

GOVERNMENT FISCAL EXPENDITURE AND HUMAN CAPITAL
DEVELOPMENT IN NIGERIA**Musa Samuel Olayinka**

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Abstract

This study examined the effect of long run government expenditure on education in Nigeria aiming at attaining significant human resource development. Much have been expended to improve educational and health standard from 1981 to 2019, but it appears no noticeable results has been achieved. Statistical facts show that Nigeria is lagging behind in providing sound education and health for her citizens. The objective of the study is to find both the long run and short run effects of education and health expenditure on school enrolment in Nigeria. Enrolment rate is a key indicator in human capital development. We assume education and health expenditure can stimulate school enrolment. Estimation technique is based on the auto-regressive distributed lag model (ARDL) bound test approach to co-integration. To achieve robustness in the study, two distinct model estimates are made: the direct effect of expenditure on enrolment and also the direct effect when expenditure is expressed as percentage of national debt. Major findings indicate effect of government expenditure is indistinct when national debt is added in the model. Therefore, for debt financing of public expenditure to be significant, there must be sound prudential guidelines laid down to administer public spending and debt. It is recommended there should be optimal substitutability between debt-financing expenditure on human capital development and other sectors competing for government revenue. Education spending is significant and should be devoted to primary and secondary schools to secure a good foundation for the pupil advancing to tertiary institutions. This is imperative for the Nigerian level of economic development.

JEL Classification: E62, J24, P43, I38

Keywords: Human capital, Education, school enrolment, health expenditure, ARDL**1. Introduction**

The role of government in human capital development especially in a developing country is very vital. Most developing economies are faced with serious market failure which only the government can correct. Therefore, government intervention in the economy is necessary. In Nigeria for instance, government has made several efforts aiming at

correcting market deficiencies in order to attain economic growth and development. One of these is to formulate policy aiming at human capital development and in this respect, schools of various levels are created with public fund. As a result, huge public fund has been expended on education, health and human resource development. However, it appears this is either not enough, or the appropriate mechanism of distributing such fund is missing. Meaning that a lot are still being expected from the government even in today where government revenue is nosediving.

Apart from the government revenue mentioned above, on a general note, government also plays a very key role in the economic system. Economic resource management; revenue collection and distribution rest upon the government. Optimal distribution is imperative because over 75% of the resources are in control domain of the government (Ogbole, Amadi and Essi, 2011; Oluwatobi and Ogunrinola, 2011; Adedeji, Ajayi and Tizhe, 2019). Even though the government has been making frantic efforts to manage the economy since independence, yet there are still much to be done in human resource development.

It is true that conspicuous amount of debt has been incurred to provide aids for human resource development for growth purpose in Nigeria, but this only produces meagre outcome (Nnanna, Alade and Odoko, 2003; Dang, 2016). With respect to education and human resources, the objective of this study is to examine the effect of long run government human capital expenditure on school enrolment rate in Nigeria. Therefore, the relevant question is whether public expenditure on social infrastructures such as education and health, can promote growth and development and add value to human capital? There is no doubt quite a number of research have examined similar topics, (Dallis, Likita and Abekya, 2017; Okafor, Ogbonna and Okeke, 2017; Aliyu, Ndagwakwa, Zirra, and Salam, 2019; Ogbuagu and Ewubare, 2019), but they are not particular about long run observation of changes in the government spending on education and health. The national debt effect is also not considered. Often, as seen in many developing countries, national debt tends to hamper government spending on development. It is an innovative idea in this study to factor in national debt in the empirical analysis.

2. Stylized Facts about School Enrolment in Nigeria

Table 1.0: Change in Primary & Secondary School Enrolment in Nigeria.

	% Change	% Change	% Change	Public
	Primary	Secondary	Total	Health
	School	School	&	Expenditure
Year	Enrolment	Enrolment	Secondary	(% of DGP)
			School	
1981-1985	6.52	19.72	Enrolment	0.6
1986-1990	-0.96	-2.27		0.7

1991-1995	3.03	-0.43	2.41	0.7
1996-2000	4.29	6.53	4.59	0.9
2001-2005	2.94	9.35	4.17	1.2
2006-2010	-0.38	7.55	1.56	0.9
2011-2017	-0.29	0.72	0.01	1.0
<i>Source: World Development Indicators, UNDP, (2014) & WDI (2017)</i>				

From table 1.0, enrolment rate from 1986-2000 rose by an average of 100%. However, the figure declines gradually from 4.49% in year 2000 to 0.01% in year 2017. The decline is as a result of gradual decrease in enrolment rate and the negative changes that are recorded annually in both primary and secondary schools. The NBS (2011) records 4,754,457 enrolment rate in year 2006 and 7,103,598 in year 2010 which is an average growth rate of 10%. In other words, only about 10% of eligible school children are actually enrolled in either primary or secondary schools between year 2006 and 2010. This portends a bad image for education and a limiting factor to human capital development in Nigeria. Health is an input factor in education and human capital, from table 1.0, percentage of public health expenditure to gross domestic product (GDP) is 1% or less from 1981 to 2017. It appears Nigeria has never met the United Nations 5% budget recommendation for health since independence. In fact existing literature reveals that there has been increase in defense spending to the detriment of health and education.

