees and their students impact the local economy. This spending multiplies through the local economy until the monies are used to purchase goods and services from outside the local area. Second, higher education provides financial and non-financial benefits to the individual who pursues an advanced education and to society in general. Third, institutions of higher education are increasingly focused on knowledge creation. Thus, universities are sources of research and development innovations that simultaneously can be beneficial to society and conducive to economic growth.

Pioneering studies, such as Nelson and Phelps (1966) and Schultz (1975) demonstrate empirically the transmission mechanism from higher education to economic growth. Evidence from Nelson and Phelps (1966) who present a simple growth model suggest that people with higher education contribute to economic growth through two mechanisms. First, they are able to pursue regular activities more efficiently than the average workers with lower levels of education. Second, is that they are more competent when it comes to exploiting new technical opportunities in the economy. Empirical data on farmers was used to support the second assumption. The authors observed that highly educated farmers introduced new methods into farming and produced better results than the average farmers. They concluded from the analysis that the marginal productivity of the highly educated farmers will reflect the rate of technical change, meaning that the rate of return on investment in higher education is positively correlated with the rate of technical progress; this by implication enhances economic growth.

In furtherance of this, Schultz (1975) carried out an empirical analysis using farming in India and observed that farmers with education were significantly more productive than average in regions where green revolution takes place and this was not the case where methods of farming remained unchanged. He interpreted this to mean that education makes individuals better prepared to “deal with disequilibria”. This implies that when individuals are exposed to change such as new technological innovations, he or she will be more competent in finding a solution and this is enhanced by skills that are gained from education, which he referred to as “entrepreneurial”.

Much of the findings in the literature on the impact of higher education on growth are inconclusive and very sensitive to the measures of higher education. Stengos and Aurangzeb (2008) examined the impact of education on growth in Pakistan for the time period of 1973-2001. Education, measured as gross enrollments and total expenditures, is broken down into primary, secondary and tertiary as well as by gender in each of the above categories. The study adopted time series techniques to determine whether education, for each category, has a casual impact on growth. The robustness of these results is then examined using Levine- Renelt (1992) methodology. It was discovered that secondary and higher education has a strong and robust impact on growth, whereas, at the primary level only initial female enrolments show a causal but not robust impact on growth.

Katircioglu (2009) employs the bounds test for co-integration and Granger causality to investigate the higher education-led growth hypothesis in the case of Northern Cyprus. The empirical results show that long-run equilibrium relationship exists between higher education growth and economic growth of North Cyprus. Granger causality test

suggest unidirectional causality that runs from higher education growth to economic growth in Northern Cyprus.

Lin (2004) investigates the effects of higher education curricula on the labour force and economic growth in Taiwan over the 1965-2000 period. In order to examine the potential differential effects of curricula structure on growth, the author selected four academic disciplines in higher education in Taiwan. In the same vein, outputs were divided into three industrial sectors to examine whether different academic disciplines have differential effects on economic development in each sector. Empirical evidence shows that higher education provided a positive and significant effect on Taiwan's economic development. Furthermore, it was revealed that engineering and the natural science majors played significant role in the development process.

Gyimah-Brempong, Paddist and Mitiku (2006) investigate the effect of higher education on economic growth in African countries by using panel data over the period from 1960-2000. A modified neoclassical growth equation and a dynamic panel estimator were used in investigating this relationship. The results revealed that all levels of education, especially higher education have a positive and statistically significant effect on the growth rate of per capita income in African countries. The growth elasticity of higher education was estimated to be about 0.09, an estimate which is twice as large as the growth impact of physical capital investment. This implied that African countries need to enhance higher education investment for productivity growth.

Khorasgani (2008) investigated the existence of a long and short run relationship between growth and higher education in Iran for the period 1959-2005. By conducting a baseline survey analysis of Iran and then by using multivariable time series data on the variables such as annual logarithmic gross domestic product, physic capital (K), human capital, research expenditure (R) and by using an autoregressive distributed lag (ARDL) model. The study findings revealed that higher education overall had a positive and significant effect on economic growth in Iran from 1959 to 2005.

