**THE IMPACT OF EDUCATION IN THE DEVELOPMENT OF NIGERIA ECONOMY**

**Abstract**

This study investigates the relationship between government spending on education and economic development in Nigeria using annual time series data for the period of 1981 to 2013 sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. Using Johansen`s co-integrated test it was established that there is evidence of long run relationship between GDP and government spending on education. The long run coefficient of both capital and recurrent expenditures are statistically significant and are positively related to growth. The error correction term is negative and statistically significant. This suggests there is no sign of any problem in the adjustment from short run to long run equilibrium. The test for Granger causality also shows evidence of a bi-directional causality between recurrent expenditure and economic growth and a unidirectional causality running from capital expenditure to GDP as a proxy to economic growth. We therefore concludes that both capital and recurrent government spending on education positively influenced economic growth in Nigeria over the period under study and hence the paper recommends that, government should increase budgetary allocation on education expenditure in general in order to improve its effect on the growth of the Nigerian economy.

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**CHAPTER ONE**

**INTRODUCTION**

**Background of the study**

Education is an age long phenomenon in all societies although it may take various forms from one society to another. In Nigeria two forms of education were in existence before the advent of colonialism. They were indigenous education and Islamic education. Traditional education as was practiced in the southern and some parts of the middle belt Nigeria, consisted essentially of general but informal training in character, norms, agriculture, fishing intellectual and other ways of life as approved by society. Islamic education on the other hand was practiced mainly in Northern part of Nigeria. It is based on the Quran. Both forms of education preceded the Western education which was introduced to Nigeria in the 19th century by the European Christian missionaries. The advent of colonialism brought about formal education in Nigeria. The colonialists had to organise the training of the indigenous people to understand the Queen’s language. The Christian missionaries organised schools and trained Nigerians the art of reading and writing. The initial persons that were trained in the communities became the first indigenous persons to be employed by the colonial government as interpreters, clerks and teachers. It did not take long before the benefits of formal western education became manifest in Nigeria. The regional governments of independent Nigeria expanded educational opportunities, building more schools and providing grant-in-aid to missionary schools in their respective regions especially in the southern regions. Expanded educational facilities were seen as the panacea to the manpower needs and overall development in post colonial Nigeria. The role of human capital formation in economic development has long been recognised in the literature. According to Harbison (1973, p.3), “human beings are the active agents who accumulate capital, exploit natural resources, build social, economic and political organisations and carry forward national development. Clearly, a country which is unable to develop the skills and knowledge of its people and utilise them effectively in the national economy will be unable to develop anything else”. Several other theoretical and empirical studies have found a positive correlation between human capital development and economic growth ( Lucas, 1958; Romer, 1990; Barro, 2001; Abbas and Foreman – Peckb 2007). Education – formal and informal, contributes to skill acquisition. Informal education begins at the household level where children are taught how to sweep, clean their environment, fish or farm. By participating in these activities they learn how to do things by themselves and contribute to family income growth. Although such incomes are not recorded in national income accounting, they nevertheless amount to substantial family income. According to Schultz (1962), formal education is a kind of investment in human being that enables them to acquire skills. Such skills raise the marginal product of the worker itself and also help to raise the marginal product of the other co -operant factors. Thus human capital has a unique character – it enters the production function as a factor of production and also as a marginal product augmenting variable. The latter makes the marginal rate of return on capital and other inputs rise continuously so that the unexplained growth rate explains the Solow’s surplus

**1. Statement of the problem**

The educational sector in Nigeria is plagued by many problems. This is attributed to the attention given to education by the Nigerian governments (both past and present) is relatively low. Even many years after independence, it is stunning to know that the adult illiteracy rate is still at 74% (Ibidapo-Obe, 2007) and the gross enrollment rate is also low. The minimum amount to be spent by a country on education as stated by the United Nations (UN) is 26% of the country’s annual budget. Ironically, according to the data by Herbert (2002) from 1977-1998, the total education budget represented an average of 9.7% of total government expenditures, while its percentage share of the GDP from 1991-2009 has maintained a value of 0.85%. Its highest value was 5.11 % in 1981 and its lowest was 0.85% in 1991 (UNESCO, 2011). Looking at the statistics above, it is clear that expenditure on education is still very low. Another pertinent issue in the Nigerian educational sector is that of teacher education. The basic problems reported by surveys carried out in various research in Nigeria have shown the discrepancy between the demand for teachers and the supply for teachers, and that teachers fail to meet the minimum requirement as stated by the National Policy For Education. This is due to lack of incentives, brain-drain and lack of motivation (Ibidapo-Obe, 2007). According to Dike (2002), he noted that the Federal Government reported that the falling standard of education in Nigeria is caused by “acute shortage of qualified teachers in the primary school level.” It was reported by the same author, that about 23 percent of the over 400,000 teachers employed in the nation’s primary schools do not possess the Teachers’ Grade Two Certificate, even when the Nigerian Certificate of Education (NCE) is the minimum educational requirement one should possess to teach in the nation’s primary schools. It is no wonder then that Nigerian students do not generally perform well in most (external) public examinations. Almost every year, the Chief Examiners Reports (CER) for the West African Examinations Council (WAEC) and the National Examinations Council (NECO) highlight the abysmal poor performance of students at the Senior Secondary School Certificate Examinations. Added to this poor performance in those public examinations, is the widespread vice of examination malpractice, which is indicative of poor and inadequate preparation for examination. When students have not read widely and thoroughly and have not been well prepared for examinations, the tendency is to turn to short-cuts and sharp practices in order to pass examinations.