Table 2.0: Selected Countries Government Expenditure on Education and Health as Percentage of GDP (1991-2017)

Countr y	1991- 1995	1996- 2000	2001 - 2005	201 0	2011	2012	2013	2014	201 7
Nigeria									
Educati on	0.4	0.6	0.7	0.5	0.9	0.9	0.9	0.7	0.6
Health	0.7	0.9	1.2	0.9	1.2	1.0	0.9	0.9	0.9
Ghana									
Educati on	Na	Na	7.4	5.5	8.1	7.9	6.0	6.0	6.5
Health	1.6	1.5	2.9	3.8	3.6	3.1	3.2	2.1	3.0
Niger									
Educati on	2.9	3.2	Na	3.7	4.2	4.3	4.9	6.8	4.8
Health	1.5	1.5	3.0	2.2	2.5	2.2	2.5	3.2	2.5
Kenya									

Educati on	Na	5.2	7.3	5.5	6.1	Na	na	5.0	6.2
Health	2.0	2.2	1.8	1.4	2.6	3.3	3.3	3.5	3.2
India									
Educati on	Na	4.3	3.1	3.3	3.7	3.8	3.9	3.9	Na
Health	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.4	1.3
Brazil									
Educati on	4.5	3.9	4.5	5.6	5.7	5.9	5.7	5.8	Na
Health	2.8	2.8	3.4	3.8	3.7	3.7	3.8	3.8	3.8
United Kingdom									
Educati on	4.8	4.3	5.2	5.9	5.8	Na	5.7	5.8	Na
Health	5.6	5.5	6.7	7.9	7.8	7.8	7.8	7.6	7.8

Source: UNDP Data Bank, (2017) & CBN Statistical Bulletin, (2017)

*na = Not available.

Table 2.0 shows selected countries government expenditure on education and health as percentage of gross domestic product (GDP). Nigeria is compared with less developed countries like Ghana and Niger, and also developing countries like Kenya and India as well as emerging economy like Brazil and a developed country like the United Kingdom. The table illustrates that between year 1991 and 2017, Nigerian government expenditure on education and health, expressed as percentage of GDP, ranges from 0.4% to 0.9%. In fact, the rate declines from 0.9% in 2012 to 0.6% in 2016. This means that for about 2 ½ decades, education and health expenditure fall below 1% point in Nigeria compared to a seemingly better scenario like Niger Republic which ranges from 2.9% to 6.8% and 1.5% to 3.2% for education and health respectively. Although, India also has low rate of spending on health but most selected developing countries as well as the advanced countries have higher rates of expenditure as percentage of GDP. Based on statistical fact from the table 2.0, one can conclude that Nigeria appears to be falling behind in education and health expenditures since 1991.

3. Relevant Literature and Theory

3.1 Conceptual Literature

The importance of government expenditure became significant in the 1930s when the market system failed the whole world economies. The market, as postulated by the classical economics, has in-built or automatic self-regulatory mechanism which stabilizes the economy whenever there is an equilibrium. However, this did not work in the 1930s great depression and there had to be a new way of addressing the then depressed economies. Keynes (1936) suggested an increase in government expenditure to boost the lackluster nature of these market economies. Although Keynes' theory worked till the 1950s, but since then there has been debate whether government fiscal policy really has

significant role to play in economic management. According to Okoye (2019) “governments have a primary responsibility to ensure that structures for contract enforcement, protection of lives and property, development of critical infrastructure and social amenities are in place for the economy to function”. Mitchell (2005) suggests that if these basic functions of government are not financed economic activity would be very low or non-existent. This is the reason for budgetary allocations to the government. The promoters of large government expenditure explain that increased government expenditure on public goods like education, healthcare and infrastructure are necessary essential for human capital development and higher level of productivity. They maintain that increase government spending boost aggregate expenditure and stimulate the economic growth. Oladeji and Adebayo (1996) agree that human resources is a fundamental variable in the growth and economic development of a nation.

In a developing country like Nigeria, government expenditure is essential to step-up economic growth and development. A lot of human and financial resources are required to develop the latent resources available in the country. It appears no private initiative would be enough to complement government effort. Therefore, adequate public expenditure is required to put the country on the path of growth and development. This brings us to the sources of government expenditure. There are different sources of government revenue to finance its expenditure. These ranges from tax, to levies, duties, public corporations and royalties. If the current governments rely too much on debt, particularly external debt, this might have unfavourable long run implication for the future generation.