In Nigeria, issues related to human capital development have been receiving attention among academics and policy makers. For instance, in 2002, the Nigerian Economic Society picked 'human resource development in Africa' as the theme of the annual conference. Most studies focused on the empirical investigation into the growth-human capital linkage (NES, 2002). However, there was no empirical study on the direct impact of higher education on economic growth. The results of the few studies on the effect of education at all levels on growth in Nigeria are a mixed bag: while some suggested that education has the tendency to influence growth performance of the Nigerian economy, others refuted this assertion. This study is therefore set to examine the effect of higher education proxied by tertiary school enrolment and graduate turnout on economic growth in Nigeria during the period 1977 to 2007.

2.1. Higher Education and the Nigerian Economy

Nigeria has the potential to become Africa's largest economy and a major player in the global economy by virtue of its rich human and material resource endowment. However, much of its potentials have remained untapped. The country has had lost decades of development due to negative-to-slow growth and has been one the weakest growing economies in the world on a

per capita basis especially for the period 1981-2000. The GDP grew by an average of 2.8 per cent in the 1990s, but the average growth rate for the 1999-2003 period was about 3.6 per cent with a per capita growth rate of 0.8 per cent per annum which is far lower than the 4.2 per cent per capita growth rate needed to significantly reduce poverty (NPC, 2004). However, with the advent of civilian rule, growth performance has improved significantly. Table 1 presents the sectoral growth rates of gross domestic product (GDP) for the period 2004-2008 period. The real GDP measured in 1990 basic prices grew by 6.4 per cent in 2008, compared with 6.5 per cent recorded in 2007. Non oil GDP grew by 9.1 per cent in 2008, compared with 9.5 per cent in 2007. Sectoral analysis showed that in 2008 agricultural output grew by 6.5 per cent, services by 10.45 per cent, communication by 37.68 per cent. Industrial output fell by 2.2 per cent partly due to the poor performance of the oil sector. Inflation was put at 15.1 per cent in December, 2008.

Table 1
Sectoral Growth Rates of GDP at 1990 Constant Basic Prices (%)

<i>Activity Sector</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>
Total GDP Growth Rate	6.58	6.51	6.03	6.45	6.41
Oil GDP Growth Rate	3.30	0.50	-4.51	-4.54	-4.76
Non-oil GDP Growth Rate	7.76	8.59	9.41	9.52	9.13
OF which Agriculture	6.50	7.06	7.40	7.19	6.54
Industry	4.15	1.71	-2.51	-2.23	-2.18
Services	8.83	7.96	9.18	9.88	10.45
Finance and Insurance	2.73	2.85	4.98	5.03	4.82
Manufacturing	10.00	9.61	9.39	9.59	9.26
Mining and Quarrying	10.85	9.53	10.28	12.64	12.91
Communication	27.77	28.38	32.45	28.50	37.68

Source: CBN (2008) Annual Report and Statement of Account, CBN, Abuja.

Available estimates showed that the natural unemployment rate in 2008 was 12.8 per cent, compared with 10.9 per cent in 2007. Economic growth performance has not culminated in a decline of poverty incidence and unemployment rate. Poverty is deep and pervasive with an estimated 70 per cent of the population living below the poverty line. Despite the fact that successive Nigerian governments recognize the critical importance of higher education for high quality manpower development, especially in the context of increasingly technologically driven world economy, education policies were not directly tied to economic growth.

The Nigeria's formal education system is made up of primary education, secondary education and tertiary education. Higher or tertiary education refers to the post-secondary part of the national education system. It covers colleges of education, colleges of agriculture and other similar post-secondary institutions, polytechnics, monotronics, universities and advanced teachers college. Higher education in Nigeria is aimed at providing specialized manpower for nation-building, promotion of economic and social well-being and self reliance and self-sufficiency. Generally, the goals of tertiary or higher education as emphasized in the National Policy of Education (2004) are: (i) contribute to national development through high

level relevant management training; (ii) Develop and inculcate proper values for the survival of the individual and society; (iii) Develop the intellectual capacity of individuals to understand and appreciate their local and external environments; (iv) Acquire both physical and intellectual skills which will enable individuals to be self-relevant and useful members of the society; (iv) Promote and encourage scholarship and community service; (v) Forge and cement national unit and (vii) Promote national and international understanding and interaction.

