

Government Educational Expenditure and Human Capital Development in West African Countries

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Abstract:-The current study focused on the impact of government education - social expenditure (expenditure on education and health) on human capital development in West African countries. The research was conducted with variables from 13 countries in the region, which comprises of Nigeria, Ghana, Togo, Senegal, Niger, Mali, Liberia, Gambia, Guinea, Cote D'Ivoire, Burkina Faso, Guinea-Bissau and Sierra Leone; with variables from 1985 – 2016. The result obtained shows that increase government education and health expenditure have positive and significant impact on primary and secondary school enrolment. The Granger causality result also shows that there is bidirectional causality between government health expenditure and primary as well as secondary school enrolment. The result also shows that there is bidirectional causality between government educational expenditure and secondary school enrolment. The implication of this is that government of these countries must take adequate measures to ensure proper allocations and utilization of funds to these sectors in order to achieve a meaningful human capital development.

Key words: Government education expenditure, Health expenditure, Primary and Secondary school enrolment

Jel classification: H51, H52, J24

I. INTRODUCTION

Education, especially in the less developed countries (LDCs) had been argued to be a major factor in poverty reduction; and government expenditure on the educational sector as the catalyst in achieving equity and promoting economic growth and development (Barro, 1991; Hanushek, 1996; Schultz, 1995; Jung and Thorbecke, 2003). Mincer (1993) also emphasized that higher education attainment promotes high income earnings and increase job securities of workers. Education assumes to be one of the basic primary needs of every society and has been viewed as a crucial part for socio-economic development, since it supplies trained man power and form the basis for the attainment of other development goals (Akwe, 2014). According to Sen (1999), education is desired by both individuals and the society at large and education tends to have positive externality as individuals benefited directly from acquiring education – in form of increase in skills and productivity of the individual – and indirectly benefits the society in form of knowledge transfer (Enueme, 1999). Hence, the impact of educational development in societal building cannot be overemphasized.

Educational development been considered as the panacea for economic development has made most countries of the world

to devote a large share of their country's resources to the sector as education is believed to be the tool through which an individual developed the needed skills for better life and the achievement of life's goal (Kambhampati and Rajan, 2006; Olaniyan and Okemakinde, 2008). The strength of human capital development of any country has also been seen as a function of the development of the educational system in the country (Bowles and Gintis, 2011). Hence, many countries of the world had taken drastic efforts in promoting reforms that will boost the performance of their educational system (World Health Organization (WHO), 2000). Though some countries have actually achieve some tremendous increase in the stock of human capital development – through education – while some are yet to achieve their goals.

West African and other African countries are not left out of this, as many countries in this region have undertaken measures to boost the performance of their educational system (Gupta and Verhoeven, 2001; Dye et al., 1999). These countries had engaged in the formulation and implementation of several policies geared towards the improvement in their education system. Educational reforms like other economic reforms have a unique target, but most education reforms in West African countries are ignited by problems that cannot be ignored – policies are sometime made in response to the identified problems and not likely made in prospect of future needs.

The integral part of every reform is finance (Cerych and Sabatier, 1986 and United Nations Development Programme (UNDP), 2007). The availability of finance can lead to the successful implementations of project while its absence can thwart a project. For instance, the televised methods of teaching introduced by the government of Cote d'Ivoire in 1970's fail because of lack of funds (Yew-Wong, 2005; Sany, 2010).

