International Journal of Development and Economic Sustainability
Vol.7, No.7, pp. 25-38, December 2019
Published by *ECRTD- UK*
ISSN: 2053-2199 (Print), ISSN: 2053-2202(Online)

EDUCATION: A CATALYST FOR HUMAN CAPITAL DEVELOPMENT IN SCIENCE AND TECHNOLOGY

[1] Emeh, E. Onyinyechika, [2] Pepple, Adoye E.

Institute Of Continuing Education
Capt. Elechi Amadi Polytechnic
Rumuola, Port Harcourt
Rivers State, Nigeria.

ABSTRACT: *This study investigates, the human capital development in science and technology in Nigeria. It used ordinary least regression technique and time series date from 1986-2017 which were sourced from Central Bank Statistical Bulletin. The variables were tested for unit root and co-integration they are found to have a long run relationship with RGDP. However, the result indicates that human capital development affects the administrative growth of the economy within the study period. This study therefore recommends that adequate attention must be given to the equipping of our schools with modern research facilities and technological experimentation device and government should improve conditions of service for workers in the educational sector and more competent hands that will help improve productivity of the national economy at large needs to be engaged.*

KEY WORDS: Education, Administration, Health, Human capital Formation and Development.

INTRODUCTION

Education is the passport for global exposure. It is the most powerful weapon that can be used to rule the world. Education has the capacity to eradicate poverty. Education is the process of receiving and giving systematic instruction, especially at schools and the society at large. It is the process of facilitating, learning or the acquisition of knowledge, skills, values, belief and habits. It is important for humans to be available, ready and willing to be educated to enable them apply their inspiration to develop their environment through the aid of science and technology, as well as solving its problems in most strategic ways.

The Vice President, Yemi Osinbajo noted that in re-designing the country's education curriculum as part of its education road map, where every child would count; the Federal government's new policy was to introduce science, technology, engineering, art and mathematics curricular in primary schools. He also recognized that schooling should support the development of skills in cross-disciplinary, critical and creative thinking, problem solving and digital technologies. According to him, time had come for African countries to invest more in education to lift the people of the continent out of poverty, and convert our countries to the greatest centres for innovation and creativity in the world.

Health is next to education. They are basic objectives of development; they are important ends to themselves. Health is central to well-being and education is essential for satisfying and rewarding life; both are fundamental to expanding human capabilities that lie at the heart of the meaning of development. Development is never ending in its own way; development is a process by which people create and recreate themselves, to realize higher level of civilization in accordance with choices, want

and values [Todaro and Smith, 2009]. According to World Bank Development Indicator, (2004) with Nigeria's large reserves of human and natural resources, Nigeria has the potential to build a prosperous economy, education and infrastructure service and provide health care services that her population needs. Nevertheless, Nigeria belongs to group of poor countries with high level of resources but low level of productivity in the educational sector, administrative, science and technology and the national economy at large.

Despite the tremendous progress in expanding enrollment and increasing years of schooling since 1960, Nigeria is yet to benefit from such development in terms of increased growth; schooling in Nigeria has not delivered fully on its promise as the drivers of economic success. Expanding school attainment, at the center of most development strategies has not guaranteed better economic conditions (Fadiya 2010). Scholars attributed the failure of the Nigeria's educational system to system (Uwatt, 2002, Chete and Adeoye, 2002; Babatunde and Adefabi 2005). According to Babatunde and Adefabu (2005), the education that most Nigerians receive is not very good; children attend primary schools which last for six years, but the education they receive there is not sufficient. The pupils to teacher ratio was 37 to 1 and the youth literacy rate was 13% for males and 20% for females up to the late 1990s. In 2002, 33% of the relevant age group attended secondary school and only 4% attended tertiary schools. The lower number of student in tertiary schools can be easily explained in that spending per students in tertiary schools was 529.8% of the GNP. Furthermore, public spending on education was only 0.9% of the group in 2002 (World Bank,2004).

Health comes next to education in the development of human capacity. According to Yesufu (2000), a good health policy is a means by which government can at once ensure that manpower is generated in the right mix, distributed in accordance with national priorities and ensuring that the highest level of labour productivity. Health improvement influences morbidity and labour force productivity; thereby enhancing the process and speed of economic development.