3.2 Theoretical Literature

The basic theory for this study is the endogenous growth model and public expenditure theory. The submission of the traditional model of development is that economic growth is important and should precede economic development. However, while this model worked for most countries in Europe and America, it failed in many underdeveloped countries in South America, Sub-Saharan Africa and Asia. Nevertheless, since the early 1990s, some of the Asian countries and emerging economies have broken loose of the yoke. Today, it appears only sub-Saharan African countries remain in bondage of underdevelopment.

Proponents of the endogenous growth model provide a theoretical framework for analyzing persistent GNI growth that is determined by the system governing the production process rather than by forces outside that system (Todaro and Smith, 2010). Thus, models of endogenous growth suggest an active role of public policy in promoting economic development through direct and indirect investments in human capital. They also prescribe foreign private investment in knowledge-intensive industries such as computer software and telecommunication (Todaro, and Smith, 2010). The endogenous growth theory summarizes that as countries approach steady-state, convergence to equilibrium would diminish pace of growth unless there is technological change and government policies target at increasing in human capital, research and development and other knowledge base intensive training institutions, (Romer, 1986; 1990 & 2009; Aghion and Howitt, 1992; and Todaro, 2010).

Therefore, the growth of education and health sector in the developmental process of any economy cannot be over-emphasized because only seasoned educated and healthy people can produce optimally and contribute to national output, (Kareem, 2017). Education mainly is concerning with twofold objectives of building skills and providing productive employment for unutilized or under-employed manpower. In addition, health is a major input in education, conversely; education is required to develop seasoned health personnel. In addition, investing in education raises per capita gross national product (GNP), reduces poverty, expands knowledge and generates employment. Improvements in education, health and nutrition reinforce each other (Ekpo, 1987; Oluwatobi & Ogunrinola, 2011; Ogbuagu and Ewubare, 2019). Education also has effect on social equity and even distribution of wealth like the case of South East Asian countries (World Bank, 2010; Ahsan & Haque, 2015).

Another noticeable attribute of human capital is the tendency to grow cumulatively over a long period of time. In other words, human capital development possesses innate multiplier effects. On a general note, human capital development is essential for labour surplus economy. This human resource can be transformed into human capital with effective inputs of education, health and moral values. Therefore, human capital formation is achieved when these inputs are employed to transform raw human resources into productive human resources. It is the long run combination of these productive human resources and natural resources in optimal mix that can speed the pace of growth and development of a nation. Where there is human development, the qualitative and quantitative progress of the nation is inevitable (Abel and Deitz, 2012).

3.3 Empirical Literature

On a general note, recent literature prove that government expenditure has insignificant impact on economic growth in Nigeria. Most of the literature conclude that fiscal policy is partially effective on economic growth in Nigeria between the period of 1980 and 2018. Some of these literature include Aliyu, Ndagwakwa, Zirra, and Salam (2019), Ogar, Arikpo, and Suleiman (2019) and Musa, Ishaya, Aliyu and Mathew (2019). They suggest that government expenditure can only have significant effects if, and only if, they are expended on productive or real sectors. These literature question the effectiveness of Nigerian government expenditure. In the education and human resource development sector, public expenditure is seen as insignificant particularly since the mid-1970s. Adetula, Adesina, Owolabi, and Ojeka, (2017), and Omodero (2019), Ogbuagu and Ewubare (2019), Omodero and Nwangwa (2020) observe that fiscal spending on education continued to show downward trend and educational institution decay is noticeably felt. They suggest government should redirect expenditure to favour education sector and to enhance human resource development.

To emphasize education importance in human capital development, Krugman (1994) and Stiglitz (1996), observe that the Asian speedy economic growth is achieved through “cooperative development” and massive improvement in productivity which, in turn, are achieved through development in human capital.

In the notable conference of the Nigerian Economic Society (NES, 2002) where the theme was human capital development, diverse authors identified some of the issues underlying Nigeria’s poor human capital development. For instance, in the work of Ojo & Lawanson (2002) and Uwatt (2002), it was stated that human capital development can

be enhanced through education, but education has been dispensed with little alacrity. Obikaonu (2002) and Okafor et al., (2016) noted that government knows what to do regarding human resource development following the declaration to improve the human quality of life in 1999-2003 and what needed to be done is to switch into action and welcome inclusive growth. Olaniyi and Adam (2002) identified government had spent too much on debt services and defence, leaving social infrastructures within budget allocation.

Following statistical facts from the National Bureau of Statistics (NBS) and the World Bank, Nigerian government has not provided adequate social infrastructures to sustain economic growth. Year on year budget allocation to key social infrastructures like education and health has fallen below the United Nation's recommended value of at least 5% of annual budget. In addition, research findings show that government has executed unbalanced developmental strategy beyond its bound and has relatively spent less on education. This has been a constraining factor in the path to development, (Oluwatobi & Ogunrinola, 2011; Okafor et al., 2016; Kareem et al., 2017; Syed & Javed, 2017).