Compared with countries such as Britain, the United States of America, Sierra Leone, Canada, the development of higher education is relatively recent in Nigeria. Prior to the establishment of the University College Ibadan, (UCI) in 1948, the practice was for Nigerians yearning for University education to attend British and American Universities and Fourah Bay College Sierra Leone. There were two Universities in 1960/1961; by 1974 the number of Universities rose to six. Since the 1970s, there has been an increase in the numbers of universities, polytechnics and colleges of education. Instead of consolidating and expanding existing higher institutions to take care of required expansion of student enrolment and to take advantages of economies of scale and ensure optimal utilization, government preferred to establish new ones (Folayan, 1997). Consequently, most of the higher institutions operate under extremely low capacity.

The trend and performance of higher education development in Nigeria measured by total enrolment in federal universities by major discipline, student teacher ratio in federal universities and percentage of literate adults, 15 years and above by states of the federation are contained in Tables 2, 3 and 4. Table 2 shows enrolment trends in Nigerian Universities between 2001 and

Table 2
Total Enrollment in Federal Universities by Major Discipline

<i>Discipline</i>	<i>2001/ 2002</i>	<i>2002/ 2003</i>	<i>2003/ 2004</i>	<i>2004/ 2005</i>	<i>2005/ 2006</i>	<i>2006/ 2007</i>
Administration/ MGT. science	29,407	29,741	45,247	47,886	29,757	43,808
Agriculture	18,557	27,201	30,457	26,455	22,022	22,604
Arts	31,182	31,456	35,585	38,589	33,998	37,652
Dentistry	–	–	–	–	–	727
Education	33,782	33,798	48,230	48,889	49,247	52,988
Engineering Technology	47,278	50,983	51,816	59,702	57,824	56,421
Environmental Science	10,864	14,676	18,036	18,853	17,968	18,065
Law	14,395	13,896	15,430	18,506	16,299	15,008
Medicine	26,360	25,426	28,001	31,540	25,884	26,338
Pharmacy	5,727	5,873	8,967	5,538	4,740	5,261
Science	59,361	74,933	78,761	97,724	75,187	76,704
Social Science	45,320	38,154	54,450	52,924	56,725	53,946
Veterinary Medicine	3,474	3,365	7,273	3,771	3,735	3,066
Total	325,707	349,502	419,253	450,377	393,386	412,588

Source : National Bureau of Statistics 2007, Annual Abstract of Statistics, Federal Government of Nigeria, Abuja

2006. A notable feature was its rapid development from an enrolment of 325,707 in 2001 to 450,377 in 2004. Therefore after, there was a decrease in the number of student enrolment in 2005 before rising again in 2006. The major reason for the decline could be attributable to the harsh economic environment and high unemployment rate among graduate which seems to discourage acquisition of higher degrees. Available statistics in Table 3 showed that student/teacher ratio according to academic discipline rose considerably between 1990 and 2005. The high student/teacher ratio has persisted due to the acute shortage of teachers. For instance, student teacher ratio in the fields of administration, engineering technology and social sciences rose from 30, 15 and 18 in 1990 to 38, 30, 40 in 2005 respectively. The flow of academic staff from the Universities has hindered the development of the University system. Evidence from Table 4, however, shows that the adult literacy rate rose sharply from 57.22 per cent in 2001 to 63.1 per cent in 2005. In spite of this, Nigeria still faces the challenge of reforming the economy for enhanced growth and human development.