The pursuits of the benefits of education in West African countries had led most of these countries to increase their expenditure on the educational sector (Bryceson, 2002). For instance, in Nigeria, government educational expenditure in 1980 was ₦2 billion, which was the highest educational expenditure in Africa (World Bank, 2003). During this period, government educational expenditure represents 22.3 percent of total government expenditure. This value increased to ₦3 billion in 1981 which represents 23.8 percent of the total government expenditure. Thereafter, government expenditure on this sector witnessed a drastic fall as the value dropped

from ₦3 billion in 1981 to ₦162 million in 1983 and further to ₦156 million in 1985. Though the sector has experienced an increase in 1988 through 1990's and much effort had been made to increase this sector as the budgetary allocation to this sector in 2000 was ₦58 billion and increased to ₦171 billion and ₦394 billion in 2010 and 2017 respectively (World Bank, 2017). Undoubtedly, Nigerian government had increased their educational expenditure significantly over the years

Other West African countries also have a high percentage of government expenditure on the educational sector. For instance, Ghanaian government education expenditure as a percentage of total government expenditure in 1980 was 7.64. This percentage rose to 23.93 in 1990, which is the highest percentage attained so far in Ghana. As of 2000 and 2010, education expenditure as a percentage of total government expenditure stood at 15.74 and 20.94. While in 2015 and 2017, the percentage increased significantly to 21.02 and 22.56 respectively. Other West African countries such as Senegal and Cote d'Ivoire have their own share of government spending on education as a percentage of total government expenditure in 1980 as 18.74 and 19.22 respectively. These percentages dropped to 16.25 and 18.81 in 1990. Thereafter, the percentages increased from 16.25 and 18.81 in 1990 to 24.05 and 21.17 in 2000 and further increased to 24.05 and 22.77 in 2010. In 2015, government expenditure on education as a percentage of total government expenditure in these two countries was 25.27 and 21.17, while in 2017, the figure stood at 23.76 and 22.12 respectively. These percentages show that government expenditure on educational sector in West Africa has increased over the year (World Bank, 2017).

The United Nation's (UN) also understood the impact of human capital development in promoting a healthy economy, framed a road map through which underdeveloped economy can achieve a meaningful economic growth and development. The goals of this policy focused on two basic aspects of human capital development which are education and health. The policy is basically known as the Millennium Development Goals (MDGs) in which 189 countries of the world subscribed into, including the West African countries (Woolcock and Narayan, 2000; Noe, Hollenbeck, Gerhart and Wright, 2006; Hanushek, 2013). The millennium development goals which was stated to be achieved by 2015 had its targets which includes to eradicate extreme poverty and hunger, promote universal basic education, promote gender equality and women empowerment, reduce child mortality, improve maternal health, combat HIV/AIDs, malaria and other forms of diseases, secure environmental sustainability and to develop a global partnership for development (World Health Organization (WHO), 2005).

The commitments made by these countries to pursue the MDG's have actually led to the increase in government expenditure over the years and this has increased human capital development in these countries over the years (Clemens, Kenny and Moss, 2007; Frenk et al., 2010). The

increases in government educational expenditure have been proved to be the major reason for the recent increase in educational participation in most LDCs (Temple, 2010). For instance, as of 1999, primary school enrolment rate was 63.5 percent. After the introduction of the MDGs in 2000, primary school enrolment increased to 67.4 percent. In 2005 and 2010, this percentage had increased to 68.2 and 69.5 percent respectively. In 2017, primary school enrolment experienced an increase to 74.3 percent. Secondary school enrolment on the other hand has also experienced some significant increase in Nigeria. In 1980, total secondary enrolment rate was 32.79. This value increased to 33.2 percent in 1990 and further to 36.39 in 2000. Following the MDGs project, secondary school enrolment rate increased to 60.77 in 2010 and further increased to 63.66 percent in 2017 (World Bank, 2017).

Ghana on the other hand had its primary school enrolment rate in 1980 as 86.4 percent. This value increased to 87.8 and 93.3 percent in 1990 and 2000 respectively. The MDGs can also be said to have improved primary school enrolment as this percentage increased to 95.4 and 98.4 percent in 2010 and 2017 respectively. Secondary school enrolment in Ghana in 1980, 1990, 2010 and 2017 are given as 83.5, 92.3, 85.3, 94.7 and 90.4 percent (World Bank, 2017).