Ahsan and Haque, (2015) observed developed and developing countries government expenditure performance. They employed school enrolment rate as dependent variable and developed a dynamic panel model technique, it was found that the reason for the apparent irrelevance of human capital to generate growth in an economy lies with its level of development.

The diverse observations made by these authors provide the need to carry-out further research on government expenditure effects on education. In fact, with reference to the above premises, authors disagreed on adequate effect of government funding on education and health. This may be as a result of omitting debt burden effect on education expenditure. In the literature, most estimated time series variables are expressed as percentage of GDP. What appears left undone is the consideration for implicit debt burden effects. In developing countries, government engages in series of debt profile to sustain social infrastructural spending as well as defence and services. In addition, no well-known work has done this for Nigeria for over three decades. It is therefore thought relevant to compare the effect of government expenditure on human capital, (taking primary and secondary school enrolment as proxy for human capital) with national debt factor.

Some further observation made are that in Nigeria, statistical facts have proved developmental effects of government fiscal policy is far from being realized in spite of yearly deficit spending. However, unlike classical economics, it does not necessarily mean government fiscal impact is totally void. Looking elsewhere, in the "East Asian Miracles", governments explicitly in one end or implicitly in another end, have played major role in economic development (Krugman, 1994; Stiglitz, 1996). In fact, it is the "combination of ingredients, many of which involved government interventions acting together, that account for East Asia's success" (Stiglitz, 1996). This means that most developing countries like Nigeria may possess developmental potentials; and if individual independent government has high proclivity to wielding appropriate fiscal and political instruments, there probably would be substantial changes. Therefore, this study examines the role of government impact in human capital development in Nigeria. Particularly; it examines the relationship existing between government expenditure and school enrolment for over three and a half decades. The study analysis begins with descriptive

statistics. It also includes simple empirical methodology to substantiate the research findings.

4. Research Methodology

4.1 Theoretical Framework

The theoretical framework is equivalent to Musgrave and Wagner's ideologies concerning the relevance of human capital and government expenditure to economic prosperity. A simple utility function, like the type developed by Fosu (2001) and Adebisi (2002) is adapted for this study. The government attempts to maximize its objective function, that is, social welfare, subject to expenditure on two commodities: education (E) and health (H). It is assumed that both commodities have positive marginal utility functions. If the purchasing power (or expenditure) of government is a given amount (G), representing budget, we are then faced with maximizing a smooth utility index function:

$$U = U(E, H) \dots \dots \dots \text{where } U_e, U_h > 0. \quad (1)$$

Subject to (the budget constraint)

$$ES_e + HS_h = G \quad (2)$$

Where ES_e denotes government expenditure on education and HS_h expenditure on health. (G) represents government revenue which may be defined as:

$$G = A + B + C - D \quad (3)$$

A is the tax revenue, B , domestic non-tax revenue, C , foreign aid and D , debt services. Equating equation (2) with equation (3) gives:

The first order condition can be stated as:

$$U_e = U_h \text{ and;} \quad (4)$$

where U_e and U_h are the marginal utilities of expenditures on education and health respectively

$$ES_e + HS_h = G = A + B + C - D \quad (5)$$

Where ES_e is government expenditure on education and ES_h is government expenditure on health. The objective is to explore a change that will occur in E and H following a change in G . If we assume both E & H are normal goods, then we can state that $\partial E / \partial G > 0$; $\partial H / \partial G > 0$, that is expectation is that the partial effect of government expenditure on education and health respectively is positive. Furthermore, if it is assumed government spends all its revenue (G) on education and health, then, government utility is maximized having partially differentiated equation (4) and (5) and obtaining the optimal function in equation (6) below:

$$\frac{U_e}{U_h} = \frac{S_e}{S_h} \quad (6)$$

It should be noted that equation (6) can also be related with indifference curve function where it can be theorized that government try to expend its income on education and health. Assuming the social welfare function has the common properties of quasi concavity, then the second order condition of equation 4 and 5 are satisfied as:

$$U_{ee} < 0; U_{hh} < 0, \quad (7)$$

where U_{ee} and U_{hh} are second order partial utilities.

4.2 Model Specification

A dynamic linear equation model is developed in this study following (Oluwatobi & Ogunrinola, 2011; Okafor et al., 2016; Kareem et al., 2017). First, school enrolment rate is expressed as a function of government expenditure on education and health. This is because expenditure on education and health is assumed to be inputs in education and enhances school enrolment. Moreover, government capital expenditure can partially affect education by creating enabling environment for schooling. School enrolment includes primary and secondary school enrolment only. Enrolment in tertiary education is excluded owing to unreliable and insufficient data.