Table 3
Student Teacher Ratio in Federal Universities

<i>Discipline</i>	<i>1990</i>	<i>2001/ 2002</i>	<i>2002/ 2003</i>	<i>2003/ 2004</i>	<i>2004/ 2005</i>	<i>2005/ 2006</i>
Administration	30	26	33	38	49	38
Agriculture	12	11	14	13	17	15
Arts	14	22	18	25	24	20
Education	20	24	22	35	32	31
Engineering Technology	15	24	27	24	30	30
Environmental Science	13	16	18	12	25	20
Law	26	34	40	36	35	30
Medicine	8	15	13	14	15	12
Pharmacy	12	23	14	21	14	12
Science	13	19	19	23	32	25
Social Sciences	18	40	30	70	41	40
Veterinary Medicine	6	12	9	14	10	10

Source: National Bureau of Statistics 2007, Annual Abstract of Statistics, Federal Government of Nigeria, Abuja.

3. ANALYTICAL FRAMEWORK AND MODEL SPECIFICATION

For the purpose of this study, following Khorasgani, (2008) and Lin (2004) and the Cobb Douglas model, a production function, which is modeled as a function of labour, physical capital, and human capital will be employed. The production function is expressed as:

$$Y_t = AK_t^\alpha L_t^\beta H_t^\gamma \quad (1)$$

Where Y is real output, K is physical capital, L is raw labour input, H is the quality of human capital, A is an exogenous knowledge and technological factor, and α , β , γ are the physical capital, labour and human capital shares, respectively and t is time trend. The analytical framework is premised on the assumption that individuals who invest in education at the beginning of their lives and then work until they retire or die, their earnings depend on their human capital, which is a function of schooling. Khorasgani (2008) posits that the only cost of

Table 4
Percentage of Literate Adults, 15 Years and Above

<i>States</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>
Abia	82.28	82.29	82.3	82.33	82.4
Adamawa	47.34	49.09	50.83	54.33	57.2
Akwa Ibom	84.61	84.71	84.8	84.99	85.2
Anambra	79.8	79.45	79.09	78.38	78.6
Bauchi	66.85	63.68	60.51	54.17	54.9
Bayelsa	22.2	21.78	21.35	20.5	25.1
Benue	62.81	64.17	65.52	68.23	70.3
Borno	28.74	30.03	31.32	33.9	38.9
Cross River	78.32	78.03	31.32	33.9	38.9
Delta	82.65	83.75	84.85	87.04	90.5
Ebonyi	62.46	63.41	64.37	66.28	67.3
Edo	81.59	82.16	82.73	83.87	85.8
Ekiti	72.86	73.96	75.05	77.24	79.1
Enugu	72.09	72.38	72.68	73.27	74.2
Gombe	35.27	37.78	40.29	45.31	55.4
Imo	75.58	77.59	79.6	83.61	85
Jigawa	25.69	28.84	32	38.31	49.3
Kaduna	52.39	53.46	54.53	56.67	63.3
Kano	37.33	39.7	42.07	46.8	50.4
Katsina	28.49	30.36	32.24	35.98	39.1
Kebbi	28.8	29.51	30.22	31.63	40.6
Kogi	59.91	60.51	61.12	62.33	65.8
Kwara	61.46	61.4	61.34	61.21	62.5
Lagos	90.15	91.22	92.29	94.43	94.7
Nassarawa	47.78	47.95	48.11	48.45	51.9
Niger	31.53	31.07	30.6	29.67	32.3
Ogun	65.69	65.36	65.04	64.38	69.2
Ondo	75.61	75.42	75.22	74.83	77.7
Osun	67.57	68.44	69.31	71.05	72.1
Oyo	68.58	68.88	69.19	69.8	71.5
Plateau	58.02	56.6	55.18	52.34	55.4
Rivers	84.8	85.27	85.74	86.67	88.6
Sokoto	21.7	23.09	24.49	27.27	34.7
Taraba	47.98	48.29	48.61	49.23	51
Yobe	13.66	14.45	15.24	16.82	20.5
Zamfara	17.83	18.11	18.39	18.95	26.9
FCT, Abuja	65.35	64.43	63.51	61.66	68.1
Nigeria	57.22	58.51	89.8	62.37	63.1

