Investment in Education and Economic Growth in Nigeria: 1981-2012

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Abstract

This study examines the impact of government investments in education on economic growth in Nigeria over the period 1981-2012. Economic growth proxy by growth rate of GDP is the dependent variable while government capital expenditure on social services, recurrent expenditure on education, primary school total pupil enrolment and primary school pupils-teachers ratio are explanatory variables. Employing the OLS technique, the paper found that government capital expenditure on social services (education and health) and government recurrent expenditure on education have significant implications on economic growth over the period of this study. Total primary school pupil enrolment and primary school pupils-teachers enrolment were found to have mixed influences on economic growth. The low level of funding of the sector, poor conditions of service, high level of pupils out of school and the low pupil-teachers ratio in Nigeria were suspected to have accounted for these results. However, the goodness of fit of about 66 percent indicates that high potentials for growth exist in the educational sector. The paper therefore recommends an increase in government budgetary allocation to the education sector from the present less than 15 percent to UNDP/UNESCO requirement of 25 percent allocation to the sector, improvement in the welfare of educational staff and regular monitoring of funds and services rendered in the sector to ensure improved standards as possible ways of making education growth a friendly sector in Nigeria.

Keywords: *Education, Government Investments, Economic growth, Health, Government expenditure, and Cointegration*

1.0 Introduction

The budget is a key government tool for the implementation of social, political and economic policies and priorities. Despite its importance, the budgeting process in Nigeria has been characterized by policy makers rather than participatory approach to goal design and priority setting [2].

Educationists have acknowledged investment in education as one way the poor can escape from poverty. This can be achieved through well-targeted government spending and subsidy to the sector by redefining and sharpening the role of government in areas which has become key issues in modern development policy. This has led to the recommendation by UNESCO to developing countries of allocating 26% of the total budget to the educational sector. According to Omotor [26], if you see any economy that is not doing well, find out what is spent on education. Hence Aboribo [1], Combs [11] have posited that increase in

national income and per capita income is a function of education and that disparities among nations can better be explained by the differences in the endowments of human rather than physical capital. This underscores the reason why the 'Asian Tigers' in the past three decades allocated between 25 — 35% of their annual budgets to their education sector [1]).

Education is seen as a right and responsibility to be guaranteed to all generations (Anyanwu et al, [3]), thus in - most developing countries improving the widening access to education especially basic educational is a cardinal objective of their government (Omotor, [36]). Accessing the actual levels of public expenditure is the key to understanding any government's true expenditure priorities and coherence with the government's policy objectives.

In Nigeria, elements of uncertainties has beclouded the sector, notable is the fact that schools at all levels lacked teachers and basic infrastructures, since the schools suffer from over crowing, poor management, poor intrasectoral allocation, abandoned capital projects, inadequate funding, poor conditions of service etc [16]. These most times led to incessant strikes and closure of schools culminating in poor quality of teaching and poor products. Government priority to education is still very low while the inadequate funding of higher education has had a calamitous effect on teaching and research in tertiary institutions and in particular Universities have been forced to embark on income generating projects in order to generate more funds. Since allocation of government funds to universities is based on students enrolment, many universities have increased their students enrolment, so as to attract more government funds which has resulted in over - crowding of many Nigerian universities with dwindling structural facilities. Above all, per capital education expenditure in Nigeria is less than $15 which poses a challenge towards meeting the Millennium Development goal expected to be achieved by 2015.

However, it is observed that despite the sustained democracy in the past eleven years the problems of inadequate funding, infrastructures and facilities are yet to be resolved in Nigerian Universities, currently the Nigerian government in a bid to shy away from adequate funding is turning around to embrace academic freedom and university autonomy' as a way out of the university crisis. Central to this thinking is the principle of cost sharing, and the ability of each university to generate a substantial part of its revenue outside of government subventions. The question is what will be the implications of such private financing on university vision and mission? Nevertheless, if private funding visa-vis public funding becomes a significant source for supporting university education, then it becomes imperative to understand the implications that this could have on the future of higher education and university' system in particular in Nigeria and how this would impact on the development of the National economy. It is against this backdrop that this work is conceived. The rest part of the study is organized as follows: literature review, methodology of study and empirical analysis and conclusions and recommendations.