**1.3 Objectives of the study**

1. To ascertain whether education impacts on the development of Nigerian economy significantly.

**1.4 Research questions**

1. Does education significantly impact on the development of the Nigerian economy?

**1.5 Research hypotheses**

Ho: Education does not significantly impact on the development of the Nigerian economy.

Ha: Education significantly impacts on the development of the Nigerian economy.

**1.6 Significance of the study**

The above mentioned problems constitute the basis for this research work which aims at examining the impact of government expenditure and teachers’ educational qualifications on the educational sector using different methodological approaches emanating from adopted data.

The study will also benefit the education authorities and administrators, as this will propel reforms and transformation where necessary in the educational sector.

**1.7 Scope/Limitations of the study**

This study covered the impact of education in the development of the Nigerian economy.

**Limitations of study**

1. Financial constraint- Insufficient fund tends to impede the efficiency of the researcher in sourcing for the relevant materials, literature or information and in the process of data collection through the internet, questionnaire and interview.

Time constraint- The researcher simultaneously engaged in this study with other academic work. This consequently cut down on the time devoted for the research work.

**1.8 Definition of terms**

Education: The process of receiving or giving systematic instruction, especially at a school or university.

Development: The process of developing or being developed.

Economy: The state of a country or region in terms of the production and consumption of goods and services and the supply of money.

**CHAPTER TWO**

**LITERATURE REVEIW**

**2.1 Introduction**

Over the years various works have examined the relationship between the quality gotten from the outcome of education and economic growth. Some economists have emphasized different means through which quality of education may affect economic growth. Some economists claim that it is increase in government expenditure on education that leads to economic growth. Some others have stressed the level of school attainment obtained by individuals as the driving force to economic growth.

**2.2 Empirical Literature focusing on the Quality of Education an Economic Growth**

The following empirical works have found significant positive effect of the outcome of education measured by the quality on economic growth.

Barbara and John (2000), reviewed some empirical macro econometric literature on productivity and education, focusing on the UK policy. The study used pooled samples of developing countries and OECD countries between the period of 1978 and 1998. They used a panel regression analysis, to investigate the correlation between human capita which is generally measured by formal education and economic performance. The results obtained showed that there is convincing evidence that the quality of human capital increases productivity in the economy, and hence leads to economic growth.

The empirical study by Andrea and Stefano (2001), investigated the causal impact of a qualitative labor force gotten through education on economic growth in 21 OECD member countries over a period of 1971 to 1998. The authors made use of a crosssection regression analysis and pooled cross- section time series regression to determine the long-run relationship between growth and human capital. The human capital augmented growth equation was estimated using a consistent econometric technique (PMG), the average number of formal education of the working age population was used as a proxy for human capital. The results obtained showed that there is a positive and significant impact of qualitative human capital accumulation on economic growth.

Lee (2010) examined the importance of education in enhancing economic growth of 75 countries between the periods 1960-2000. The study used conditional dummy and educational attainment for the age group of 15 and above in the population in 1960. The results revealed that education helps to accelerate growth in a cross-section of economies once continental dummies are being controlled for.

Using the Generalized Methods of Moments (GMM), Zhang and Zhuang (2011) examined the impact of the accumulation of human capital on economic growth in China the results reflects that tertiary education had played a significant role than primary and secondary levels of education on economic growth. Moreover, the role of the human capital composition on regional economic growth is very relevant to the level of development. The provinces that are more developed benefit more from tertiary education, while underdeveloped provinces depend more on primary and secondary education.

Eric and Ludger (2007) both theoretically and empirically examined the role of education in promoting economic performance, placing much emphasis on the role of educational quality, rather than just the school attainment. The study uses a crosscountry panel regression analysis covering 14 OECD countries between a period of 1960 and 2000 and estimate the model by OLS. The study made use of performance from the PISA international test as a proxy to measure the quality of education. The results obtained showed that the quality of education, which is measured base on the knowledge obtained as depicted in tests of cognitive skills, is more important in achieving economic growth than mere quantity of education.

Eldridge (2011) study the role of the quality of education of the labour market as a driving force for economic growth in South Africa. The study used a cross- country panel regression technique for the period between 1965 to 1975, 1975 to 1985 and 1985 to 1995. The result obtained showed that the level of school attainment as a proxy for educational quality contributes about 0.4% to the annual GDP in South Africa. The results also showed that the quality of the educational outcome basically the ability of the school system to impact cognitive skill is a basic determinant of the performance of the labour, force which in turn enhances economic growth.

Simon and Francis (1998) explained Africa‟s achievements over the years in the formation and accumulation of human capital through education and the impact on economic growth. The study used a cross- country panel regression of the top 10 leading economies in Africa between periods of 1960 to 1995. The result obtained shows that the quality of human capital accumulated acquired through education remains the major factor in accounting for the disparity in growth rate across countries in Africa. The study considered the complexity of the role of the quality of human capital in Africa‟s growth and development, which is as a result of inadequacy in the investment in education and health. The study suggested that

Africa‟s earlier investment in education will enhance the welfare of the future generation and in turn lead to long-run economic growth.