Statement of the Problem

There are indications that human capital development is not given priority in Nigeria. Therefore, there is need to examine the level of government spending on the education and health sectors and its impact on science and technology as well as its impact on economic growth at large and the provision and implementation of good policy recommendation.

Objectives of the Study

The broad objective of the study is to analyze the effect of education on human capital development in science and technology on Nigeria economy. The specific objectives are to:

i. Ascertain the relationship between public expenditure on education and economic growth in Nigeria.
ii. Ascertain the relationship between public expenditure on health and economic growth in Nigeria.
iii. Examine the impact of capital formation on economic growth in Nigeria.
iv. Proffer policy recommendations to correct the inadequacies in the Nigeria health and education sectors.

Conceptual framework

Government expenditure on education

Education in Nigeria is a constitutional matter which makes it the responsibility of the government though it is financed by the public sector in conjunction with the private sector and external bodies. It follows that the sources of education investment funds are majorly public in nature. One of the approaches the government adopts in financing education is the annual budgetary allocation to the sector that are distributed as subvention or grants to the different levels of education. These grants or subventions to educational institutions are made through the respective education ministry of the levels of government by the coordinating agencies of education like National Universities Commission (NUC), NCCE, NBTE, etc. Data available on federal government expenditure on education in Nigeria reveals dynamic change over the period under review (1970-2013) from available dates as shown in the appendix, gross domestic product (GDP), and federal government budgetary expenditure on human capital (education and health), it is obvious that federal government budgetary allocation to the education sector stood at N25,84 million in 1970. It rose from 17.14 million in 1971 to N47.23 million in 1972, representing about 300% growth rate from -3.85% 1971 level from 1972 to 1976 federal government allocations to education grew phenomenally. For instance, the growth rate was 8.1% in 1972, 34.8% in 1974, 331.47% in 1975 and 23.67% in 1976. Budgetary allocation to education hit its billion Naira mark in 1976 standing at N33940.7 billion. However, the education expenditure fell to 569.6 million in 1978 representing a negative growth rate of 452.04%, the reason for the monumental growth in allocation to education in the early 1970s could be attributed to the policy of reconstruction, rehabilitation and reconciliation (3Rs) embarked upon by the federal government in response to the massive destruction of public infrastructure during he civil war.

Human capital development and economic growth in Nigeria

Economic growth means the expansion of a country's capacity to produce goods and services its people want within a given period. Gross Domestic Product (GDP) refers to the total market value of all final goods and services produced in an economy within a given period (Gbosi and Omoke, 2004). Nigeria witnessed fair robust economy in the early 1970s with an average growth rate of 11.88 percent between 1970 and 1974. The satisfactory performance of the economy in the early 1970s was not sustained from mid-1970s. Specifically, GDP recorded the first negative growth rate of -5.22% 1975. In that same year, health expenditure as a percentage of total government expenditure was only 1% while that of education was 10% GDP improved in 1976 and 1977 recording impressive growth rate on 9% and 6% respectively. At the end of the oil boom in the early 1980s, processes for developing human capital. Myers (1964) maintained that the most obvious way of developing human capital is through formal education, beginning with first level education, continuing with various forms of post primary education and post-secondary education. Furthermore, that education is one of the main domains of public intervention in the social sectors where the most spectacular results have been achieved. This national consciousness of the significance of education in Nigeria formed the basis upon which educational expenditure became a matter of serious consideration since 1960 to date. However, the impression expansion of the Nigeria education system has still proved inadequate to reach the universal primary education and suppress the regional (zonal) and gender disparities in access. The characteristics distribution of the population reveals a high proportion of the young

Human capital and economic growth in Nigeria

Economic growth means the expansion of a country's capacity to produce goods and services. Her people want within a given period. Gross Domestic Product [GDP) refers to the total market value of all final goods and services produced in an economy with a given period (Gbosi and Omoke, 2004).