Other West African countries also had an increase in school enrolment rate over the years. Senegal and Cote d'Ivoire for instance have experienced such an increase both in primary and secondary school enrolment rate. Senegal secondary school enrolment in 2000, 2010 and 2017 is given as 48.46, 87.65 and 84.72. While that of Cote d'Ivoire was 61.5, 70.3 and 91.9 percent respectively. Hence, investment in education is essential in promoting human capital development and hence economic productivity (Okeke, 2014).

To crown it all, Nelson Mandela observed that education remains the most sophisticated tool to transform the world, as quoted by Ola (1998) "if you see any economy that is not performing well, discover what is spent on education." The author emphasized the relationship between economic development and education spending and so revealed that low government education spending brings about low economic performance. Hence, this research deems it fit to examine the impact of government educational expenditure on primary school enrolment, secondary school enrolment and to observe the causality between government education expenditure and education outcome in West Africa.

II. LITERATURE REVIEW

Conceptual Literature

Concept of Government Expenditure

Government expenditure refers to the allocated resources handled by the government for its own interest and the nation at large. It can also be referred to as government spending. The resources are distributed in such a way that it reaches the various sectors of the economy like the education sector, health sector, agricultural sector etc. Government expenditure,

also known as government or public spending is usually classified into capital and recurrent expenditure (CBN, 2003). Public spending is more efficient in production of services. Capital spending has been defined as the payment for non financial assets employed in a production process that exceeds period of one year while recurrent spending refers expenditure on non repayable arrangements in a period of one year. This consists of payments of wages, salaries and supplements, buying of goods and services etc (CBN, 2003).

According to Edame and Eturoma (2014), government spending is affected by speed growth of the populace, changes in a country's demography, people's taste, rise in technological demand for industrialization, increase in urbanization, increase in currency depreciation overtime etc. On the other hand, education outcomes refers to the objectives of learning upon which higher education programs are built. Government spending can also be defined simply as the knowledge, skills, attitudes, and values that tertiary students will need to achieve success in their various working places, families and communities (Palomba and Banta, 1999).

Concept of Education Outcome or Human capital development

Education outcomes also includes those things that students should know, comprehend and be able to carry out to be an educated person and to meet up with the future demands and the demands of the modern world (Palomba and Banta, 1999). It can also be referred to as general education abilities, education goals, competencies, core abilities, core competencies, essential learning outcomes, learning goals, learning objectives, college-wide outcomes, principles of undergraduate learning, and transferable skills of liberal learning etc (Palomba and Banta, 1999).

Theoretical issues

Musgrave and Rostow theory of public expenditure

Musgrave, the economist and Rostow, the economic historian suggested development model which shows that pattern of economic growth might have a relationship with the growth of public spending. They argue that public spending forms the basis for economic growth and thus, explains how economic transition from traditional economy to an industrialized economy. They assume that a state passes through developmental stages just like organisms. Investment such as provision of economic infrastructures like roads, electricity etc is initiated in the first development stage. In the later development stages, the balance of public investment moved beyond infrastructure to human capital development achieved through increase in expenditure on health, education and welfare services which move the economy beyond growth to development (Edame and Eturoma, 2014).

Bowen's Model of Public Expenditure

Bowen (1943) suggests that social goods are unequally made available to voters. For him, each of the individuals in a

community is expected to contribute for social goods. This is because social goods are beneficial to all individuals in that community. He clearly stated that these individual is also expected to contribute different amounts since their beneficial capacity varies. Thus, different individual curves must add vertically in the case of public goods. However, an equal amount of social goods and the marginal cost of supplying them must be produced to be the same to the marginal utilities received by the community (Okeke, 2014).

Wagner's law of increasing public expenditure

Adolph Wagner (1835-1917) in his theory of "increasing state activity" states that there is intrinsic propensity for the operations of various arms of governments to increase both intensively and extensively. This law is based on the assumption there is co-existence between the existence of an economy and the growth of the government activities in which the government sector grows more than the economy (Edame and Eturoma, 2014).