Dowrick (2002) theoretically and empirically reviewed some studies that explained the relationship between educational quality and economic growth and (research and development) RD. The authors found out that research and development are sources that enhance economic performance. Public expenditure and participation in education has increased drastically during 19th and 20th centuries, GDP has also increased spuriously within this time period.

The study by Eric (2013) examined the role of the human capital as a drive to economic growth in developing countries with much emphasis on school attainment. Over the years there has been this wide gap between developed and developing countries, the developing countries have tries to cover this gap through level of school attainment. The authors concluded that developing countries can only improve their economic performance and close the gap between them and developed countries by improving the school quality, not just school attainment. The authors highlighted the determinants of skill to include school inputs, neighborhoods, peers, or general institutional structures which in turn improve the human capital and lead to improvement in individual productivity as well as economic productivity.

**2.3 Empirical Works that Found Significant Impact of Education Expenditures on Economic Growth**

On the other hand, several authors used government spending on education as an explanatory variable to explain educations impact on growth. Below are some literature reviewed;

Antonia (2012) analyzes the impact of education on economic growth in Nigeria between periods of 1985 to 2007. The author used primary and secondary data for the analysis, the analysis incorporates regression of Ordinary Least Square (OLS) using the sample years 1985 to 2007. The estimated regression results show a positive relationship between gross capital formation recurrent expenditure and real economic growth. The study finding and conclusion shows that it is the increase in recurrent expenditure on education that impacts on economic growth. The academic qualification of teachers also has a role to play in the academic performance of students. Generally, the author advocated for an increase in government expenditure on education in the form of construction of new school structures, subsidies for school fees for all individuals, good salary for teachers, this will foster economic growth.

Ernest (2011) presents and examines the direct and indirect effect of public expenditure on economic growth. The integrated sequential dynamic computable general equilibrium (CGE) model was adopted to examine the effect of an increase in government expenditure on education on the economic performance of Africa. The study explored the effect of different policies on the long run growth and poverty reduction in leading Africa economies over the period of 2004 and 2015. The study concluded that the impact of government spending is best analyzed within a computable general equilibrium micro simulation framework given the wide nature of the economy.

Ararat (2007) carried out an empirical analysis to investigate the role of education on the economic growth in Ukraine and Russian federation which are the two largest economies of the former soviet bloc. The paper estimated the importance of educational level basically secondary and tertiary education for enhancing substantial economic growth in these countries. The study employed the model of endogenous economic growth and system of log-linear and linear equations accounting for different time lags. The estimates reveal that there is little or no significant effect of education attainment on economic performance. The results gotten from the system equation proves that a 1% increase in the access of the population to education which can only be possible through increase in government expenditure on education, will in the long run lead to an increase in the GDP per capita growth.

**2.4 Empirical Works focusing on the effect of Average Years of School, and High School Attainment on Economic Growth**

The following are examples of empirical work that found out that it is the level of school attainment that determines human capital accumulation and impacts on the economic growth.

Dawn et al. (2013) examine the relationship between high education and economic growth in the United Kingdom within 1982 to 2005. The authors highlight the long term benefits of attaining a degree- level education and the impact on the economic performance. The authors adopted the integration and correction model (ECM) approach to estimate the GDP growth model. They also made a replicate of the Gemmell (1996) model of over 15 countries within 1982 and 2005. The evidence from the results proves that a percentage increase in the share of the labour force with high education increases the GDP in the long run by about 0.2-0.5%. The accumulation of the graduate skills contributes about 20% to the GDP growth rate in the UK within this time period.

**2.5 Empirical Paper that Found a Positive Effect of both the Quantity and Quality of Education on Economic Growth**

Menbere and Marek (2011) empirically examined the extent to which investment in human capital accumulation contributes to growth dynamics of the European Union between the periods of 1995 to 2009. The authors used a panel data set covering 21 European Union member countries and estimated the model by OLS. The study used school enrolment, labour force with primary, secondary and tertiary education and research and development expenditures as proxies to measure human capital accumulation. The result from the study reveals that all the education variables have positively significant impact on GDP per capita growth rate.

**THEORITICAL FRAMEWORK**

**3.1 Human Capital**

According to Mankiw (2003), human capital is the skill and knowledge that individuals acquire through means like education from early childhood, programs such as head start to on- the job training for adults in the labour force. Human capital raises the ability to produce goods and services in the economy, human capital is also an important tool in explaining differences in international standard of living.

Loosely speaking, human capital refers to stock of characteristics and knowledge a worker possesses which can be innate or acquired through education that contributes to his or her productivity.

This research work focuses on education as a fundamental of human capital; education plays a vital role in determining the growth rate of any country. Through education countries absorb and use modern technology, and develop the capacity for self-sustaining growth and development. In the section below I present some of the variables used for measuring level of education.