Nigeria's economy witnessed fair robust economy in the early 1970s with an average growth rate of 11.88 percent between 1970 and 1974, the satisfactory performance of the economy in the early 1970s was recorded the first negative growth rate of -5.22% 1975, in that same year, health expenditure as a percentage of total government expenditure was only 1, while that of education was 10% GDP improved in 1976 and 1977, recording impressive growth rate of 9% and 6% respectively. At the end of the oil boom in the early 1980s, the economy witnessed contraction. Accordingly, the economy recorded negative GDP growth rate (World Bank, 2007).

Aggressive output as measured by GDP recorded negative growth rates of -13.13% in 1981, 0-23% in 1982,-5.229% in 1983 and -4.82% in 1984, after the economy recovered and recorded improved performance with positive growth rates of 9.7% and 2.5% in 1985 and 1986 respectively. One year after the introduction of SAP, the economy witnessed a negative growth rate of-0.7% from a weak rate of 2.5% recorded in 1986. This is understable because the SAP period was a period of tightening government policy. Though GDP recorded positive growth rate from 1990 to 1999, the rates were weak with an average of 3% between 2000 and 2013, the economy of Nigeria performed satisfactorily well with an average growth of 5%. From the above analysis, it can be seen that economic growth in Nigeria has been influenced by policy changes. On the average, GDP in Nigeria has not performed well from 1970 to 2013. It was that while human capital expenditure underwent change, Gross Domestic Product also fluctuated almost in the same pattern. More fundamentally, the analysis reveals three years of concurrent negative growth rate pattern among education, health expenditures and GDP growth rate. The years include 1982, 1984 and 1987. This revelation suggests that fluctuation in the human capital development expenditure may have accounted for the poor performance of the Nigerian economy from 1970 to 2013. Finally, federal government's expenditure in human capital as percentage of annual budgetary expenditures show government neglect of this social sector in Nigeria over the years.

Quantitative Theory of Human Capital Development

Erosa et al (2010) developed a quantitative theory of human capital development in order to evaluate the magnitude of cross-country differences in total factor productivity (TFP) that explains the variation in per-capita income across countries. They built a heterogeneous agent economy with cross-sectional variation in ability, schooling and expenditures on schooling quality. In their theory, the parameters governing human capital production and random ability process have important implication for a set of cross sectional statistics-mincer return, variance of earnings, variance of schooling and intergenerational correlation of earnings. These restrictions of the theory and U.S household data were used to pin down the key parameters driving the quantitative implication of the theory. They found that human capital accumulation strongly amplified total factor productivity (FFP) difference across countries. In particular, an elasticity of output per worker with respect to TFP of 2.8: a 3-fold difference in TFP explains a 20-fold difference in output per worker. They argued that the across country difference in human capital implied by the theory are consistent with a wide array of evidence including earnings of immigrants in the United State, average mincer returns across countries and the relationship between average years of schooling and per-capita income across countries. The theory implies that using mincer returns to measure human capital understates differences across countries by a factor 2.

Jaiye (2015), empirically investigated the relationship between investment in education, health and economic growth in Nigeria, using time series data from 1982 to 2011. The paper employed trend analysis, the Johnson co-integration and ordinary least square technique. Empirical findings however

indicate that there is a long-run relationship between government expenditure on education, health and economic growth. The findings of this work have strong implication on education and health policies and considering that they are of great debate in the country. Theorem, this study recommends that in order to accelerate growth and liberate Nigerians from the vicious cycle of poverty, the government should put in place policies geared towards massive investment in the education and health.

Elechi and Emeh (2018) examined human capital investment as a catalyst for sustainable economic environment in Nigeria. The broad objective of the study is to analyze the effect of human capital investment on the Nigerian economy from 1986 to 2017. The data used for the study were sourced from the Central Bank Statistical Bulletin and ordinary least squares (ols) techniques were used to analyze the data. The findings of the study reveal that, there is a positive relationship between government expenditure on health and real gross domestic product. This study recommends that; there is need for Nigerian policy makers to pay more attention to the health sector and increase its yearly budgetary allocation.