EMPIRICAL LITERATURE

Using panel data set on US states for some selected years, Godspeed (2000) focused on empirical investigation on the nature of the relationship among education spending, inequality and economic growth. The result revealed that while other sorts of government spending have negative and insignificant impact on economic growth, education expenditure has a positive and significant impact on economic growth. However, the impact is indirect as because it was found to increase economic growth by reducing inequality. Similarly, Josaphat and Oliver (2000) employed time series data to conduct a study on the impact of public expenditures on economic growth of Tanzania for of a period of 32 years. They disaggregated the total government expenditure into expenditure on physical investment which was found to have a negative impact on growth, consumption expenditure which effects on growth was found to be positive and human capital investment which was discovered to have insignificant impact on economic growth.

Through construction of expenditure model and ordinary least square mechanism, Omotor (2004) examine the trends of the federal government spending and its impact on national development in Nigeria over the period of 1977 to 1998. The result found federal government revenue as the only determinant of educational spending. Nurudeen and Usman (2010) chose analyzed the relationship between government expenditure and economic growth in Nigeria from 1979 to 2007. The motivation behind this study was as a result of continuous rise in government spending overtime which has insignificant economic impact. However, the result of the study discovered that there exist negative relationship between the government total capital expenditure, total recurrent expenditures, government expenditure on education and economic growth. On the other hand, the study also found that the relationship between government expenditure on transport, communication, health and economic growth is positive.

Odiro (2011) also evaluated the dynamic effect of government spending on education on the growth of the Nigerian economy using dynamic recursive framework of computable general equilibrium (CGE)-micro simulation (MS) model in examining the likely effect of a rise in government education spending on the Nigerian economy from 2004 to 2015. The result of this study revealed that the Nigerian economy is significantly explained by government spending on education and thus recommended that more funds should be channeled to education sector to ensure increase in the growth of the Nigerian economy. Employing the co-integration and error correction methods,

Nabil et al (2007) employed overlapping-generation model (OLG) carried out a study on the effects of public spending on education, human capital and growth in Canada. From their simulation result, they found that increase in tax induced government spending on education may have both negative and positive effects on human capital in the short run and long run respectively. It was also discovered from the economic and welfare analysis that the disturbances brought about by alternative tax instruments and the productivity of education public spending is a major determinant of the type of impact public expenditure would have on the growth of human capital in Canada. On the other hand, using battery of time series data analyzing techniques, Maitra and Mukhopadhyay (2012) examined the effect of public spending on education and health sectors in enhancing the economic growth of twelve countries in Asia-pacific region from 1981 to 2011. The result of the study revealed that while education and health-care spending has a positive relationship with economic growth in some countries, negative relationship exist between education and health care spending in some other countries. It was also found that neither education nor health care spending has a significant impact on economic growth in few countries.

Nworji (2012) used OLS multiple regression model in examining the effect of public expenditure on economic in Nigeria for the period 1970 to 2009. The result indicated that while total spending on economic services had insignificant negative effect on economic growth, capital expenditure on transfers had insignificant positive effect on growth and total spending on social and community services and recurrent expenditure on transfers had significant positive effect on economic growth. Applying a single equation error correction mechanism, Dada (2013) carried out a study to examine the composite effects of government expenditure on private consumption and output growth in Nigeria from 1961 to 2010. The result revealed that that government spending on education and health and social security have crowding-in effect on private consumption while other components such as government spending on administration, construction, agriculture, transport and communication have crowding-out effect on private consumption. The findings further revealed that government spending on education and health, social security, agriculture and administration has positive effect on output while expenditure components such as government

spending on construction, transport and communication have negative effect on output.

III. METHODOLOGY

This research work adopts the Human capital investment theory of Becker (1975). Becker in his theory of human capital development highlighted the various interactions paths between income, expenditure and human capital development. High income is believed to allow people invest more financial resources in the quantity and quality of education while low income might lead to suboptimal investment in education leading to low human capital development. The aspect of this theory that is most relevant to this study is the idea that spending on education affects human capital development, as well as has potential impacts on the income earning ability of individuals. Following these explanations, this study will model education outcome as a function of public education spending in West African countries. This can be stated mathematically as

$$HCD = f(G_s) - eqn(1)$$

Where: G_s represents government spending and HCD is the Human capital development.