**3.2 Proxies Used In Measuring Input and Output of Educational Performance**

**3.2.1 Input**

**3.2.1.1 Expenditure on Education**

This can be either public (government expenditure) or private expenditure by individuals on education. Public expenditure is significant in improving the education system in any economy of the world. Increase in government expenditure on education leads to increase in the quality and quantity of human capital, comparable to social and physical capital, which contributes significantly in the economic performance. Public expenditure can be in form of increase in school facilities, increase in school size, increase in teacher‟s salary, and more scholarship for students, subsidization of student fees.

**3.2.2 Output – Quantity**

**3.2.2.1 School Enrolment**

According to United Nations (UN) education indexes the gross enrolment index is used as a proxy to measure the number of student enrolled in school at several different grade levels (tertiary, secondary and primary schools). The gross enrollment ratio is calculated by most countries by dividing the number of individuals who are actually enrolled by the number of children who are of the corresponding school enrolment age.

**3.2.2.2 School Attainment**

According to the US census bureau glossary educational attainment is a term commonly used to refer to the highest degree of education an individual has completed.

**3.2.3 Output-Quality**

**3.2.3.1 Educational quality**

The educational quality is used to determine the outcome student gets from education, most empirical studies have used international standardized test like the PISA test of student‟s performance as a proxy to measure educational quality.

**3.3 Sources of Human Capital**

**3.3.1 Schooling**

Investment in schooling is very important in human capital formation. Through schooling workers can learn and absorb information, ideas, and new technologies.

**3.3.2 Innate ability**

Workers can have different amount of skills/human capital base on innate differences. Biological research have proven that some component of IQ are generic in origin, as a result of this component even when individuals have the same access to investment opportunities and same economic constraint they may have different amount of skill.

**3.3.3 Training**

This is a form of human capital acquired after schooling; it is basically associated with some set of skill that is necessary for certain industry or useful with a particular set up technologies. Most firms invest in the training of workers and most workers invest in specific technologies that firms will use in the future.

**3.3.4 Pre-labour market influence**

Sociologically, pee groups affects individuals basically before they join the labour market for instance the decision on where to live made by parents will be a deciding factor of whether the children will be exposed to a good or bad pre-labour market influence.

**3.4 Economic Growths**

Economic growth as defined by Mankiw (2007) as an increase in the market value of the goods and services produced by an economy over time. Economic growth is the increase in national output which is a result of improved technology, formulation and accumulation of human and physical capital, and increase in in quality and quantity of resources.

**3.5 Basic Theory of Human Capital**

**3.5.1 Solow Growth Model**

The Solow – Swan (1956) closed economy neoclassical model is a model that explain the relationship between growth, saving and investment. It was an extension of the Harrod-Domar model. It introduces labor and technology into the growth equation inclusive with capital accumulation. The model describes the influence of saving, population growth and technology on economic growth. The Solow model revealed that, capital accumulation is dependent on saving rate which leads to higher level of output and faster growth. The model used a Cobb-Douglas production function in which growth is a function of labor, capital and technology. This is given

by the equation below;

The model built an equation for capital accumulation, which is given by;

Where δ represents depreciation rate, depicts saving rate as a fixed proportion of income, and k represent capital stock.

The relationship between population growth, saving and capital of the Solow model can be illustrated with the help of a diagram.

The diagram below illustrates a situation when population growth decreases and its impact on capital stock and output.

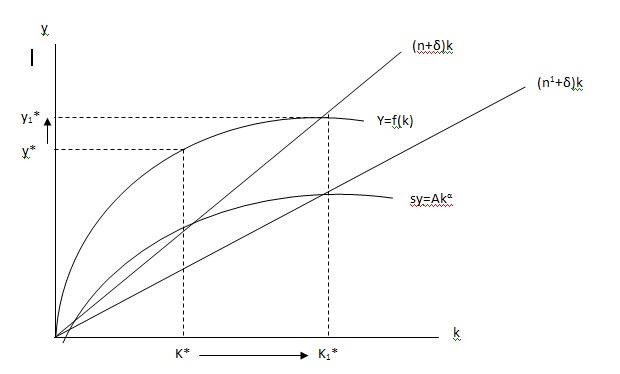


Figure 3.1: Graphical Illustration of the Solow Model when Population Growth Decreases.

In the above diagrammatic illustration, when there is a decrease in population growth rate from (n) to (n1) the (n + δ) curve will rotate to the right (n1 + δ), this change resulted to a higher level of capital stock k\* which eventually increases the level of output from y\* to y\*1. This pushes up the level of capital stock, which at the end resulted in increase in growth rate. The same analysis can be done for saving (s) and technology (A) respectively

3.5.2 Solow – Swan Model with Human Capital. Mankiw, Romer and Weil

(M-R-W)

The Solow growth model show how growth in the capital stock, advancement in technology and growth in the labour force interact and affect economic growth. The main weakness of the Solow-swan model in its original form is that it does not acknowledge the impact of human capital on economic output.

Gregory Mankiw, David Romer and David Weil (1992) tested Solow model with empirical data. They saw that it performed well, but they suggested that it would fit the data even better if they modify the model to include human capıtal. . In the MRW human capital augmented model, marginal product and output are minimal (lower) in the poor countries, since they have less human capital than the richer ones. They changed the production function into:

(1)

Where α + β < 1 , because there is decreasing returns to capital inputs. K = physical capital, H = human capital level of skills that a worker, L = labour A is again technological progress.