Source: National Bureau of Statistics 2007, Annual Abstract of Statistics, Federal Government of Nigeria, Abuja

schooling is the foregone earnings. He, therefore hypothesizes that the earnings of an individual who is no longer in school are given by:

$$I = wH(E) \quad (2)$$

Where I is the earnings of an individual, w is the wage per unit of human capital and $H(0)$ is the quality of human capital as a function of schooling, which is denoted by E . Consequently, an estimated structural earnings function can be specified as:

$$\ln I = \text{constant } t + f(E). \quad (3)$$

Equation (2) and (3) imply that human capital will be given by:

$$H = e^{f(E)} \quad (4)$$

While the constant term in equation (3) will correspond to $\ln(w)$. According to Willis (1986) the standard assumptions about the $f(E)$ function are that $f_E > 0$, $f_{EE} \leq 0$. In order to simplify the model, Khorasgani (2008) assumed that $f(E_t) = Et$. Substituting equations (4) into (1), the production can be re-expressed as follows:

$$Y_t = AK_t^\alpha L_t^\beta e^{\gamma E_t} \quad (5)$$

The parameters to be estimated are A , α , β , λ . Equation (5) is known as the transcendental production function, a generalization of the Cobb Douglas production function. Taking natural logarithms of both sides of equation (5), the production function becomes linear:

$$\ln Y_t = \ln A + \alpha \ln K_t + \beta \ln L_t + \gamma E_t \quad (6)$$

Khorasgani (2008) observed that the model in equation (6) involves an implicit assumption in the functional form that output growth is linearly related to the number of years of higher education. The main idea is the application of a human capital measure as an additional input into the production function.

Given the foregoing discussion and relying on Khorasgani (2008), the following model is specified in an attempt to examine the role of higher education in Nigeria's development process.

$$\ln RGDP_t = \alpha_0 + \alpha_1 \ln GCF_t + \alpha_2 \ln LBF_t + \alpha_3 \ln GRAD_t + \alpha_4 \ln HTE_t + \alpha_5 DUM_t + \alpha_6 INF_t + U_t \quad (7)$$

Where;

$RGDP$ = Real gross domestic product

GCF = Physical capital proxied by gross fixed capital formation

LBF = Labour force

$GRAD$ = Graduate turnout

HTE = Students' enrolment into higher institutions

DUM = Political instability proxied by dummy variable

INF = Inflation rate

$\ln$ = Logarithmic transformation.

Real gross domestic product is a proxy for economic growth performance while higher education is proxied by tertiary school enrolment and graduate turnout. The choice of these proxies is supported by development literature. The a priori expectations are: $\alpha_1, \alpha_2, \alpha_3, \alpha_4 > 0$; $\alpha_5, \alpha_6 > 0$. This implies that all the explanatory variables except political instability and inflation rate are expected to have positive effects on economic growth. An attempt will be made to

empirically investigate the relationship between higher education development and economic growth in Nigeria for the period 1977-2007, using cointegration and error correction technique. The data for the empirical analysis were obtained from various issues of *Annual Reports and Statement of Accounts*, *Statistical Bulletin* published by the Central Bank of Nigeria, Annual Abstract of Statistics of the Nigerian National Bureau of Statistics. and publications of the Federal Ministry of Education, Nigeria.

4. EMPIRICAL RESULTS AND DISCUSSIONS

4.1. The Augmented Dickey Fuller Test of Unit Root

First, there is the need to know the time series characteristic of all the variables. This is done by conducting a unit root using the Augmented-Dickey Fuller (ADF) test. If the unit roots test showed that the variables were non-stationary, then, there is the need to test for co-integration. If the variables did not co-integrate, then they would be differenced to attain stationarity before the regressions are run. Non-stationary variables might lead to spurious regressions: in this case, the results may suggest statistically significantly relationships between the variables in the model, when in fact this may just be evidence of contemporaneous correlation. The unit root test results are in Table 5. The ADF statistics were compared with the Mackinnon (1980) critical values provided by the Eviews econometric package to know whether the variables are stationary or not, if the absolute ADF value is higher than any of the absolute Mackinnon values. The results reveal that all the variables were not stationary in their levels. However, the variables were all stationary in their first differences.