Literature Review

Education at all levels contributes to economic growth through imparting general attitudes and discipline and specific skills necessary for a variety of workplaces. It contributes to economic growth by improving health, reducing fertility and possibly by contributing to political stability. The major importance of the educational system to any labour market would depend majorly in its ability to produce a literate, disciplined, flexible labour force via high quality education. Consequently, with economic development new technology is applied to production, which results in an increase in the demand for workers and better education. The pioneer work in this regard is the work of Lucas [28] which revealed that the growth rate of human capital, which is also dependent on the

amount of time, allocated by individuals to acquire skills. Rebelo [38] later extended the model by introducing physical capital as an additional input in the human capital accumulation function. However, the model of endogenous growth by Romer [39] assumes that the creation of new ideas is a direct function of human capital, which manifests in the form of knowledge. As a result, investment in human capital led to growth in physical capital which in turn leads to economic growth. Other studies that supported the human capital accumulation as a source of economic growth include Barro and Lee, [4]; Romer, [39]; Benhabib and Spiegel, [5].

Some studies have examined different ways through human capital can affect economic growth. In a recent development, Gupta and Chakraborty [20] developed an endogenous growth model of a dual economy where human capital accumulation is the source of economic growth. They argued that the duality between the rich individual exists in the mechanism of human capital accumulation. Rich individuals allocate labour time not only for their own production and knowledge accumulation but also train the poor individuals. In a different dimension, Bratti et al [9] estimated a model of economic growth and human capital accumulation based on a sample of countries at a different stage of development. Their result revealed that the increase in the primary and secondary level of education contributes to an increase in productivity. They posit that human capital accumulation rates are affected by demographic variables. For example, they established that an increase in life expectancy at birth brings about an increase in secondary and tertiary education while a decrease in the juvenile dependence rate negatively affects secondary education. Finally, they added that geographic variables have a considerable importance in the human capital accumulation process. Nevertheless, studies differed on the impact of human capital on productivity growth.

As a source of productivity, Haouas and Yagoubi [22] examined openness and human capital as sources of productivity growth for MENA countries. Controlling for fixed effects as well as endogeneity in the model, they found that while human capital significantly influence growth, it has no underlying effects on productivity growth. Loening [27] investigates the impact of human capital on economic growth in Guatemala through the application of an error correction methodology. He examined two different channels by which human capital is expected to influence growth. The result from his study revealed that a better-educated labour force appears to have a positive and significant impact on economic growth both via factor accumulation as well as on the evolution of total factor productivity.

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Investment on Health and Economic Growth

Health is one of the most important assets a human being has. It permits us to fully develop our capacities. If this asset erodes or it is not developed completely, it can cause physical and emotional weakening, causing obstacles in the lives of people. The previous connection can be seen as the relationship between income and health. Life cycle models have explained how one's health status can determine future income, wealth and consumption (Lilliard and Weiss [26]; Smith [41].

Nowadays, it is possible to say that a person could expect to live a long and healthy life. We could say its economic value is huge and health gains had the economic consequences of widespread economic growth and an escape of ill-health traps in poverty as has been posited by the World Health Organization, [47]. But also, health problems could be reflected as reductions and obstacles for economic progress, stating the disease is prevalent among young workers, affecting productivity and domestic saving rates. Therefore, there has been a growing interest to extend the relationship between health and economic growth, catalyzed in considerable extent by a 1993 World Bank report on health [46]. Barro [4] comments health is a capital productive asset and an engine of economic growth. Using this argument, we can consider health as a determinant of human capital. Likewise, Mushkin [34] indicates human capital formation, with the help of health services, and education are based on the argument that people develop themselves when they invest in these assets and will earn a future return with them. Grossman [19], Bloom and Canning [7] explain healthy individuals are more efficient as assimilating knowledge and, in consequence, obtain higher productivity levels. Hamoudi and Sachs [21] argue there is a cycle of simultaneous impact between health and wealth. An early empirical review of the impact of health on economic development, Sorkin [42] concluded that health, seen through

reductions in mortality, had an important impact on economic growth during the early twentieth century. However, he comments increases in the health status of the population of developed nations will have little impact on economic growth, but the impact could be different for developing nations. For this matter, he points out several ways how health programs could have an impact on economic development on developing nations.

The first way is through productivity gains and increasing man-hours of work. Jack [23] explains productivity of labour depends on factors like physical and mental capabilities, investments in human capital and efficiency of labour organization and management, and emphasizes changes in health could affect productivity through the previous channels. Also, labour productivity could also be reduced by the need to care for sick relatives or by reducing years of schooling if parents are chronically ill. On the other hand, improvements in health could positively affect the experience level of the work force by increasing their life expectancy and good health status condition.

The second way is making feasible the development of previously unsettled regions. Sorkin [42] mentions a major health program could initiate the development of areas where economic activity was deterred by unfavorable health matters. Bryant [10] indicates health and health services can improve or retard economic development and social and economic changes within a egion. The third way is improving innovation and entrepreneurship by changing the attitudes of people. Malenbaum [30] used a step wide regression equation with macroeconomic data of 22 poor countries, using agricultural output as the independent variable, with several social, economic and health data as dependent variables. With this, he showed how the influence of health factors on output seems to be larger compared with other economic and social variables. As a conclusion, Malenbaum [30] suggests health programs could change the happenings of the lives of the poor by taking their own decisions and to have the feeling to influence the events on their everyday activities, which often accept them as pre-ordered.