The production equation (1) assumes constant returns in variables H, K and L. With a level of technology (A), Production can be doubled if inputs are doubled, therefore instead of hiring L amount of labour 2L workers can be hired and each supplied with k= of physical labour meaning the physical capital input doubles, and each is been endowed with h defines human capita level of skills per worker, same amount of h of human capital, so human capita as an input to production doubles.

The capital accumulation equation still remain the same as before in the original solow model:

(2)

And the human capital accumulation equation becomes

(3)

The production function in per capita terms is written as,

y Y  ykAh1 where h H , k  K

L L L

from the original Solow model the saved fraction of income at each period (sY), which the MRW human capital augmented model break it up, and partly invested some part of the income saved in human capital (SH) and other in physical capital (SK), in a way that;

(4)

Thus, these leave us with two basic dynamic equations:

(5)

(6)

İn the steady state and

and

(7)

From the above equation (7) we arrive at the steady state human capital stock per person (hss)

(8)

where α < 1-α and

(9)

And the steady state capital per person (kss) will be:

(10)

since 1 – β ˃ α

Since in the steady state and the equation (7) and (9) are equated together which gives:

With the use of mathematical techniques, putting together the steady state value of k and h, we have:

(11)

This proofs that in the steady state .

Therefore, in steady state:

The implication of the MRW constructed human capital augmented model is that rich countries are rich because they have a high saving rate (s), low population growth rate (n), high level of technology (A), and they allocate a larger amount of their time to accumulating new skills, this means they have a larger human capital. Loosely speaking countries with more educated labor force will be richer with this extension of theSolow model.

Figure 3.2: An Increase in the Investment Rate in Human Capital

Source: Hans J and Whitta J, lecture note 7 on Solow Model with Human capital. In the above diagrammatic illustration, when there is an increase in SH which means more accumulation of human capital, but as a result of the increase in stock of human capital this generates an increase in output an increase in physical capital accumulated. The physical capital will increases because of the constant rate of investment on physical capital, this explains the reason why kss and hss increases to kss‟ and hss‟ as seen in figure 3.2. Since the physical capital stock per person (kss ) and the human capital stock per person (hss) increases during the transition to the new steady state, therefore yss = (kss) (hss) must be increasing.

**EMPIRICAL LITERATURE REVIEW**

There is a substantial number of empirical evidence suggesting most governments in developing countries are directly responsible for investing or spending on education at both lower and higher level of the educational system. But whether this can promote economic growth has been a topic of serious debate in the literature. This is because several empirical studies on relationship between government spending on education and economic growth point at different directions. For example there are ample of studies that demonstrated existence of long run relationship between government spending on education and economic growth. Musila and Balassi (2004) using annual data for the period 1965 to 1999 in Uganda, showed a positive and significant impact between education expenditure per worker and economic growth in both long-run and short-run. Babatunde and Adefabi (2005) using Johansen co-integration approach has examined long run relationship between education and economic growth in Nigeria. The results of their study suggests there is long run relationship between enrolments in primary and tertiary levels of education and the average years of schooling with output per week. Afzal et al (2010) used an autoregressive distributed lag (ARDL) model in Pakistan to confirm the existence of direct relationship between school education and economic growth both in the short-run and longrun. Tamang (2011) applied Johansen co-integration test to support the presence of long run relationship between government spending on education and economic growth in India. On the other hand, Hussin et al (2012) used vector autoregressive regression (VAR) to show evidence of a positive relationship between economic growth proxy by GDP and fixed capital formation, labour force and government expenditure on education in Malaysia.

In contrast, there are some studies that either do not support the existence of long run relationship between government spending on education and economic growth or have revealed weak relationship. Obi and Obi (2014) found using Johansen co-integration that long run relationship does not exist over the period of 1981 and 2012. On the other hand, studies that reported weak relationship between education and economic growth include the work of Bils and Klenow (2000), Pritchett (2001), Bosworth et al (2007). For example, Bils and Klenow (2000) using a panel of 52 countries between 1960 to 1990 argued that it was too weak to conclude that education or school achievement significantly contributed to economic growth. Bosworth et al (2007) assessed sources of growth to Indian economy; the authors concluded that education's contribution to India's economic growth has been negligible.

Some other studies have also confirmed De Meulmester and Rochet (1995) recent arguments that the relationship between education and economic growth are not always positive. This probably cannot be unconnected with the previous argument presented by Blaug (1970) and Sheehan (1971) that an investment in education is nothing but a mere consumption because investment in acquiring knowledge or skills is only for individual interest and does not contribute to economic growth. In most cases, the empirical study conducted by Devarajan et al (1996) on panel of 43 developing countries is used by those in this line of argument to support their fact. In the Devarajan et al study, government expenditure on education is found to negatively correlate with economic growth.