Since education is the basis of human resource development, we can assume that expenditure on education and health as well as economic capital goods are inputs in education. By a simple augmentation to equation (5), this relationship can be re-stated linearly in equation (8) below:

$$EDUC = f(GEXP) \quad (8)$$

Where EDUC represents education and GEXP, a vector of government expenditure which include government expenditure on education ($GEXPE$), government expenditure on health ($GEXPH$) and government capital expenditure ($GCAPE$). Assuming $SCHENR$ denotes school enrolment and also replaces education, in equation (8), then, we can express school enrolment in terms of vector of government expenditure in equation (9):

$$SCHENR = f(GEXPE, GEXPH, GCAPE) \quad (9)$$

We can also express $SCHENR$ in terms of vector of $GEXP$ where by each independent variable is expressed as a percentage of total national debt. This allows incorporating national debt effect of education and health expenditure. This is stated in equation (10):

$$SCHENR = f(GEXPETD, GEXPHTD, GCAPETD) \quad (10)$$

Where:

$GEXPE$ = Government expenditure on education

$GEXPH$ = Government expenditure on health sector

$GCAPE$ = Government capital expenditure

As defined by the National Policy on Education (NPE 2014), primary education is the education given in institutions for children aged 6 to 11 years plus, while the secondary education is the education children received after primary education and before the tertiary stage. Both the primary and secondary education as well as good health are key to success of a developing country. The relationship between government expenditure on education and school enrolment is expected to be positive. Likewise, a positive

relationship is expected between health expenditure and school enrolment. Therefore, it is assumed that as government increases expenditure on education and health, there would be improvement in human resource development indicated by the trend in school enrolment rate. Capital expenditure represents expenditure on administration, economic services, social and community services and transfers (CBN, 2017). It is assumed that Nigerian government expenditure affect total economic activities and consequently a determining factor propelling school enrolment and expected to have positive effect.

4.2.1 Estimation Technique

The technique is drawn from the auto-regressive distributed lag (ARDL) bound test approach to co-integration developed by Pesaran and Pesaran (1997); Pesaran and Shin (1999); Pesaran et al., (2001). Some of the advantages associated with ARDL are that it can be applied regardless of the stationary properties of the variables in the model. This method is suitable for examining the short run and long run effects of relationships between two or more variables. The approach allows the examination of the impact of lagged value of the exogenous variables on the endogenous variables thereby opens way for dynamic analysis. ARDL provides very valuable means for testing for the presence of long-run relationships between economic time-series. It allows co-integration test, and estimates short-run and long run dynamics even when the variables in question may comprise a mixture of both stationary and non-stationary time series, (Giles, 2013).

Additionally, a dynamic Error Correction Model (ECM) can be obtained from ARDL via a simple linear transformation (Banejee et al., 1993), which permits implications on long-run estimates, which may be impossible in alternative co-integration method, (Sezgin, 1997; Sezgin and Yildirim, 2002). “ARDL method has additional advantage of yielding consistent estimates of the long-run parameters that are asymptotically normal irrespective of whether the variables are $I(0)$, $I(1)$ or mutually integrated since there is no need for unit root pretesting”, (Majeed et al., 2010), but it is still important to complement the estimation process with unit root test in order to ensure that none of the variables are integrated of order greater than $I(1)$. More to the explanation is that appropriate lags in the ARDL are adjusted for both residual correlation and endogeneity unlike single equation co-integration analysis such as Engle and Granger (1987). Pesaran and Shin, (1999) states that endogeneity is less of a problem so far the ARDL model is free of residual correlation.

Equation (11) and (12) are auto regressive distributed lag (ARDL) variant of equation (9) and (10):

$$\Delta SCHENR_t = \delta_0 + \sum_{i=1}^r \delta_1 \Delta SCHENR_{t-i} + \sum_{i=1}^r \delta_1 \Delta GEXPE_{t-i} + \sum_{i=0}^r \delta_2 \Delta GEXPH_{t-i} + \quad (11)$$

$$\sum_{i=0}^r \delta_3 \Delta GCAPE_{t-i} + \phi_1 SCHENR_{t-1} + \phi_2 GEXPE_{t-1} + \phi_2 GEXPH_{t-1} + \phi_3 GCAPE_{t-1} + \mu_t$$

$$\Delta SCHENR_t = \delta_0 + \sum_{i=1}^r \delta_1 \Delta SCHENR_{t-i} + \sum_{i=1}^r \delta_1 \Delta GEXPETD_{t-i} + \sum_{i=0}^r \delta_2 \Delta GEXPHTD_{t-i} + \quad (12)$$

$$\sum_{i=0}^r \delta_3 \Delta GCAPETD_{t-i} + \phi_1 SCHENR_{t-1} + \phi_2 GEXPETD_{t-1} + \phi_2 GEXPHTD_{t-1} + \phi_3 GCAPETD_{t-1} + \mu_t$$

Where Δ represents, ∂ and ϕ represent coefficients due for estimation, μ , the error term. Both the short run and long run model of equation 11 are stated in equation 13 and 14:

4.2.1.1 Short Run Effect of Government Expenditure on School Enrolment in Nigeria.

$$\Delta SCENR_t = \delta_0 x + \sum_{i=0}^r \delta_1 \Delta SCENR_{t-i} + \sum_{i=0}^r \delta_2 \Delta GEXPE_{t-i} + \sum_{i=0}^r \delta_3 \Delta GEXPH_{t-i} + \sum_{i=0}^r \delta_4 \Delta GCAPE_{t-i} + ECt_{t-i} \quad (13)$$

Where ECt_{t-1} is the error correction term. The Long run model is presented below:

4.2.1.2 Long Run Effect of Government Expenditure on School Enrolment in Nigeria.

$$SCENR_t = \delta_0 x + \phi_1 SCENR_{t-1} + \phi_2 GEXPE_{t-1} + \phi_3 GEXPH_{t-1} + \phi_4 GCAPE + \mu_t \quad (14)$$

The disaggregation of equation (12) into short run and long run gives the effect of government expenditure on education (school enrolment) having put total national debt into consideration.

4.2.1.3 Short Run Effect of Government Expenditure on School Enrolment Incorporating Nigerian National Debt

$$\Delta SCENR_t = \delta_0 x + \sum_{i=0}^r \delta_1 \Delta SCENRTD_{t-i} + \sum_{i=0}^r \delta_2 \Delta GEXPETD_{t-i} + \sum_{i=0}^r \delta_3 \Delta GEXPHTD_{t-i} + \sum_{i=0}^r \delta_4 \Delta GCAPETD_{t-i} + ECt_{t-i} \quad (15)$$

The “TD” affix to each independent variable signifies variable is expressed as percentage of total national debt (TD). The Long run model is presented as follow:

4.2.1.4 Long Run Effect of Government Expenditure on School Enrolment in Nigeria (with Implicit National Debt Effect)

$$SCENR_t = \delta_0 x + \phi_1 SCENRTD_{t-1} + \phi_2 GEXPETD_{t-1} + \phi_3 GEXPHTD_{t-1} + \phi_4 GCAPETD + \mu_t \quad (16)$$

Data employed for table 1.0 and 2.0 are sourced from the United Nations Development Programme (UNDP Data Bank, 2019) and World Development Indicators, (WDI, 2019). For the empirical analysis, data are sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin (2019). Since they are times series secondary data, and are often associated with structural breaks, it is necessary to examine whether they have unit root.

This is examined in the next section and we then proceed to the bound test approach to co-integration.

5. Presentation of Regression Results

5.1 Unit Root Test

Table 3.0: Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) Unit Root Tests

VARIABLES	ADF	ADF	Order of	PP	PP	Order of
	Level	1st-Difference	Integration	Level	1st-Difference	Integration
SCHENR	-3.964	-7.378	I(0)	-3.716	-8.762	I(0)
GEXPE	0.104	-5.380	I(1)	0.181	-5.346	I(1)
GEXPH	-0.091	-6.413	I(1)	0.288	-7.217	I(1)
GCAPE	-0.943	-8.030	I(1)	-0.830	-8.030	I(1)

Source: Author's Computation

Table 3.0 above shows the level and first difference of the unit root test of each variable used for regression analysis. All the time series variables have unit root except school enrolment which is stationary at level indicating a smooth and consistent school enrolment in Nigeria over time. It is an indication of improvement in Nigerian educational system since 1981. On the other hand, all other variables have structural breaks but are stationary at first difference. In other words, and probably due to the huge national debt effect, there has not been smooth government expenditure on education and health particularly the capital expenditure to sustain the two social goods.

Moreover, the combination of both order of integrations, I(0) and I(1) in table 3.0 forms the basis for proceeding to the bound test approach to co-integration.

5.2 Co-integration Test

Table 3.1: Lag Length Selection and Bound Testing for Co-integration, Equation (11)

Maximum Lag	SIC	AIC	PESARAN TABLE		Wald Statistic Critical Value
			Lower Bound	Upper Bound	
1	2.9519*	3.3601	2.56	3.49	3.5558*
2	2.6189	3.2144	2.56	3.49	2.1783

Source: Author's computation

Table 3.2: Lag Length Selection and Bound Testing for Co-integration, Equation (12)

Maximum Lag	SIC	AIC	PESARAN TABLE		Wald Statistic Critical Value
			Lower Bound	Upper Bound	

1	6.5454	6.1372	2.56	3.49	2.7774
2	6.8190	6.2693	2.56	3.49	2.8168
3	6.9776	*6.1912	2.56	3.49	4.0657*

Source: Author's computation

In this section, model (11) is estimated to check for bound test relationship between education & health expenditures and school enrolment rate in Nigeria. It is assumed variables are integrated of order I (0) and I(1) unlike Johansen co-integration test which requires uniform order of integration (Karantininis et al., 2011).