On a theoretical basis, Mankiw et al. [31], Barro [4] and Grossman [19] have developed models that include health capital as a significant variable for economic growth. Nevertheless, life expectancy is the most used variable to represent it. This variable is defined by the United Nations as the average number of life years since birth according to the expected rate of mortality by age. Jacobs and Rapaport [24] show analysts prefer to focus on a survival time indicator, such life expectancy, because it emphasizes the duration of health status and places implicit importance on a person's well-being. However, under the classification of the European Commission of Public Health, there are four determinants of health: genetics, lifestyles, environment and socioeconomics. It is not clear the definition of life expectancy is the best definition for health capital. Bhargava et al. [6] mention life expectancy does not reflect the productivity of the labour force accurately and capital formation and innovation need the labour force to be active and healthy during most of its working life. Also, Evans et al. [15] mention death and health factors could not be related. Thus, it is unsure whether life expectancy completely measures the impact of health on economic growth.

In 1992, Mankiw et al. extended the Solow model of growth by adding human capital, specifying this variable has a significant impact on economic growth. Later, other authors developed models that included human capital, specifically health capital. Barro [4], following a Ramsey scheme, develops a growth model including physical capital inputs, level of education, health capital, and the quantity of hours worked. By obtaining first order conditions, he finds an increase in health indicators raises the incentives to invest in education and a raise in health capital lowers the rate of depreciation of health, adding there are diminishing marginal returns to investment

in health [17]. Grossman [19] develops a model that allows health capital formation, seen as a capital good, to be able to work, to earn money, and to produce domestic goods. He shows an increase in the quantity of health capital reduces the cost of being sick. The model assumes people are born with initial endowments of health which depreciate with age and grow with investment in health. Among their principal findings, it can be mentioned the productive nature of health is produced when a good state of health allows a more effective performance in the job and study. Grossman also finds that the principal determinants of health capital accumulation and demand for medical services are wages, age and level of education.

In an empirical analysis, Bloom et al. [8] follows the Solow model with human capital. Although they find that health capital is a significant variable for economic growth under the two-stage least squares method, key variables such as capital and schooling are not significant; therefore, the results are questionable. For Latin America, there is a series of technical research documents of public health developed by the Pan American Health Organization. Which find a strong correlation between economic growth and the regional health, estimating regressions similar to Barro's [4] where health is much more robust than schooling [33].

Nevertheless, the study of human capital has been focused on the schooling factor. Despite the studies of Bloom et al., it has been assumed that schooling is a matter of great relevance. Recently, this concept has been extended to the variable of interest in this study, health. In this case, health differs from schooling in the sense that it varies through the course of life and is the result of elections based on behaviour, primarily during childhood and older adulthood [43]. Likewise, Gallego [17] mentions a theoretical solid structure integrating health and economic growth has not been developed. He attributes this to the lack of interaction between the contributions of health economic and economic growth theory, and the bias towards a major importance of schooling as a primary determinant, due to the difficulty to disaggregate the impact of the two variables on the product.

In addition, the relationship between health and labour has been deeply studies. Bloom and Canning [7] describe how healthy populations tend to have higher productivity due to their greater physical energy and mental clearness. Likewise, Strauss and Thomas [43] review the empirical evidence of the relationship between health and productivity, establishing correlations between physical productivity and some health indicators. They focus particularly on those related with nutrition or specific diseases.

In the field of health economics, the endogenous causality between health and income has been the topic of several studies whose purpose is to establish the direction of the causality. Luft [29] gives an informal explanation of this causality: "a lot of people who otherwise wouldn't be poor are, simply because they are sick; however, few people who otherwise would be healthy are sick because they are poor". In order to explain the direction of the causality of the impact of health over income, Smith [41] uses life cycles models, which link health condition with future income, consumption and welfare. According to this, Bloom and Canning [7] explain this direction of the causality with education, indicating healthy people live more and have higher incentives to invest in their ability since the present value of the human capital formation is higher. The higher education creates higher productivity and, consequently, higher income.

Similarly, some empirical and historical studies have analyzed the relationship between health and economic growth. They establish an endogenous relationship between them and, at the same time, argue there are exogenous factors, which determine the health conditions of a person [21].