Table 5
Results of Stationarity (ADF Unit Root) Tests

Variable	ADF Test Statistic		5% Critical Values		Remarks
	At Level	1 st Difference	At Level	1 st Difference	
LNRGDP	-0.6077	-5.1704	-2.9665	-2.9705	1(1)
LNGCF	0.2058	-3.9007	-2.9627	-2.9665	1(1)
LNLBF	-1.9007	-4.2137	-2.9665	-2.9705	1(1)
LNHTE	-0.1054	-4.9493	-2.9627	-2.9665	1(1)
LNGRAD	-0.9111	-4.2203	-2.9665	-2.9750	1(1)
DUM	-2.0174	-4.5162	-2.9665	2.9705	1(1)
INF	-5.4282	-3.3174	-2.9705	-2.9665	1(1)

Source: Extracted from the Computer Output.

4.2. Johansen's Maximum Likelihood Test for Cointegration

The model could not be specified in their level without the risk of obtaining spurious regressions unless they were co-integrated. Consequently, cointegration test was conducted to ascertain whether or not the variables were co-integrated. From Table 6, there is at most three cointegrating equations at 1% and 5% respectively. By implication, this means that there is co-integration among the variables in the long-run. It shows that the variables explain each other. Thus, the null hypothesis that there is no co-integrated among the variables in the long-run is rejected.

Table 6
Johansen Co-integration Tests Results

<i>Eigen Value</i>	<i>Likelihood Ratio</i>	<i>5 Per cent Critical Value</i>	<i>1 Per cent Critical Value</i>	<i>Hypothesized No of CE(S)</i>
0.880766	190.5720	124.24	133.57	None **
0.824518	128.8987	94.15	103.18	At most 1 **
0.649549	78.43234	68.52	76.07	At most 2 **
0.559231	48.02488	47.21	54.46	At most 3 *
0.407732	24.26706	29.68	35.65	At most 4
0.268685	9.076959	15.41	20.04	At most 5
8.79E-05	0.002548	3.76	6.65	At most 6

Source: Extracted from the Computer Output

*(**) denotes rejection of the hypothesis at 5% (1%) significance level.

< R test indicates 3 co-integrating equations(s) at 5% significance level.

4.3. Error Correction Model

As shown in Table 7, the error correction model (ECM) coefficient is properly signed and statistically significant at 1 per cent level. This is an indication that the model can correct any deviations from the long-run equilibrium relationship between the real gross domestic product (RGDP) and the explanatory variables. The R^2 of 0.72 suggests that 72 per cent of the systematic variations growth behaviours has been explained by the variables included in the model. The F-statistic shows the overall significance of the model. The F-statistic figure is 7.61, suggesting that the model is significant at 1 per cent level. The t-statistic of the coefficient of all variables except inflation rate is statistically significant at 1 per cent and 10 per cent level. There is also an absence of first order serial correlation as the Durbin-Watson statistic shows:

Table 7
Parsimonious Representation of the ECM

<i>Independent Variables</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>T-Statistic</i>	<i>Prob.</i>
D (LNGCF, 2)	0.3799	0.1715	2.2156	0.0379
D (LNLBF,2)	0.0973	0.0294	3.3137	0.0033
D (LNGRAD, 2)	0.5613	0.1384	4.0552	0.0006
D (LNHTE, 2)	0.5011	0.1681	2.9813	0.0071
D (DUM, 2)	-0.1633	0.0890	-1.8341	0.0809
D (INF, 2)	-0.0009	0.0021	-0.4299	0.6717
ECM (-1)	-0.9916	0.1892	-5.2413	0.0000
C	0.2259	0.0475	4.7522	0.0001