In addition, there are group of studies that found relationship between government expenditure on education and economic growth is either a one way process or a two way process. Chandra (2010) applied both linear and non-linear Granger causality test on annual time series data that range between 1951 and 2009 to examine the causality between investment in education and economic growth in India. The study established a bi-directional causality between investment in education and economic growth. The result of this study is contrary to an early study conducted by Pradhan (2009) that investigates the causality between public education spending and economic growth in India during 1951 to 2001. In that study, the author revealed there is unidirectional causality between education and economic growth in the Indian economy. The direction of causality is from economic growth to education spending and not vice versa. Also Omojimite (2010) conducted both co-integration and Granger causality test to investigate whether there is strong relationship between public expenditure on education and economic growth in Nigeria using a time series data for the period of 1980 to 2005. The results revealed public expenditure Granger cause economic growth but the reverse is not the case. The causality test also discovered that there is a bi-directional causality between public recurrent expenditures on education and economic growth. In the result output, it was also reported that no causal relationship was established between capital expenditure on education and economic growth, as well as between primary school enrolment and economic growth.

From the reviews of the empirical studies conducted in both developing countries and Nigeria, it is quite obvious that the relationship between government spending on education and economic growth is debatable. Some might say it has positive effect and vice versa, but a thorough observation would show that the differences from the previous studies could arise from the type of methodology used, lack of harmonised data, the type of variables chosen, type of econometric specification used and other factors. The present study contributes to this debate by further revisiting robustness of an empirical evidence on the relationship between government spending on education and economic growth using both Johansen co-integration and vector error correction model (VECM) to estimate long run and short run dynamics between different types of government spending on education and economic growth in the case of Nigeria. The study will also add to the debate on causality between disaggregated government spending on education and economic growth. This is because even though regression analysis deals with dependence of one variable to other variables, it does not imply causation or direction of influence (Omojimite, 2010).

**CHAPTER THREE**

**METHODOLOGY**

The purpose of this paper is to provide empirical analysis of the impact of government educational spending on the growth of Nigerian economy. The study started by first testing for unit root to check for stationarity. This is because standard errors produced using non-stationary variables would be biased. The implication of this is that the conventional criteria used to judge whether there is a causal relationship between the variables would be unreliable. In addition, if non-stationarity is ignored a significant relationship could be established when none really existed (Granger and Newbold, 1974). Afterward, we test formally for the co-integration of the time series and finally, set up the appropriate Error Correction Model before we test for causality using Granger causality test. These procedures however, raise several methodological issues that are treated individually in the following headings.

**Sources of Data collection**

The data used was generated entirely from secondary sources. Annual time serial data over the period of 1981 to 2013 for capital and recurrent government spending on education, and GDP in Nigeria were obtained from both World Bank Development Indicators and Central Bank of Nigeria Statistical Bulletin (2013).All variables were transformed into natural logarithm form to reduce problem of heteroskedasticity

Unit Root Test

In order to obtain reliable model that captures the relationship between government spending on education and economic growth, a unit root test is employed to examine the time series properties of the variables to be used in the study. This to large extent will enable us avoid the problems of spurious regression. For the unit root test, Augmented Dickey-Fuller (ADF) testis to be used which is an extension of Dickey-Fuller (DF) test. ADF test has advantage over DF because it included extra lagged terms of the dependent variable in order to eliminate problems of autocorrelation. The following equation present the possible form of the ADF test:

ΔYt = α0 + δYt-1+ α2t + ∑ Yt-k+ ut (1)

Where ΔYt is the change in the dependent variable, α0 is a constant term, α2 is a coefficient of a time trend t, ΔYt-k is the set of lagged explanatory variables, ut is by assumption a white noise error term and k is the lag length. The test involves testing the following hypothesis:

H0: δ = 0 (Yt is not stationary or Yt has a unit root)

H1: δ > 0 (Yt is stationary)

Once we confirmed the stationarity of our variables, or non-stationary variables have been normalized by taking first difference, we go ahead to test for the existence of co-integration between non-stationary variables.

Test for Co-integration

Generally, two non-stationary series, xt and yt, are co-integrated if they can produce a linear combination such as xt - βyt that will yield a new series zt which is stationary. The co-integrating vector [1 – β] yielding a stationary series may or may not exists. Therefore to know when to use the error correction model (ECM), one needs to test for the presence of co-integration.

Engle and Granger (1987) establish that co-integration exist if the residual of the OLS equation, ut contains a unit root. If for example ‘a’ and ‘b’ are the estimated parameters of the true parameters α and β in the regression equation such that;

yt,=α + βxt + ut (3) Where

ut = yt – a - bxt (4)

the formal method adopted in this research work is that of Johansen – Juselius multivariate cointegration model which is given below:

Δxt = ∑ ҐiΔxt-k + Πx t-j + εt

Where;

xt is the vector of GDP, capital and recurrent expenditure on education. Δ is the symbol of difference operator; εt is a vector of the residuals, while the expression Πx t-j is the error correction term.

For our own purpose we will employ the pre-programmed Johansen co-integration test provided by the Eviews. And once co-integration among the variables has been established, the Error Correction Model which allows estimating the short run relationship between variables can be employed (Engle and Granger, 1987).