Chete and Adeoye (2013) explored the association between human capital development and economic growth in Nigeria. A number of methodological approaches were employed to examine this link. Specifically, the Granger causality tests were inconclusive on the direction of causality. The variance, decomposition analysis shows that "own shocks" constitute the predominant source of variation in employment growth's forecast errors, and that innovations of employment growth can be better predictors of income growth. The impulse response analysis reveals that there are considerable oscillations in the response patterns of income and employment to unanticipated shocks in each other. The paper observed a mismatch between the manpower needs of the country and skills turned out by the educational system.

Oluwatobi and Ogunrinola (2011) examined the relationship between human capital development efforts of the government and economic growth in Nigeria, it seeks to find out the impact of government recurrent and capital expenditures on education and health in Nigeria and their effect on economic growth. The data used for the study are from secondary sources while the augmented solo model was also adopted. The dependent variable in the model is the level of real output while explanatory variables are government capital and recurrent expenditure on education and health, gross fixed capital formation and the labour force. The result shows that there exists a positive relationship between government recurrent expenditure on human capital development and the level of real output, while capital expenditure is negatively related to the level of real output. The study recommends appropriate channeling of the nation's capital expenditure one education and health to promote economic growth.

Gap in Literature

The motivation of this research work stems from the fact that the educational sector is the passport for global exposure and it is the major sector in developing nations. Furthermore, impacting knowledge positively to the right persons that will in turn invest in science and technology that will spark up the growth of the economy positively. This research work stems from the works of Chete and Adeojo (2013) and Jaiye Oba (2015) differed by the extension of study periods. The study therefore recommends that adequate attention must be given to the equipping of our schools with modern research facilities and technological experimentation devices.

METHODOLOGY

For the purpose of this study, the ex-post facto research design is used. The annual time series data were collected from secondary source from 1986-2017. The data were collected principally from Central Bank of Nigeria (CBN), Nigerian Stock Exchange (NSE), Statistical Bulletins 2017. The variables used for the work include, Real Gross Domestic Product, Government Expenditure on Education, Government Expenditure on Health and Gross Capital Formation.

Model Specification

The specification is being guided by existing theory or empirical evidence from previous studies.
The model is specified as follows:

RGDP = f (GEE, GEH, GCF). …equ (i)

$RGDP = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu t$…..(ii)

$RGDP = \beta o + \beta_1 GEE + \beta_2 GEH + \beta_3 GCF + \mu t$ ..equ (iii)

Where:

RGDP - Real Gross Domestic Product (Proxy for economic growth)
GEE - Government Expenditure on Education
GEH - Government Expenditure on Health
GCF – Gross Capital Formation

The a priori expectations are $\beta 1, \beta 2, \beta 3 > 0$. This implies that all the independent variables in the model have positive relationship with economic growth.

Data Presentation

Table 1: Data on Real Gross Domestic Product (RGDP), Government Expenditure on Education (GEE), Government Expenditure on Health (GEH) and Gross Capital Formation (GCF) in Nigeria from1986 to 2017.

YEAR	RGDP	GEE	GEH	GCF
1986	15,237.99	608.94	360.4	5471.8
1987	15,263.93	584.65	236.4	4181.9
1988	16,215.37	508.35	443.2	4368.4
1989	17,294.68	392.46	452.6	4455.7
1990	19,305.63	365.4	658.1	6177.8
1991	19,199.06	211.96	757	6154.3
1992	19,620.19	223.99	1025.4	5970
1993	19,927.99	114.26	2684.5	6924.9
1994	19,979.12	133.73	3027.8	6221.4
1995	20,353.20	223.77	5060.9	4591.7
1996	21,177.92	278.44	4851.5	5422.6
1997	21,789.10	285.48	29417	5901.9
1998	22,332.87	248.01	11984	5603.4
1999	22,449.41	310.11	16180	5439.4
2000	23,688.28	342.02	18182	6365.9
2001	25,267.54	340.36	44652	4984
2002	28,957.71	450.67	63171	5997.8
2003	31,709.45	509.97	39686	9005
2004	35,020.55	662.89	59787	6843.4
2005	37,474.95	840.49	26559	6127.6
2006	39,995.50	1196.7	44794	9766.7
2007	42,922.41	1314.1	12240	13842
2008	46,012.52	1639.7	32555	13742
2009	49,856.10	1316.8	11871	18520
2010	54,612.26	2969.8	70638	21352
2011	57,511.04	3304.6	73216	19591
2012	59,929.89	3729.3	77436	20091
2013	63,218.72	4186.3	81212	21671
2014	67,152.79	4669.4	84763	24578
2015	69,023.93	4951.2	85419	28130
2016	67,931.24	4977.5	86321	29012
2017	68,421.64	5012.8	86610	29654