Source: Extracted from the Computer Output

R – Squared = 0.72

Adjusted R-squared = 0.62

Durbin-Watson Stat = 1.88

F-Statistic = 7.61

Prob. (F-Statistic) = 0.00

As shown in model (7), the physical capital formulation proxied by gross fixed capital formation was found to be crucial in affecting the real gross domestic product in the period under consideration. This corroborates the findings of Uwatt (2002). The result also showed that the labour force positively and significantly influences growth behavior in Nigeria during the period of study. This is an indication that the labour force plays a key role in enhancing growth of the Nigerian economy. An educated work force contributes significantly to output growth. The higher education variables proxied by graduates turnout (GRAD) denoting high level manpower and student enrolment in tertiary institution (NTE) exert positive and statistically significant influence on RGDP. The two variables are significant at 1 per cent. The positive sign is an indication that higher level of education enhances growth performance in Nigeria by endowing individuals with skills that would enhance better performance technologically in a changing global environment.

From the result, it was discovered that political instability has a negative and statistically significant impact on the growth of the economy. The negative sign of political instability is welcomed and conforms to the *a priori* expectation. Unstable political environment is an obstacle to social and economic development. The political stability of a nation builds investors' confidence in such a nation. Investments cannot thrive where there is a frequent change of government and unstable policies. The coefficient of inflation rate is negative but not significant. The fact that inflation rate is negatively related to the growth of the Nigerian economy is not unexpected. Economy theory shows that a lower inflation rate will promote stability and improves the standard of living of the people by increasing their purchasing power.

Based on the outcome of the results estimate, it can be inferred that there exist a long-run relationship between higher education and economic growth in Nigeria. Higher education enhances growth of the Nigerian economy by making workers more technically and intellectually productive. It is noteworthy, however, that a lot still needs to be done if Nigeria wants to fully benefit effectively from the gains of higher education in an ever changing global environment. Nigerian needs to be politically stable and create a favourable and conducive macroeconomic environment in order to enhance growth.

5. CONCLUSION AND POLICY IMPLICATIONS

The study examines the relationship between higher education and economic growth in Nigeria during the period 1977–2007. The results indicated that in Nigeria, the output growth is significantly influenced by physical capital formulation, labour force, higher education proxied by graduate turnout denoting high level manpower and students enrolment in higher institutions. Political instability and inflation rate were shown to exert negative impact on growth.

This study points to the importance of investing massively in higher education development in order to enhance output growth performance and make it relevant in addressing the challenges of globalization. In this context, proper higher education policies which must take into consideration the needs of the country in terms of the development of manpower and skills must be put in place. There is the need for the government to increase the percentage of total budget accorded to the education sector. In this regard, allocations to higher education need to be increased if Nigeria wants to be relevant in the ever-changing global environment.

Funding of higher education must be specific in its objectives. In order to guard against misappropriation and mismanagement of funds, the Nigerian federal government in collaboration with higher institution authorities can establish monitoring unit to periodically asses what the school administrators have accomplish with any disbursed funds. In addition, better infrastructural facilities and modern laboratory equipments should be provided.

The study suggests the need to encourage private sector participation in the provision of higher education in order to improve accessibility. The services provided by such institutions should be affordable to all. For Nigeria to derive maximum gains from the higher education-led growth hypothesis and be relevant in a competitive global environment appropriate institutional framework that promotes adequate investment in higher education under stable macroeconomic environment must be put in place.