**The Error Correction Model (ECM)**

The ECM corrects for shocks that drive the variables away from the long run trend, given the fact that for co-integrated non-stationary series, a suitable combination makes the series stationary. For this it implies that ECM exploits the fact that an appropriate linear combination of co-integrated variables yields a stationary series to correct for temporary (common) deviations from the long term relationships between the two variables. With ECM therefore, we can transform co-integration from a source of error into an added tool for uncovering information. The error correction models of co-integration can therefore be specified as follows:

ΔYt = α0 + α2t + ∑ΔYt-k +∑ΔXt-k + πet-1 + ℮t (5)

Where; ∆ denotes the difference operator, ℮t is serially independent random error with zero mean, and π is the error correction term (also known as the adjustment coefficient) derived from the long-run cointegration model. In fact π tells us how much of the equilibrium error is corrected each period and it is expected to be negative and statistically significant. If π = 0, then there is no adjustment and therefore there is no long run relationship, and hence we cannot adopt the ECM to estimate the model.

**Granger Causality Test**

The test is named after the first causality tests performed by Clive Granger in 1969. It analyses the extent to which the past variations of one variable explains (or precede) subsequent variations of another. The test come in pairs, testing whether variable xt Granger causes variable yt and vice versa. Formally the Granger causality test analyses whether the unrestricted equation:

Yt = α + ∑ βj yt-j + ∑גj xt-j +µ1t

Yields better result than the restricted equation:

Xt = α + ∑βj yt-j + µ2t with ∑גj xt-j = 0 (the null hypothesis)

If we are able to reject the null hypothesis then we can state that variable xt Granger causes yt

**Model Specification**

If we established the co-integration of our variables, we can therefore go further to specify the final form of the model and its equations. Since the original model of this study can assumed the form

GDPt = β0 + β1 CEEt + β2REEt +εt (6)

Then, the corresponding error correction model using two lags will be specified as:

ΔGDPt = β0 + β1ΔCEEt-k + β2ΔREEt-k + β3ECt-1+ µt (7)

K = 1, 2,

Where: β1, andβ2 represent the short run elasticities of the variables. While β3, is the coefficient of the error correction term which is the lagged value of the residuals derived from the co-integrating regression of the variables and it indicates the speed of adjustment of the system to the long-term equilibrium path.

**Data and Variables**

We used an annual data of the variables from 1981 to 2013 which was sourced mainly from the Central Bank of Nigeria statistical data and the World Bank Development Indicators. We therefore included in the model based on availability of data the following variables:

1. Gross Domestic Product (GDP): this refers to the total value of goods and services in a given period of time, usually one year irrespective of the nationality of the people producing these goods and services. In economic literature, the variable is usually used as a proxy to economic growth of a country. It is also a socio-economic indicator used in the measurement of growth of a nation(CBN, 2008)

2. Capital Expenditure on Education (CEE): It refers to payment for non-financial assets in educational sector used in the production process for more than one year. Loan amortization (capital repayment) is also included (CBN Annual Report, 2010).

3. Recurrent Expenditure on Education (REE): it is the expenditure on goods and services (other than capital assets) in educational sector used in the process of production within one year. Interest on loans is included (CBN Annual Report, 2010).

Based on economic theory, we expect the sign of both the coefficient of capital and recurrent expenditure on education (β1, and β2 respectively), to be positive.

**CHAPTER FOUR**

**RESULTS AND DISCUSSION**

The empirical analysis of the data began with a priori investigation of stationarity properties of the time series using Augmented Dickey Fuller (ADF) tests as shown in Table 1.

# Table 1: ADF Unit Root Test

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **ADF at First Difference** | |  |  |
|  | **t-statistic** | **Probability** | **Order**  **Integration** | **of** |
| ∆GDP | -5.001724\* | 0.0018 | I(1) |  |
| ∆CEE | -5.418799\* | 0.0007 | I(1) |  |
| ∆REE | -13.02914\* | 0.0000 | I(1) |  |

## **Source:** Extraction from estimation output using E-views 7

Note: \*and \*\* indicates rejection of hypothesis at 1% and 5% level of significance

Table 1 reports the result of ADF unit root test. The test indicates that, all the variables are found to be stationary in their first difference at 1% level of significance. This obviously implies, the variables are integrated of the same order I(1). This further suggests there is need to test for co-integration in order to see whether there is long run relationship among the first order integrated variables.

# Table 2: The Result of Co-integration Tests

Unrestricted Co-integration Rank Test (Trace)

|  |  |  |
| --- | --- | --- |
| Hypothesized | Trace | 0.05 |
| No. of CE(s) Eigenvalue | Statistic | Critical Value Prob.\*\* |
| None \* 0.528868 | 35.97290 | 29.79707 0.0086 |
| At most 1 0.394534 | 15.65225 | 16.49471 0.0473 |
| At most 2 0.074995 | 2.104815 | 3.841466 0.1468 |

Trace test indicates 1 co -integrating eqn at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

|  |  |  |
| --- | --- | --- |
| Hypothesized | Max-Eigen | 0.05 |
| No. of CE(s) Eigenvalue | Statistic | Critical Value Prob.\*\* |
| None \* 0.528868 | 25.32065 | 21.13162 0.0646 |
| At most 1 0.394534 | 13.54743 | 14.26460 0.0647 |
| At most 2 0.074995 | 2.104815 | 3.841466 0.1468 |

Max-eigenvalue test indicates 1 cointegrating eqn at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

The result of co-integration test as presented in the table above shows that, there is long run relationship among the variables as the test using both t-statistic and the maximum eigenvalue indicates the existence of one co-integrating equation at 5% level of significance. Thus, we can reject the null hypothesis that there is no co-integration in the data and conclude that there is long run relationship between GDP, capital and recurrent government expenditure on education in Nigeria.