Table 3.1 shows bound testing results when independent variables have no link with national debt while in table 3.2, independent variables are expressed as percentage of total national debt. In both cases, bound relationship is established between government capital expenditure, education/health expenditure and school enrolment rate in Nigeria. The bound relationship is proved by Wald statistic value (3.5558) in equation (11) and (4.0657) in equation (12) respectively which are both greater than the upper critical values in the Pasaran table at 5% significant level. In other words, these variables may be a determining factor in primary and secondary school enrolment in Nigeria. Estimation of the short run error correction and long run model are presented in table 5.0 and 6.0

5.3 Short Run Regression Result

Table 5.0: Short Run and Long Run Effects of Government Expenditure on School Enrolment in Nigeria

Regressors	Sort Run Model, eq. (13)		Sort Run Model, eq. (14)	
	Dependent Variable = SCHENR Coefficients	T-Statistic	Dependent Variable = SCHENR Coefficients	T-Statistic
SCHENR (-1)	0.5495 (0.1806)	3.0412**	0.4696*** (0.1406)	3.3394
GEXPE (-1)	0.0035 (0.0370)	0.0948	-0.0601* (0.0274)	-2.1874
GEXPE (-2)	-0.0340 (0.0249)	-1.3655	-	-
GEXPH (-1)	-0.0374 (0.0495)	-0.7557	0.0847** (0.0312)	2.7150
GCAPE (-1)	-0.0186 (0.0268)	-0.6947	0.0620** (0.0272)	2.2811
GCAPE (-2)	-0.0327 (0.0290)	-1.1262	-	-
ECt (-1)	-0.6475 (0.2163)	-2.9933***	-	-

Goodness of Fit, Residuals and Stability Diagnostics Tests				
R ²	0.5271 or 53%		R ²	0.9788 or 98%
F-statistics	2.7246 [0.0265]		F-statistics	171.69 (0.000)
χ^2 Serial corr. (LM Test)	0.3424 (0.7139)		χ^2 Serial corr. (LM Test)	0.2629 (0.7717)
χ^2 White Heteroscedasticity	0.4961 (0.8464)		χ^2 White Heteroscedasticity	1.088 (0.3991)

***, **, * = Significant at 1%, 5% and 10% level; () Standard error; [] Probability F-Statistic

The error correction term (0.6475) in table 5.0 is significant at 10%, and shows relatively high speed of convergence to long run equilibrium. In the short run, although, expenditure on education directly affects school enrolment but the variable is not significant. In the short run, health expenditure is negatively related with school enrolment. That is a good health system that can add to the citizens’ wellbeing might not induce school enrolment. If health spending is not significant, it may be as a result of mismanagement. The relationship between capital expenditure and school enrolment in the short run is negative. However, in the long run, capital expenditure can induce school enrolment. That is if education facilities are provided, it will encourage more pupils to enroll in schools. Therefore, an increase in capital expenditure over a long time will increase the pace of human capital development in Nigeria.

In the long run, government health expenditure is significant and positively related with school enrolment. This means that cumulative health spending can contribute significantly to human capital development. Also, school enrolment in the previous year will significantly induce enrolment in the present year. Long run education expenditure has negative a sign showing an inverse relationship with school enrolment. This may be the result of none commensurate education spending. In Nigeria, government education expenditure is too low relative to other countries. This has been emphasized in previous empirical studies that education expenditure is not significant in human capital development in Nigeria.

5.4 Long Run Regression Result

Table 6.0: Short Run and Long Run Effects of Government Expenditure on School Enrolment in Nigeria, (Expressed as a % of debt)

Regressors	Sort Run Model, eq. (15)		Long Run Model eq. (16)	
	Dependent Variable = SCHENR Coefficients	T-Statistic	Dependent Variable = SCHENR Coefficients	T-Statistic

SCHENR (-1)	0.3410 (0.3459)	0.9856	0.1878 (0.1687)	1.1128
GEXPETD (-1)	-2.2903 (2.5907)	-0.8840	0.1991 (2.3712)	0.0840
GEXPETD (-2)	-0.9972 (2.7332)	-0.3648	-	-
GEXPHTD (-1)	1.9062 (5.0779)	0.3753	-1.3488 (4.1032)	-0.3287
GEXPHTD (-2)	2.8162 (4.7640)	0.5911	-	-
GCAPETD (-1)	0.1885 (0.2734)	0.6694	0.4231*** (0.1496)	2.8265
GCAPETD (-2)	-0.0803 (0.2599)	-0.3089	-	-
ECtTD (-1)	-1.0359 (0.3829)	-2.7050***	-	-
Goodness of Fit, Residuals and Stability Diagnostics Tests				
Short Run		-	Long Run	
R ²	0.5586 (56%)	-	R ²	0.4270 (43%)
F-statistics	2.1554 [0.0634]	-	F-statistics	2.7689 (0.0272)
χ^2 Serial corr. (LM Test)	0.0787 (0.9247)	-	χ^2 Serial corr. (LM Test)	0.6292 (0.5415)
χ^2 White Heteroscedasticity	0.5834 (0.8353)	-	χ^2 White Heteroscedasticity	1.0942 (0.3955)

***, **, * = Significant at 1%, 5% and 10% level; () Standard error; []

Probability F-Statistic

In table 6.0, the study factors in national debt, expressing expenditure on health and education as percentage of national debt and then verifies the effect on school enrolment rate in Nigeria. In both the long and short run, education and health expenditure are not significant having factor-in national debt effect. Also, there is a significant and high speed of adjustment to long run equilibrium. Debt financing capital expenditure is significant and linearly related with school enrolment. This means if government borrows more fund to finance education fixed capital, it may raise school enrolment and induce human capital development.