One major problem in the empirical studies of the impact of health on economic

growth consists in their use of life expectancy as a proxy variable of health. For example, Bloom and Canning [7] point out recent economic analysis shows the significance of health conditions as a determinant of subsequent economic growth. However, they measure health as life expectancy, which does not consider all the its dimensions of health. Health, if its true value wants to be assessed, should be measured in all its dimensions: mortality, morbidity, disability and discomfort. Life expectancy takes into account mortality, but it is not perfectly correlated with the rest of the health dimensions [15]. Moreover, life expectancy reveals only the lifetime of the stock of human capital, saying nothing about the time in the labor force of this capital or the problems caused by the population aging. This is a problem because, even though there is a solid connection between health, productivity and economic growth, health capital depreciates over time [19]) and at one point the relationship stops being binding

As a response to these problems, the purpose of this study is to extend the definition of health capital in the empirical analysis of the Solow growth model with human capital, using a variable that includes the four determinants of health defined by the European Commission of Public Health: health services, socioeconomic conditions, lifestyles, and environment. This will more accurately define the impact of health capital on economic growth.

Profile of Government Expenditure on Education in Nigeria

Recognizing the role of education in human capital development which would result to national development, the Nigerian government at independence embarked on measures aimed at expanding educational facilities at all levels hence from 1ve universities in 1970, facilities rose to 24 in 1986. As at 2005, the number of educational institutions, namely primary, secondary and tertiary stood at 59, 340; 12,61 0 and 128 respectively [12]. Table I.0 depicts the profile of federal government spending on education between 1 980 and 2007. As at 1980 the federal government spent 10.4 percent of total expenditure on education, it fluctuated significantly between 1985 and 2007, as at 2007 only 8.7 percent of total expenditure was spent on education. This fell below the minimum standard of 26.0 percent of annual budget prescribed by the United Nations Educational Scientific and Cultural Organization (UNESCO). The Nigerians educational system was also accompanied by structural defects, in efficiency and ineffectiveness which has today place the country at its lowest ebb in human capital development and utilization [12]. The emphasis has been on qualitative rather than. Qualitative dimensions of the educational system which has resulted in rising unemployment, youth restiveness, escalating poverty level, under utilization social vices, structural imbalance to mention a few.

Table 1.0: Profile on Federal Government Spending on Education in Nigeria (1980 - 2007) percentage share of education in federal government

Year	Capital	Recurrent	Total
1980	6.4	4.0	10.4
1983	3.6	6.4	10.0
1985	1.4	5.1	6.5
1990	0.6	3.3	3.8
1995	1.3	3.8	5.1
2000	3.3	6.3	9.6
2005	1.8	4.5	6.3
2007	**2.9**	**5.8**	**8.7**

Sources: Adapted from Dauda R.O 2010:162

1.3: Methodology

This study is designed to be an econometric investigation of the contribution of investment in education to economic growth in Nigeria. Using an econometric technique of Ordinary Least Squares (OLS) and co-integration analysis based on Engle Granger [14] co-integration theory, the study determined the impact of investment in education on economic growth in Nigeria. However, in order to really assess how educational investment affects economic growth, the paper extended the scope of our study by incorporating investment in health sector as a check variable. This is the case because it is believed that it is only a healthy population that can learn and understand. Also health service is a salient aspect of human capital investment and for any successful educational programme, there must be a corresponding investment in health.

To achieved our objectives, we utilized the following data; growth rate of gross domestic product, Government capital expenditure on educational and health sectors (social services), total students enrolment in primary school, teachers public ratio in Nigeria over the period 1981-2012. All these data are sourced from the Central Bank of Nigeria statistical bulletin and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics and presented in Appendix of this study.

1.3.1: Model Specification

In this study we specified a growth model that incorporates the following variables;

GDPR = F(CESS, REXE, PSEN, PPTR)) (1)

Where: GDPR = Growth rate of Gross Domestic Product,
CESS = capital expenditure on education and health (social services), REXE = recurrent expenditure on education, PSEN = total primary school pupil enrolment (proxy for UBE pupil enrolment), and PPTR = primary pupil-teachers ratio. During estimation, parameters are introduced and a disturbance term "U" to take care of variables not included in the model but affect economic growth. Hence equation 1 above is transformed thus:

$$RGDP_t = \propto_o + \propto_1 CESS_t + \propto_2 REXE_t + \propto_3 PSEN_t + \propto_4 PPTR_t + U \quad (2)$$

The dynamic model of equation (ii) after expressing same in log-linear form is specified thus:

$$RGDP_t = \propto_o + \propto_1 \ln CESS_t + \propto_2 \ln REXE_t + \propto_3 \ln PSEN_t + \propto_4 \ln PPTR_t + U_t \quad (3)$$

$\propto_1$ $\propto_2$, $\propto_3$, $\propto_4$ and $\propto_5$ are the elasticities of government capital expenditure on education, health, primary school pupil enrolment and primary school pupil-teachers ratio over the period. The apriori expectation is $\propto_1$, $\propto_2$, $\propto_3$, and $\propto_4$, >0.