References

- Adam, C. S. (1993), Time Series Econometrics in Africa. Lecture notes for a Technical Workshops run by AERC, Nairobi, Kenya.
- Adedeji, S. O. and R. O. Bamidele (2002), "Economic Impact of Tertiary Education on Human Capital Development in Nigeria". In: Ozo-Esan, P. I. and Evbuomwan, G. I (ed) 2002 Annual Conference Proceeding of the Nigerian Economic Society on *Human Resources Development in Africa*, Development of Economics, University of Ibadan.
- Baye, F. M and S. A. Khan (2002), "Modeling the Equilibrium Real Exchange Rate in Cameroon: 1970-1996", *The Nigerian Journal of Economic and Social Studies*, Vol. 44, No. 1, pp. 129-148.
- Brodonegoro, S. S. (2008), Comment on "Higher Education and the Labour Market in India", by Pawan Agarwal. In Higher Education and Development, Annual World Bank Conference on Development Economics Regional Ed. Lin J. Y and B. Pleskoric, The World Bank Washington D.C.
- Central Bank of Nigeria 2008, *Annual Report and Statement of Accounts*, CBN, Abuja.
- Central Bank of Nigeria, 2008, *Statistical Bulletin*, CBN, Abuja.
- Gyimah-Brempong, O. Paddist and W. Mitiku (2006), "Higher Education and Economic Growth in Africa", *Journal of Development Studies*, Vol. 42, Issues 3, pp. 520-529.
- Katircoglu, S. T. (2009), "Investigating Higher-Education-Led growth Hypothesis in a Small Island: The Series Evidence from Northern Cyprus". Paper Presented at the 2009: Anadolu International Conference in Economics, June 17-19, 2009, Eskisehir, Turkey.
- Khorasgani, M. F. (2008), "Higher Education Development and Economic Growth in Iran", *Business and Society: Contemporary Middle Eastern Issues*, Vol. 1, No. 3, pp. 162174.
- Larocque, N. (2008), Comment on "Intersectoral Interfaces in Higher Education Development: Private and Public in Sync?", By Daniel C. Levy. In.: Lin J. Y and B. Pleskoric,(ed). *Higher Education and Development*, Annual World Bank Conference on Development Economics Regional, The World Bank Washington D.C.
- Lin, T.C. (2004), "The Role of Higher Education in Economic Development: An Empirical Study of Taiwan Case", *Journal of Asian Economics*, Vol. 15, pp. 355-371.
- Lundvall, Benst-Ake (2008), "Higher Education, Innovation and Economic Development", In.:Lin J. Y and B. Pleskoric (ed) Higher Education and Development, Annual World Bank Conference on Development Economics Regional Ed., The World Bank, Washington D.C.

- Macerinskiene, I. and B. Vaiksnornite (2008), "The Role of Higher Education to Economic Development, *Vadyba/Management*, No. 2(11).
- Mackinnon, J. E. (1980), *Critical Values for Co-integration Tests*. Discussion Papers, University of California, San Diego.
- National Bureau of Statistics (2007), *Annual Abstract of Statistics*, Federal Government of Nigeria, Abuja.
- National Planning Commission 2004, *National Economic Empowerment and Development Strategy*, NPC, Abuja
- Nigeria Economic Society, 2002: "Human Resources Development in Africa, 2002 Conference Proceeding of the Nigerian Economic Society Development of Economics, University of Ibadan
- Nelson, R. R. and E. S. Phelps (1966), "Investment in Humans, Technological Diffusion and Economic Growth", *American Economic Review: Papers and Proceedings*, 51 (2) 65-75.
- Ojo, F. (1997), "*Human Resource Management*": *Theory and Practice*, Panaf Publishing Inc., Lagos.
- Schultz, T. W. (1975), "The Value of the Ability to Deal with Disequilibria", *Journal of Economic Literature*, American Economic Association, Vol. 13(3), pp. 827-846.
- Stengos, T and A. Aurangzeb (2008), "An Empirical Investigation of the Relationship Between Education and Growth in Pakistan", *International Economic Journal*, Vol. 22, No. 33, pp. 345-359.
- Uwatt, U. B. (2002), *Human Resource Development and Economic Growth in Nigeria, 1960-2000* In.: *Human Resource Development in Africa*, (ed.) Ozo-Esan, P. and Egbuomwan G. Selected Papers for the 2002 Annual Conference of Nigerian Economic Society, pp. 127-154.