# Table 3: The Result of Long Run Estimates

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GDP** | **C** | **CEE** | **REE** | **ECT** |
| 1.000000 | 168.1726 | 0.059071 | 0.137057 | -0.087164 |
|  |  | (0.05383) | (0.02785) | (0.02486) |
|  |  | [-1.09741] | [-4.92165] | [-3.50578] |

## **Source:** Extraction from estimation output using E-views 7

From the normalized co-integration we can see that there is a positive relationship between GDP as a proxy of economic growth and education expenditure. The result specifically shows that a one unit change in capital expenditure on education will account for a corresponding change in the GDP by about 5.9% while a unit change in the recurrent education expenditure will result to about 13.7% change on GDP and hence there is a positive long run relationship between education expenditure and economic growth in Nigeria.

**The Short-run Estimation of the Model**

The estimates of the Vector Error Correction Model (VECM) provides the short run elasticities of the variables and how GDP responds to its own lagged value and the lagged value of capital and recurrent government spending on education in the short run. It therefore indicates the short run causality between gross domestic product as proxy of economic growth, capital and recurrent government spending on education respectively. The table below presents the detail result regarding the short run causalities:

# Table 4: the Result of the Vector Error Correction Model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Estimates for Error Correction** | |  |  |  |
| **Variables Coefficient** | | **Std. Error** | **t-Statistic** | **Prob.** |
| ECT | -0.084752 | 0.024118 | -3.514131 | 0.0025 |
| D(GDP(-1)) | 0.275246 | 0.197375 | 1.39453 | 0.1801 |
| D(GDP(-2)) | -0.283082 | 0.176603 | -1.602932 | 0.1264 |
| D(CEE(-1)) | -0.004877 | 0.004697 | -1.038344 | 0.3129 |
| D(CEE(-2)) | -0.00608 | 0.004914 | -1.237242 | 0.2319 |
| D(REE(-1)) | -0.011352 | 0.005991 | -1.894817 | 0.0743 |
| D(REE(-2)) | -0.014561 | 0.005038 | -2.890451 | 0.0097 |
| Constant | 344.0664 | 94.9547 | 3.623479 | 0.0019 |
| R-squared | 0.69936 |  |  |  |
| Adjusted R-squared | 0.582444 |  |  |  |
| S.E. of regression | 214.6771 |  |  |  |
| Sum squared resid | 829552.5 |  |  |  |
| Log likelihood | -171.7095 |  |  |  |
| F-statistic | 5.981754 |  |  |  |
| Prob(F-statistic) | 0.001037 |  |  |  |

## **Source:** Extraction from estimation output using E-views 7

Table 4 shows the result of Error-Correction Model with two lags. From the result, the Error Correction

Term which shows the speed of adjustment, is statistically significant and has a negative sign (0.084752), this confirms that there is not any problem in the long-run equilibrium relationship between GDP and education expenditure. The result denotes a satisfactory convergence rate to equilibrium point per period. Although the short run coefficient of lagged GDP and capital expenditures were not significant, the short run coefficient of recurrent expenditure on education is statistically significant and also the joint coefficient of significance (F- Statistics) shows that the variables are jointly significant in explaining output variations in Nigeria. The coefficient of determination of fitness of the model (R2) has also shown that 69% of the variations are explained in the model.

# Table 5: Granger Causality Test

Null Hypothesis: Obs F-Statistic Prob.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CEE does not Granger Cause GDP | | 30 | 0.19252 0.0393 | | | |
| GDP does not Granger Cause CEE | |  | 1.96269 0.1413 | | | |
| REE does not Granger Cause GDP | | 26 | 5.32377 0.0071 | | | |
| GDP does not Granger Cause REE | |  | 3.00554 0.0525 | | | |
| REE does not Granger Cause CEE | | 26 | | | 1.13744 | 0.3765 |
| CEE does not Granger Cause REE | |  | | | 2.38152 | 0.0479 |

From the table above we can see that, there is unidirectional causality between capital expenditure on education and GDP and bidirectional causality between GDP and recurrent expenditure on education. The result therefore shows that, the past values of expenditures on education helps in the prediction of the current values of GDP.

**CHAPTER FIVE**

**CONCLUSION AND RECOMMENDATIONS**

Considering our result from various tests and estimations, we can therefore conclude that government expenditure on education both capital and recurrent positively influence economic growth in Nigeria and that although capital expenditure is not statistically significant in the short run due to its insufficiency, its effect is significant in the long run. Thus, there is the need to increase spending on capital expenditure in order to raise the growth level of the economy.

We can understand from the empirical result that there is need for government to increase budgetary allocation on education expenditure in general in order to improve its effect on the growth on the Nigerian economy.

The study also recommends that, emphasis should also be given to provision of capital goods and other overhead capital that are also very significant in improving the standard of education in the economy

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