5.5 Sensitivity Analysis

The diagnostic tests of the residual show that the model passed heteroscedasticity and serial correlation tests. The normality test shows the variables are normally distributed. The overall model displays goodness of fit and significant at 1%. This is explained by the f-statistic value of (2.7689). However, the long run co-efficient of determination (0.4270) is weak. Probably some variables are omitted. Model re-specification may be required in further relevant studies. The overall summary shows asymmetric effect of government expenditure on school enrolment rate. The asymmetrical effect is achieved by viewing the effect, with and without, the national debt.

Figure 1.0: CUSUM and CUSUM of Squares Tests

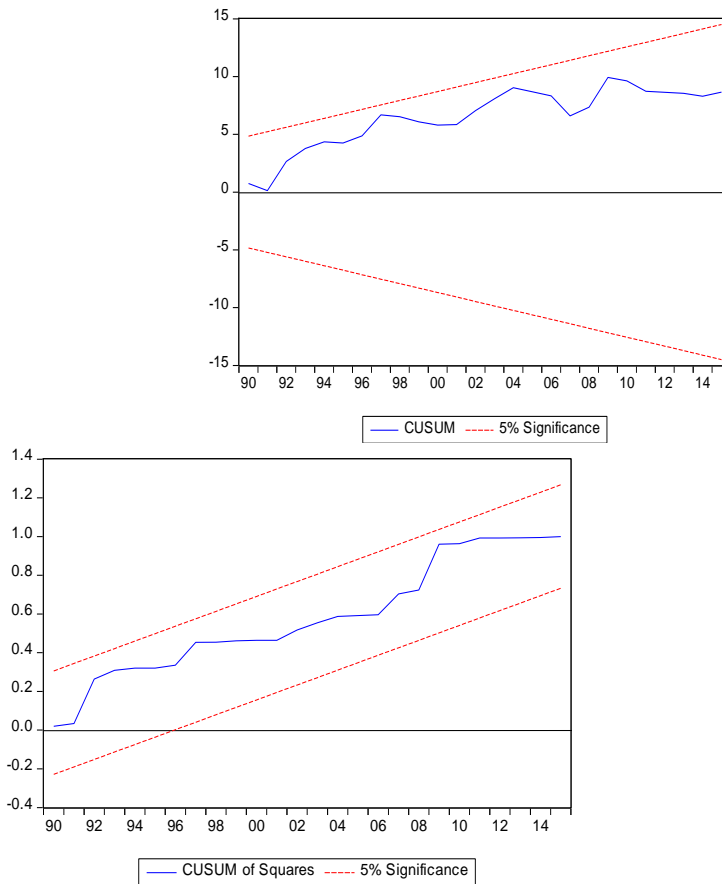


Figure 1.0 reveals evidence of stability within the period under review. There is stability as the blue line in each of the figures falls within the two red lines. Therefore, from figure 1.0, stability is established within the year under review. We can be satisfied that the model is reliable for policy analysis.

6. Conclusions and Policy Recommendations

This study centres on the empirical analysis of the effect of government expenditure on education and health. The main objective is to investigate the significance of public expenditure on education and health in Nigeria having included national debt effect. There have been plethora of literature on the impact of government expenditure on human capital development in Nigeria, but it appears none of these involved debt effect in their analysis. Findings of most literature show negative effect of government spending on human capital development, especially on education and health. However, most authors do not differentiate between debt effect and direct spending effect. The questions is what are the long run and short run effects of education and capital expenditures on

human capital development? For the empirical analysis, this study employed ARDL bound test approach.

Major findings indicate government expenditure on human capital development is significant, but, it is not significant in the long run when effect of debt is incorporated in the model. This established debt as a limiting factor with long run negative effect, restraining economic growth that would have been achieved via government expenditure. For debt financing of public expenditure to be positive and significant in development, and as recommended by previous authors, there must be sound prudential guidelines laid down to administer public spending. This study recommend that government should maintain optimal substitutability between debt-financing expenditure on human capital development and other non-educational and health sectors competing for government financial resources. The policy of substitutability between defence, health and education expenditure should be exercised with caution. Since the expenditure on social infrastructure is significant, it is suggested that much of education spending should be devoted to primary health and basic education such as primary and secondary schools. This will secure a good foundation for the pupil advancing to tertiary institutions.

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