1.3.2: Co-integration and Error Correction Model

Co-integration analysis is necessary for any economic model using non-stationary time series data. This is because if the variables are not cointegrated, then we may have the problem of spurious regression and econometric study becoming meaningless or "nonsense". On the other hand, if the stochastic trends do cancel, then we have cointegration which will then necessitate an error correction model (ECM). The error correction mechanism has the advantage of including both the long-run and short-run information of the model.

In case of a long-run relationship among the variables, equation (3) is transformed into an error correction model as follows:

$$\Delta RGDP_t = \propto_o + \propto_1 \Delta \ln CESS_t + \propto_2 \Delta \ln REXE_t + \propto_3 \Delta \ln PSEN_t + \propto_4 \Delta \ln PPTR_t + \gamma ECM_{t-1} + V_t \quad (4)$$

Where

ECM = $(\Delta RGDP_t - \propto_o - \propto_1 \Delta lnCESS_t - \propto_2 \Delta lnREXE_t - \propto_3 \Delta lnPSEN_t - \propto_4 \Delta lnPPTR_t)_{t-1}$

γ = adjustment parameter which shows the extent to which the disequilibrium in the dependent variable ($\Delta RGDP_t$) is being corrected each period.

Δ = first deference operator

V_t = $\Delta U_t = (U_t - U_{t-1})$

Either equation (3) (if there is no long run relationship among the variables) or equation (4) (in case of a long run relationship among the variables) will be estimated. Hence the first objective of this paper shall be captured by the respective test of significance on each explanatory variable. By evaluating the signs and magnitude of the elasticities, the second objective shall be addressed.

1.3.3: Estimation Procedure

The Ordinary Least Squares (OLS) was used in the estimation of the model being the best linear unbiased estimator. This is after being sure that the variables in their behaviour conform to the assumption of the classical regression model. Steps were taken to ensure that the model adheres to the principles of parsimony using the AIC (Akaike Information Criterion) and SBC (Swartz Bayersian Criterion). A unit root test was conducted using the Augmented Dickey Fuller (ADF) and Philip Perron (PP) to determine the time series properties of the model. The level or order of integration of the residual error term of a set of non-stationary time series aggregate should be zero (ie $U_t \sim 1(0)$) in order to qualify as an error correction model. Also a stability test was conducted to test for the stability of the model across samples within the period using recursive residual and cusum tests.

1.4 Empirical Analysis

Table 1.1: Correlation Matrix

	GDPR	Log(CESS)	Log(REXE)	Log(PSEN)	Log(PSTR)
GDPR	1.000000				
Log(CESS)	0.494778	1.000000			
Log(REXE)	0.556751	0.956009	1,000000		
Log(PSEN)	0.456605	0.911489	0.895019	1.000000	
Log(PPTR)	0.213430	0.009704	-0.038143	-0.006242	1.000000

Source: Researcher's Computation (e-view 7.1)

The correlation result reported in Table 1.1 above indicates positive but weak relationship between capital expenditure on social services, primary school total pupil enrolment, primary school pupils-teachers ratio and economic growth. However, a strong and positive relationship was found between recurrent expenditure on education, and growth rate of GDP. The relationship between recurrent expenditure on education, primary school pupil enrolment and capital expenditure on social services is very strong but that of primary school pupil-teachers ratio and capital expenditure on social services is very weak. Also recurrent expenditure on education has very strong and positive relationship with primary school total pupils enrolment while the relationship between primary school pupil-teachers ratio, recurrent spending and primary school total pupil enrolment is negative and weak. In nutshell the correlation result indicates that economic growth has positive but weak relationship with the explanatory variables.

Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) Unit Root Tests

The paper tests for unit roots. Augmented Dickey Fuller (ADF) and Phillip Perron (PP) are employed to perform the tests. The results of the stationarity tests of variables are presented in Table 1.2 below

Table1.2: Unit Root Tests Result: 1981-2012

Augmented Dickey Fuller (ADF) Test Statistic						Philip-Perron (PP) Test Statistic				
Variable	ADF Statistic	1%	5%	10%	Decision	PP Statistic	1%	5%	10%	Decision
GDPG	-5.015648	-3.661661	-2.960411	-2.619160	I(0)	-5.125289	-3.661661	-2.960411	-2.619160	i(0)
Log(Cess)	-9.142198	-3.670170	-2.963972	-2.621007	I(1)	-9.289442	-3.670170	-2.963972	-2.621007	i(1)
Log(Rexe)	-4.959490	-3.699871	-2.976263	-2.627420	I(1)	-12.51841	-3.670170	-2.963972	-2.621007	i(1)
Log(Psen)	-4.736616	-3.670170	-2.963972	-2.621007	I(1)	-4.733490	-3.670170	-2.963972	-2.621007	i(1)
Log(Pstr)	-4.612263	-3.670170	-2.963972	-2.621007	I(1)	-4.737751	-3.670170	-2.963972	-2.621007	i(1)