This model – showing the relationship between public education spending and educational outcome – is a modified education production function which is complemented with other control variables. Generally, an education production function describes the relationships between combinations of schooling inputs, economic and non-economic inputs and the resulting output. The production process depends, in part, on the education subsystem and its resource input but also on the non economic, social, economic and physical conditions. The functional form of this education production is given as:

$$Y_t = f(X_{1it}, X_{2it}, Z_{it}) - eqn(2)$$

Where, Y_t is a social indicator reflecting education attainment for a country t , which is a function of aggregate public spending on education as a share of GDP, X_{1it} ; allocations to different programs within the sector; X_{2it} ; and a vector of socioeconomic variables Z_{it} . In this research work, education outcome is proxy by primary school enrolment and secondary school enrolment.

The models for this work were structured in a way to empirically examine the impact of government education spending on education outcome in West African countries. The model functional form the impact of government educational expenditure and primary school enrolment can be specified as:

$$PSE = f(GEE, GDP, PTRP, URP, HEX, INF, EA) \quad eqn(3)$$

Where: PSE – represent primary school enrollment, GEE – Government education expenditure, GDP – Gross domestic product per capita, PTRP – pupil-teacher ratio in primary school, URP – Urban population, HEX – Public health spending, INF – inflation rate, EA – External aid are control

variables in order to take care of omitted variable bias. specifically, to achieve the aim/objective of determining the impact of government education spending on primary school enrollment in West Africa, and also bear in mind the basic property of the linearity of the variables, we transform the above functional relationship model to econometric form, which gives:

$$PSE_{it} = \beta_0 + \beta_1 GEE_{it} + \beta_2 GDP_{it} + \beta_3 URP_{it} + \beta_4 PPTR_{it} + \beta_5 HEX_{it} + \beta_6 INF_{it} + \beta_7 EA_{it} + \mu_{it} + \eta_i - eqn(4)$$

Where β_0 is the intercept for the country 'i', β 's- the slope, and μ_t , η_i , and ε_{it} - the error. I represent individual countries and t represent the year in chronological order, and $t > 0$. The error term was decomposed as $\mu_{it} = \theta_{it} + \eta_i + \varepsilon_{it}$, while ε_{it} is the standard or the stochastic error term, and it varies across different countries and years, θ_{it} is a set of the group (country) specific characteristic or effect, which then refers to each country of the model, and η_i is time-specific effects. Therefore, equation 5 is re-written as:

$$PSE_{it} = \beta_0 + \beta_1 GEE_{it} + \beta_2 GDP_{it} + \beta_3 URP_{it} + \beta_4 PPTR_{it} + \beta_5 HEX_{it} + \beta_6 INF_{it} + \beta_7 EA_{it} + \mu_{it} - eqn(5)$$

The equation above will be used to examine the impact of educational expenditure on primary school enrolment in West Africa.

In other to examine the impact of government education spending on secondary school enrollment, we examine the functional form of the equation below:

$$SSE = f(GEE, GDP, SPTR, URP, HEX, INF, EA) - eqn(6)$$

Where: SSE – Secondary school enrollment, GEE- Government education expenditure, GDP– Gross domestic product per capita, SPTR- pupil-teacher ratio in secondary school, URP- Urban population, HEX- Public health spending, INF- inflation rate, EA- External aid are control variables in order to take care of omitted variable bias. specifically, to achieve the aim/objective of determining the impact of government education spending and other determinants on secondary school in West Africa, and also bear in mind the basic property of the linearity of the variables, we transform the above functional relationship model to econometric form, which gives

$$SSE_{it} = \beta_0 + \alpha_1 GEE_{it} + \alpha_2 GDP_{it} + \alpha_3 URP_{it} + \alpha_4 SPTR_{it} + \alpha_5 HEX_{it} + \alpha_6 INF_{it} + \alpha_7 EA_{it} + \mu_{it} + \eta_i + \varepsilon_{it} - eqn(7)$$