Source: Central Bank of Nigeria (CBN) Statistical Bulletin (2017)

Data Analysis

Dependent variable: Real Gross Domestic Product

Method: Ordinary Least Square

Sample: 1986 -2017

Table 2

Variables	Coefficient	Std. Error	T-Statistic	VIF
CONSTANT	5.303048	0.332877	15.93094	
LOG(GEH)	0.092402	0.010703	8.633239	1.855940
LOG(GEE)	0.111926	0.029919	3.740931	5.238127
LOG(GCF)	0.377129	0.056986	6.617888	5.960415

Source: Regression Result (2017)
R^2 (Coefficient of determination) = 0.975278
R^2 (Adjusted coefficient of determination) = 0.972629
Ðurbin Watson = 1.193457
F -value = 368.1909

Summary of Findings

The study examined the impact of Human Capital Development in Science and Technology. The ordinary least square (OLS) method was used in analyzing data. The findings of the study reveals that:

There is a positive relationship between government expenditure on education and real gross domestic product. There is also a positive relationship between government expenditure on health and real gross domestic product. While there is a positive relationship between gross capital formation and real gross domestic product.

The t-test showed that; government expenditure on education has a significant impact on real gross domestic product in Nigeria. Government expenditure on health has a significant impact on real gross domestic product in Nigeria; Gross capital formation also has a significant impact on real gross domestic product in Nigeria.

The f-test shows government expenditure on education, government expenditure on health and gross capital formation jointly have a significant impact on real gross domestic product in Nigeria at 5% level of significance.

The adjusted coefficient of determination (R^2) shows that 97.3% variations in real gross domestic product is being accounted for by government expenditure on education, government expenditure on health and gross capital formation. 97.3% shows a good fit for the model.
From the regression result, Durbin Watson (DW) value is 1.193457. This value is closer to zero than two and it indicates that there is perfect positive autocorrelation in the model. The variance inflation factors of the variables are less than 10 implying that, there is no multicollinearity among the explanatory variables. There is no heteroskedasticity in the model.

CONCLUSION

For the nation to be economically viable, the need to invest in human capital development in the areas of health, education, science and technology cannot be over-emphasized. Appropriate investment in education and health is fundamental to any meaningful economic development programme that must be pursued by any developing nation especially like ours. It takes into account all the opportunities, strategies and challenges that might face the process of human development. Nigeria can only reposition herself as a potent force through the quantity and quality of the produce from the primary,

secondary and tertiary school systems, and by making her manpower relevant in the highly competitive and globalized economy through a structured well-funded, appropriate, profitable investment in health and education in the right direction and strategies planning of her health and education institutions.

Recommendations

1. Adequate attention must be given to the equipping of our schools with modern research facilities and technological experimentation device and government should improve conditions of service for workers in the educational sector and more competent hands that will help improve productivity of the national economy at large needs to be engaged.
2. There is need for Nigerian policy makers to pay more attention to the health and education sector and increase yearly budgetary allocation to them. Nevertheless, the key to good results lies not in ordinarily increasing particular budgetary allocation but rather in implementing a public finance system that, to the extent possible, links specific expenditure and revenue decisions and ensure the usage of the allocated fund as transparently as possible.
3. Improve condition of service for workers in the educational sector engage more competent hands that will help improve productivity of the sector and the national economy at large.
4. Indeed, when a man is healthy and happy, he will be inspired from the inside to impart his world positively. There should be training and retaining of health workers so that they can be more efficient and more worker labour should be recruited into the health sector so as to bring growth not only in the sector but in the whole economy.
5. Government should strengthen its core functions by creating strong macro economic policies to checkmate corrupt top government officials and politicians against the embezzlement, or loot government fund in the name of providing infrastructural development, jumbo projects and white elephant projects that resulted in fund misappropriation which can not translate to economic development of Nigeria.