Source: Researcher's Computation (E-view 7.1)

The stationarity test result reported in Tables 1.2 above indicates that growth rate of GDP as the dependent variable was stationary at a level using both ADF and PP statistic. This implies that they are integrated at order zero. All the independent variables were stationary at first difference using both ADF and PP statistic also. This implies they were integrated at order one.

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The result of the Johansen cointegration test in **Table 1.3** indicates that there exists only one (1) cointegrating equation in the trace and Max-eigenvalue tests. This implies that the variables are cointegrated (ie they adjust to short run dynamics and long run equilibrium). Given the above results the error correction mechanism is fitted in table 1.4

Table 1.3: Johansen Co-integration Test

Date: 10/27/13 Time: 18:11
Sample (adjusted): 1972 2012
Included observations: 41 after adjustments
Trend assumption: Linear deterministic trend
Series: GDPR LOG(CESS) LOG(REXE) LOG(PSEN) LOG(PSTR)
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.748979	80.79068	69.81889	0.0052
At most 1	0.460800	39.32412	47.85613	0.2476
At most 2	0.375134	20.79408	29.79707	0.3706
At most 3	0.187966	6.687545	15.49471	0.6142
At most 4	0.014598	0.441158	3.841466	0.5066

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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.748979	41.46656	33.87687	0.0052
At most 1	0.460800	18.53004	27.58434	0.4517
At most 2	0.375134	14.10653	21.13162	0.3563
At most 3	0.187966	6.246387	14.26460	0.5818
At most 4	0.014598	0.441158	3.841466	0.5066

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

Source: Computed Result (E-view)

Table 1.4: Parsimonious ECM result of economic growth and investment in Education

Variable	Coefficient	Standard Error	T-Statistic	Probability
C	1.122407	0.653492	1.717551	0.1030
DLOG(CESS(-1))	-3.430946	1.096303	-3.129559	0.0058
DLOG(CESS(-2))	-1.632093	1.031388	-1.582424	0.1310
DLOG(REXE)	1.631223	0.656737	2.483828	0.0231
DLOG(REXE(-2))	1.218039	0.641439	1.898918	0.0737
DLOG(PSEN(-1))	-27.04041	10.22203	-2.645307	0.0165
DLOG(PSEN(-2))	12.24711	10.52102	1.164062	0.2596
DLOG(PSTR)	10.64170	7.217337	1.474464	0.1576
DLOG(PSTR(-1))	-8.572903	7.534290	-1.137851	0.2701
D(GDPR(-2))	-0.384011	0.120113	-3.197075	0.0050
ECM(-1)	-0.606448	0.173077	-3.503916	0.0025
R^2 =0.78; R^2-adjusted = 0.66; F-statistic = 6.5; DW-Statistic =1.5; AIC = 5.03				

Computed result (E-view)

1.5 Empirical Results/Analysis

The result in Table 1.4 reveals that economic growth is negatively influenced by changes in the first and second lags of capital expenditure on social services (education and health). However, the first lag influence is significant; while the second lag is insignificant. Growth rate of GDP was also found to be positively influenced by initial level and second lag of recurrent expenditure on education. Its initial level was significant while the second lag is insignificant at 5 percent level. The relationship between growth rate of GDP and primary school total pupil enrolment was negative but significant at first lag; however, it is positive and insignificant at second lag. Economic growth and primary school pupils-teachers ratio also has mixed relationship. It is positive at the initial level but negative at first lag. However, primary school pupil-teachers influence at both levels is insignificant at 5 percent level. The above result also indicates that all the explanatory variables has mixed influences on economic growth at different lags/levels

The coefficient of determination (R^2) at 0.78, used to measure the goodness-of-fit of the estimated model, indicates that the model is reasonably fit for prediction, that is the model explains about 78 percent of the

total change in economic growth has been caused by the explanatory variables in Nigeria over the period 1981-2012. At 1.5, the Durbin Watson statistics does not reveal evidence of serial correlation. Furthermore, a stability of parameters in the growth equation reported in Table 1.5 is paramount.