Where α is the intercept for the country 'i', α 's- the slope, and μ_t , η_i , and ε_{it} - the error. I represent individual countries and t represent the year in chronological order, and $t > 0$. The error term was decomposed as $\mu_{it} = \theta_{it} + \eta_i + \varepsilon_{it}$, while ε_{it} is the standard or the stochastic error term, and it varies across different countries and years, θ_{it} is a set of the group (country) specific characteristic or effect, which then refers to each

country of the model, and η_i is time-specific effects. Therefore, equation 3 is re-written as:

$$SSE_{it} = \beta_0 + \beta_1 GEE_{it} + \beta_2 GDP_{it} + \beta_3 URP_{it} + \beta_4 SPTR_{it} + \beta_5 HEX_{it} + \beta_6 INF_{it} + \beta_7 lnEA_{it} + \mu_{it} - eqn(8)$$

In other to examine the causality among the variables of interest, the research examine the panel Granger causality among the variables of interest – government education spending and education outcome in West African countries. The granger causality testing is subsequent to a panel vector auto regression model. Hence, we state the panel vector auto regression model as follows:

Letting Y'_{it} be an $NT \times 3$ matrix the variables of interest such that we have $(GEE_{it}, PSE_{it}, SSE_{it})'$. Then our panel vector autoregression can thus be stated as follows:

$$lnY'_{it} = lnY'_{it-p} \delta_{ij,p} + \mu_{it} \quad \mu_{it} = \theta_i + \eta_t + \varepsilon_{it} \text{ and } p = 1, \dots, p - eqn(9)$$

$$lnY'_{it} = lnY'_{it-p} \delta_{ij,p} + \theta_i + \eta_t + \varepsilon_{it} - eqn(10)$$

Removing the panel individual effects η_i and time effects ε_t , we have:

$$ln(Y'_{it} - Y'_{it}^*) = ln(Y'_{it-1} - Y'_{it-1}^*) \delta_{ij,p} + \theta_i - \theta_i + \eta_t - \eta_t + \varepsilon_{it} - \varepsilon_{it}^* - eqn(11)$$

$$ln\Theta Y'_i = ln\Theta Y'_i \delta_{ij,p} + \Theta \varepsilon_{it} - eqn(11)$$

Where Θ represents some first difference transformation (the deviations from previous lags*) of the original variable. Therefore, the granger causality model can thus be stated as follows:

$$H_{01}: \delta_{ij,p} = 0 - eqn(12)$$

There is no causal relationship between government educational spending and education outcomes in West African countries.

IV. INTERPRETATION OF RESULTS

Unit Root Test

The unit root test is carried out to examine the order of integration of the variables. The estimation used the Levin-Lin-Chu test which assumes a common autoregressive parameter for all panels. The Levin-Lin-Chu test with panel-specific means but no time trend requires that the number of time periods grow more quickly than the number of panels, so the ratio of panels to time periods tends to zero. The test involves fitting an augmented Dickey-Fuller regression for each panel; and it required that the number of lags to include be selected based on the AIC with at most 10 lags.

Table 2: Unit root test

Variab les	ADF Statistic at Level	Prob. Value	ADF Statistic at First Difference	Prob. Value	Order of integration
PSE	-3.2120	0.0007	—	—	I (0)
SSE	-0.3074	0.3793	-6.0053	0.0000	I (1)
GEE	-1.1193	0.1315	-8.5200	0.0000	I (1)
URP	-0.0329	0.4869	—	—	I (0)
PTR	-3.0975	0.0010	—	—	I (0)
SPTR	-3.0053	0.0013	—	—	I (0)
PCI	4.8119	1.0000	-5.6428	0.0000	I (1)
HEX	-1.9229	0.0273	—	—	I (0)
EA	-2.7409	0.0031	—	—	I (0)
INF	-7.2472	0.0000	—	—	I (0)

HYPOTHESIS TESTING

H_0 : $\delta=0$ (the variables are non-stationary)

Decision Rule: reject H_0 if the absolute value of ADFcal > ADFtab or Pr < 0.05.