REFERENCES

Akpan, P. L. (2009). Public expenditure and poverty alleviation: Evidence from South Eastern States of Nigeria, 1990-2004 (Unpublished Ph.D dissertation). University of Port Harcourt, Nigeria.

Aminu U. (2011) "Human Capital: Education and Health in Economic Growth and Development of the Nigerian Economy" *British Journal of Economics, Finance and Management Sciences Vol. 2 (1)*

Anyanwu, J. C. and A. E. O. Erhijakpor, (2007). Education Expenditures and School Enrolment in Africa: Illustrations from Nigeria and Other SANE Countries. *Economic Research Working Paper, African Development Bank, Tunisia. Retrieved from http://www.afdb.org/.*

Babatunde, M. and R. Adefabi, (2005), "Long run Relationship between Education and Economic Growth in Nigeria: Evidence from the Johansen's Cointegration Approach", *Regional Conference on Education in West Africa, Ministry of Education, Dakar, Senegal*

Bakare, A. S. and E.D. Sanmi, (2011). The effect of health on economic growth: Theory and Evidence, *NBER Working Paper Series,No 8587; available on http://www.nber.org/papers/w8587.*

C.B.N (Central Bank of Nigeria), (2014) Annual report and statement of accounts for the year ended December 31st, Abuja: Nigeria, .

C.B.N (Central Bank of Nigeria), (2015) Statistical bulletin for the year ended December 31st, Abuja: Nigeria,

Chete, L. N. and B. W. Adeoye (2002). Human capital and economic growth: Selected papers for the 2002 Annual Conference of the Nigeria Economic Society (NES). Ibadan: Polygraphics Ventures Ltd.

Chete, L. N. and B. W. Adeoye (2002). Human capital and economic growth: Selected papers for the 2002 Annual Conference of the Nigeria Economic Society (NES). Ibadan: Polygraphics Ventures Ltd.

Chukwu C. The nationonlineng.net.

CSEA (2010). Public Spending on Education and Health in Nigeria: A Benefit Incidence Analysis. CSEA's 2nd economic policy and fiscal strategy seminar.

Erosa A (2010) *How Important Is Human Capital? A Quantitative Theory Assessment of World Income Inequality. Review of Economic Studies 77(4).*

Elechi E.U. and Emeh E. Onyinyechika (2018). Human capital investment as catalyst for sustainable economic environment in Nigeria. Copyright @ 2018 Academic staff union of Polytechnic (Asup) Captain Elechi Amadi Polytechnic ISBN: 978-978-498887-1-8 page 50-59.

Fadiya, B. B. (2010). Determinants of educational outcomes in Nigeria. *European Journal of Social Sciences*, 15(4),

Fadiya, B. B. (2010). Determinants of educational outcomes in Nigeria. *European Journal of Social Sciences*, 15(4),

Gbosi, N.A. and Omoke P. (2004). Inflation impact on the economic growth of Nigeria. Pack publishers.

Olayemi, S.O. (2012), "Human Capital Investment and Industrial Productivity in Nigeria", *International Journal of Humanities and Social Science, 2(16)*

Oluwatobi, S. O. and I.O. Ogunrinola, (2011). Government expenditure on human capital development: Implications for economic growth in Nigeria. *Journal of SustainableDevelopment*, 4(3).

Solow, R. M. (1956)"A Contribution to the Theory of Economic Growth". Quarterly Journal of Economics, Vol.70, No.1.

The Dakar summit on education for all (2000) *The Dakar Framework for Action. World Education Forum. Dakar Senegal*

Todaro M. P. and S. C. Smith(2003). *Economic Development* (Eighth Edition), India: Pearson Education (Singapore) Pte Ltd.

Todaro, M.P. and S.C. Smith (2009), Economic Development, Prentice Hall.

The Nation Newspaper, FG re-designing education curriculum-Osinbanjo, Agency Reporter. May 16, 2019.

Uwatt, B. U. (2002). Human development and economic growth in Nigeria (1960-2000): Selected papers for the 2002 Annual Conference of the Nigeria Economic Society (NES). Ibadan: Polygraphics Ventures Ltd.