It is a standard practice to incorporate short-run dynamics in testing for stability of the long run parameters of the growth equation. To this end, this paper applies the cumulative sum of recursive residuals (CUSUM) to the residuals of parsimonious model. For stability of the short run dynamics and the long run equilibrium parameter of the growth model, it is important that the recursive residuals and cusum of squares stay within the 5 percent critical bound (represented by two straight lines) as shown in figures 1.1 and 1.2, neither the recursive residuals nor CUSUM of squares plots cross the 5 percent critical lines, therefore, the paper concludes that the estimated parameters for the short run dynamics and long run equilibrium of the growth model are relatively stable. In order words, a stable growth model exists over the entire sample period. Other stability tests such as the Jarque-Bera normality in figures 1.3 also supports the stability of the parameters in the growth model. The results of the various tests suggest that the model is fairly well specified and robust for policy analysis.

1.5.1 Discussion of Results

The negative influence of capital expenditure on social services (education and health) on growth rate of GDP shows that government spending on this key sector is inadequate to spur growth. Human capital remains the key ingredient for rapid and sustainable growth as evidenced in emerging economies of the World like; China and India. Nigeria still spend less on this vital sector. For instance human capital accounts for less than 20 percent of total government expenditure over the period under consideration while the UNDP requirement is 25% each for education and health. This scenario may have accounted for this result.

Recurrent expenditure on education is correctly signed and significant at initial level. This revealed that incentive and better welfare for operators/workers in the educational sector is a major ingredient for improvement in human capital and economic growth. Improved condition of service also helps to reduce brain drain and attract better personnel to the sector. The continuous clamour for better conditions of service by Nigerians may have accounted for the behaviour of this variable.

The mixed influences of primary school total pupil enrolment and primary school pupils-teachers ratio have further reveal the low level of primary school enrolment and pupil-teachers ratio in Nigeria. Nigeria still records one of the highest rates of pupil out of school and currently ranked very low in pupil-teachers ratio in the World according to UNDP report of 2010.

1.6 Policy Recommendations

Based on our findings the study recommends that;

1. Government should increase its budgetary allocation to the education sector from the present less than 15 percent to meet up with the recommended UNDP requirement of about 25 percent allocation to the sector.
2. There should be in place an effort to monitor funds allocated for the sector to guide against mismanagement, misappropriation and diversion.
3. Also, a rating performance indicator should be established for the educational sector to help to monitor progress in the sector.
4. Improve conditions of service for workers in the educational sector. This will help reduce the current brain drain in the educational sector and woo more competent hands that will help improve productivity of the sector and the national economy at large.

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Appendix A:

Figure 1.1: Recursive residual

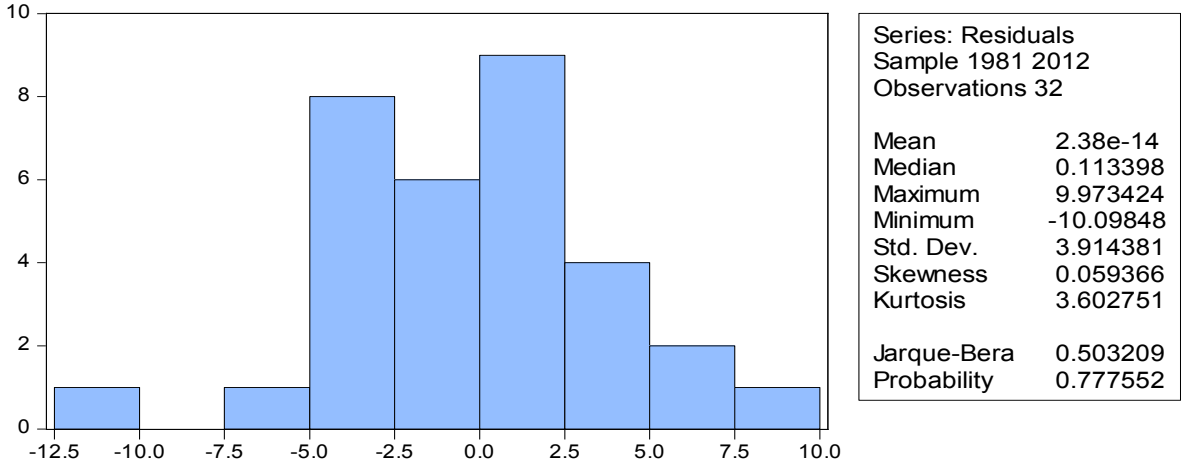

Figure 1.2: Cusum of Squares

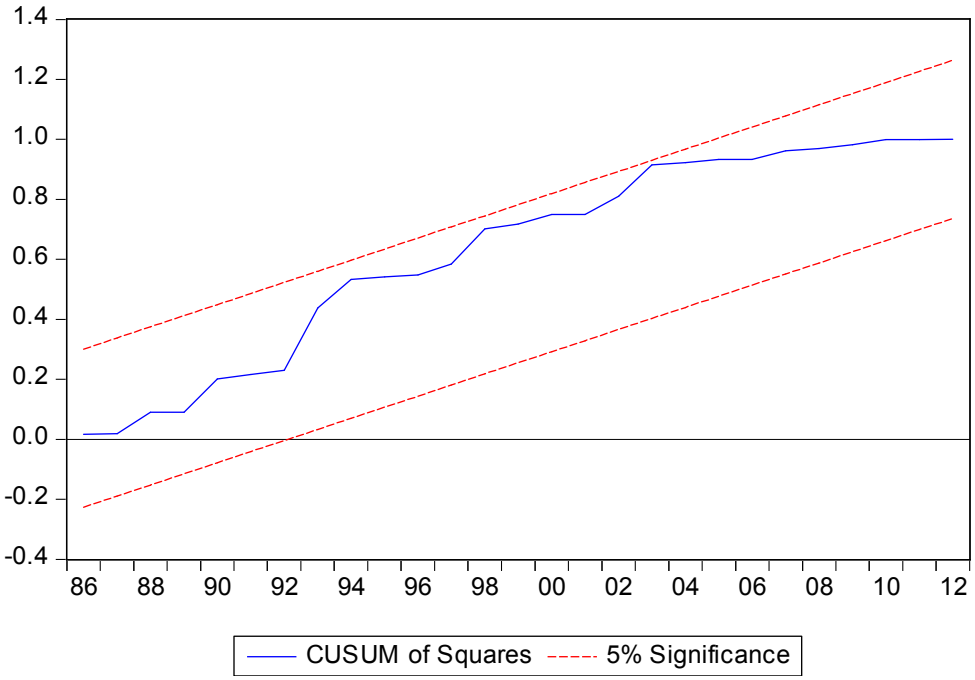

Figure 1.3: Jarque-Bera normality test result

Appendix B: Recurrent expenditure on education, Primary school pupil enrolment, Primary school Pupils-Teachers ratio, Capital expenditure on Social services, Growth rate of GDP and Capital expenditure on Social services as percentage of total spending of Government in Nigeria 1981-2012.

Year	Rexe	Psen	Pptr	cess	GDPR	% of total
1981	165.43	12117483	35.27128	1,299.0	-13.13	19.8
1982	187.93	13760030	37.22589	968.3	-0.23	15.1
1983	162.15	14311608	36.99753	1,026.5	-5.29	21.0
1984	198.90	14654798	38.16463	237.6	-4.82	5.8
1985	258.60	14383487	39.98734	1,154.0	9.70	21.1
1986	262.71	13025287	42.28001	655.4	2.51	7.7
1987	225.01	12914870	44.105	619.1	-0.70	9.7
1988	1,458.80	12690798	41.17956	1,726.0	9.90	20.7
1989	3,011.80	12721087	36.95616	1,844.8	7.20	12.3
1990	2,402.80	13607249	40.99619	2,096.0	8.20	8.7
1991	1,256.30	13776854	38.96169	1,491.7	4.76	5.3
1992	291.30	14805937	38.53585	2,132.6	2.92	5.4
1993	8,882.38	15870280	37.07169	3,575.3	2.20	6.6
1994	7,382.74	16190947	37.20261	4,994.4	0.10	7.0

1995	9,746.40	15741078	37.20776	9,215.6	4.30	7.6
1996	11,496.15	14078473	33.78198	8,656.2	2.70	4.1
1997	14,853.54	15741078	37.20776	6,902.0	1.88	2.6
1998	13,589.49	15907308	40.63354	23,365.6	1.10	7.6
1999	43,610.65	17907009	41.4422	17,253.5	5.40	3.5
2000	57,956.64	19151442	42.9015	27,965.2	3.10	11.7
2001	39,882.60	19041223	39.00579	53,336.0	1.55	12.2
2002	80,530.88	19806082	40.27665	32,467.3	10.30	10.1
2003	64,782.15	20570941	38.50097	55,736.0	10.60	23.1
2004	76,524.65	21395510	35.80647	30,032.5	5.40	8.6
2005	82,795.06	22115432	36.90999	71,361.2	6.20	13.7
2006	119,000.00	22861884	40.4173	78,681.3	6.45	14.2
2007	150,800.00	21513996	46.08983	150,895.2	5.98	19.9
2008	164,000.00	19979638	45.50164	152,174.6	6.96	15.8
2009	137,116.00	20080986	38.78351	120,710.0	7.98	10.5
2010	158,640.00	20681805	36.02612	147,409.5	7.36	16.7
2011	335,837.89	21282624	35.21039	91,900.0	6.55	10.0
2012	348,400.00	21883443	33.03762	97,400.0	6.12	11.1

Sources: UNESCO and CBN 2012