UNECA (1990) *Economic Report On Africa 1990. UN Addis Ababa*

World Bank. (2004). Attaining the millennium development Unit, South Asia Region. *Washington D.C: World Bank,* 45-50.

World Health Oranization .(2009). WHO Country Cooperation Strategy: Nigeria 2008-2013. Brazzaville: *WHO Regional office for Africa*

Yesufu T. M (2000), *The Human Factor in National Development: Ibadan, Nigeria; Spectrum Book Limited*

APPENDIX 1

Data on Real Gross Domestic Product (RGDP), Government Expenditure on Education (GEE), Government Expenditure on Health (GEH) and Gross Capital Formation (GCF) in Nigeria from1986 to 2017.

YEAR	RGDP	GEE	GEH	GCF
1986	15,237.99	608.94	360.4	5471.8
1987	15,263.93	584.65	236.4	4181.9
1988	16,215.37	508.35	443.2	4368.4
1989	17,294.68	392.46	452.6	4455.7
1990	19,305.63	365.4	658.1	6177.8
1991	19,199.06	211.96	757	6154.3
1992	19,620.19	223.99	1025.4	5970
1993	19,927.99	114.26	2684.5	6924.9
1994	19,979.12	133.73	3027.8	6221.4
1995	20,353.20	223.77	5060.9	4591.7
1996	21,177.92	278.44	4851.5	5422.6
1997	21,789.10	285.48	29417	5901.9
1998	22,332.87	248.01	11984	5603.4
1999	22,449.41	310.11	16180	5439.4
2000	23,688.28	342.02	18182	6365.9
2001	25,267.54	340.36	44652	4984
2002	28,957.71	450.67	63171	5997.8
2003	31,709.45	509.97	39686	9005
2004	35,020.55	662.89	59787	6843.4
2005	37,474.95	840.49	26559	6127.6
2006	39,995.50	1196.7	44794	9766.7
2007	42,922.41	1314.1	12240	13842
2008	46,012.52	1639.7	32555	13742
2009	49,856.10	1316.8	11871	18520
2010	54,612.26	2969.8	70638	21352
2011	57,511.04	3304.6	73216	19591
2012	59,929.89	3729.3	77436	20091
2013	63,218.72	4186.3	81212	21671
2014	67,152.79	4669.4	84763	24578
2015	69,023.93	4951.2	85419	28130
2016	67,931.24	4977.5	86321	29012
2017	68,421.64	5012.8	86610	29654

Source: Central Bank of Nigeria (CBN) Statistical Bulletin (2015)

Logarithmic table

YEAR	RGDP	GEH	GEE	GCF
1986	9.6315467527645	625.887214525734	1836.41171974068	87838.607362908926828
1987	9.6332477492235	485.465525285531	9436.37101337586	3288.338520967698858
1988	9.69371489427829	6.0940211354330	746.23117018672117	8.382152088323574
1989	9.7581539841473	866.115008733199	4365.97243462120	11768.401939454385576
1990	9.8681522059493	616.489356895462	0745.90099264394	39068.728717500018287
1991	9.8626166151678	126.629363253437	4495.35639757762	45628.724906303475084
1992	9.8843144341812	946.9328380593496	5.41160140800137	58.694502206386649
1993	9.8998807180108	687.895249769862	644.738476553296	3178.842878890518061
1994	9.9024431793500	288.015591562177	7794.89582284188	47058.735750240792288
1995	9.92099353704514	8.5292996120779	475.41061873863	51828.432005604854785
1996	9.9607144515302	018.48704321446	53545.62920259	63004668.598330684209177
1997	9.98916502479485	10.289328017507	995.65417197410	28668.68302961195033
1998	10.013814724390	289.391327705757	5.513469067932	6948.631128835343728
1999	10.019019599718	059.691531190612	4845.73692707324	85028.601424039649498
2000	10.072735703898	989.808187372681	8045.83486921488	49078.758710899267513
2001	10.1372759269986	710.70665437813	4625.83000388098	13568.513988060467289
2002	10.2735917770214	611.05360061406	6646.11073536435	71518.699148014304866
2003	10.3643699402668	10.5887537596452	6.2343519004587	889.105535257610056
2004	10.4636902846579	110.99854352500	1466.49660906390	20048.831039963138625
2005	10.5314279662253	810.18712395227	9166.73398505509	794 8.720558435138541
2006	10.5965223404153	610.70982948086	2427.08732304757	94719.186733919300508
2007	10.6671492979655	9.4124645560663	167.18090729964	95939.535462727401809
2008	10.7366687104228	610.39068624567	0967.40226857725	58239.528212115591021
2009	10.8168961165371	69.38185373005	35347.18295982	99228059.82660650820017
2010	10.9080137551286	511.16532352230	6257.99624988	94619619.968900691084361
2011	10.9597322390462	211.20116925529	9428.10307071	62168919.882825556088033
2012	11.0009307087695	211.25720706772	3848.22397582	74657799.90802723257816
2013	11.0543557661729	11.3048182984821	38.3395725679	009269.983730240212331
2014	11.1147256878411	611.34761440580	9688.44878586	275133710.10960701284454
2015	11.1422085342281	411.35532383746	6718.50738525	042515310.2445919014839
2016	11.1262512361443	911.36582818466	5658.51268303	593835110.2754648164833
2017	11.1334444278438	611.36917056132	5098.51974992	019792710.29735230257797

APPENDIX 11

Dependent Variable: LOG(RGDP)
Method: Least Squares
Date: 07/03/18 Time: 15:46
Sample: 1986 2017
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GEH)	0.092402	0.010703	8.633239	0.0000
LOG(GEE)	0.111926	0.029919	3.740931	0.0008
LOG(GCF)	0.377129	0.056986	6.617888	0.0000
C	5.303048	0.332877	15.93094	0.0000

R-squared	0.975278	Mean dependent var	10.34806
Adjusted R-squared	0.972629	S.D. dependent var	0.518162
S.E. of regression	0.085726	Akaike info criterion	-1.958849
Sum squared resid	0.205771	Schwarz criterion	-1.775632
Log likelihood	35.34159	Hannan-Quinn criter.	-1.898118
F-statistic	368.1909	Durbin-Watson stat	1.193457
Prob(F-statistic)	0.000000		

Variance Inflation Factors
Date: 07/03/18 Time: 16:07
Sample: 1986 2017
Included observations: 32

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LOG(GEH)	0.000115	45.55565	1.855940
LOG(GEE)	0.000895	176.2836	5.238127
LOG(GCF)	0.003247	1181.598	5.960415
C	0.110807	482.4937	NA

Heteroskedasticity Test: White

F-statistic	1.520133	Prob. F(9,22)	0.2022
Obs*R-squared	12.26972	Prob. Chi-Square(9)	0.1985
Scaled explained SS	17.26472	Prob. Chi-Square(9)	0.0447

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/03/18 Time: 17:07
Sample: 1986 2017
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.652427	1.389039	0.469696	0.6432
LOG(GEH)^2	-0.000817	0.001515	-0.539394	0.5950
LOG(GEH)*LOG(GEE)	0.001128	0.004789	0.235481	0.8160
LOG(GEH)*LOG(GCF)	-0.017260	0.008974	-1.923234	0.0675
LOG(GEH)	0.157922	0.068391	2.309112	0.0307
LOG(GEE)^2	0.010855	0.007183	1.511271	0.1450
LOG(GEE)*LOG(GCF)	-0.033924	0.023769	-1.427238	0.1676
LOG(GEE)	0.177923	0.164259	1.083186	0.2905
LOG(GCF)^2	0.042915	0.030071	1.427135	0.1676
LOG(GCF)	-0.418604	0.398765	-1.049752	0.3052

R-squared	0.383429	Mean dependent var	0.006430
Adjusted R-squared	0.131195	S.D. dependent var	0.012526
S.E. of regression	0.011675	Akaike info criterion	-5.812417
Sum squared resid	0.002999	Schwarz criterion	-5.354375
Log likelihood	102.9987	Hannan-Quinn criter.	-5.660589
F-statistic	1.520133	Durbin-Watson stat	2.231608
Prob(F-statistic)	0.202151		