The result Levin–Lin–Chu test in the table above shows that most of the variables used in the model were stationary at their level form. The result shows that primary school enrolment (PSE), urban school enrolment (UPR), pupils to teachers' ratio in primary school (PPTR), pupils to teachers' ratio in secondary school (SPTR), total health expenditure as a fraction of total government expenditure (HEX), external aids (EA) and inflation (INF) were stationary at their level while government educational expenditure (GEE), secondary school enrolment (SSE) and per capita income (PCI) were stationary at their first difference. Hence, all the variables used in the model have a mixed integrated order of zero and one.

Cointegration Test

Since all the variables of interest are not stationary at order zero, there is need to conduct the co-integration test to ascertain their long-run relationship. The Westerlund technique developed in 2007 will be employed. The focus of this test is to examine the absence of cointegration by determining whether there exists error correction for the panel as a whole or for individual panel members. The test encompasses large degree of heterogeneity both in the short-run dynamics and the long-run cointegrating relationship, as well as dependence on within and across the cross sectional unit (Persyn, 2010).

The Gt and Ga statistics test for the presence of short-run relationship or long-run cointegrating for at least one individual country. The statistics are computed using the weighted average of the individually estimated t-ratio's in the model. One the other hand, the Pt and Pa test statistics examine the pool information across the sectional unit. The

rejection of H_0 suggests the rejection of the presence of cointegration for the model.

Table 4.1 Cointegration Test

MODELS	Statistic	Stat. Value	Z – Value	Prob. Value
EQUATION 5	Gt	-2.304	0.397	0.654
	Ga	-0.421	5.342	1.000
	Pt	-1.574	4.588	1.000
	Pa	-0.134	3.740	1.000
EQUATION 8	Gt	-1.581	2.014	0.978
	Ga	-1.417	4.452	1.000
	Pt	-4.081	1.767	0.961
	Pa	-1.544	2.706	0.997

HYPOTHESIS TESTING

H_0 : $\delta=0$ (No cointegration)

Decision rule: reject H_0 if Pr > 0.5

The cointegration result in table 4.4 above shows that the Pr value for Gt, Ga, Pt and Pa are all greater than 0.05 for model 1 and 2. This therefore shows that there is long-run relationship in the models both for individual country and in the panel as a whole. This therefore shows that there is long-run relationship in the panel as a whole.

The Hausman Test

In order to decide whether to employ panel OLS, fixed effect or random effect, we estimate the Hausman test. It basically tests whether the unique errors (ui) are correlated with the regressors, the null hypothesis is they are not. The null hypothesis of this model is the preference of random effect to fixed effect against the alternative hypothesis of fixed effect (Greene, 2008).

MODELS	CHI-SQUARE	PROBABILITY	DECISION
Equation 5	15.96	0.0140	FE
Equation 8	19.14	0.0078	FE

HYPOTHESIS TESTING

H_0 : $= \sigma_{it}$ are consistence but not efficient, hence employ the fixed effect.

Decision rule: Accept H_0 of fixed effect if Pr < 0.5.

From the result of Hausman test above, the best model to be employed for model 1 and 2 is the fixed effect, since their probability level is less than 5%, we conclude that to obtain a consistence estimates, fixed effect should be employed.

V. REGRESSION RESULTS

Model 1 (Equation 5)

This result shows the impact of public spending on primary school enrolment in West Africa. The result is presented in the table below.

Table 6: Educational expenditure and primary school in West African countries

Variables	Coefficient	t – value	Prob.
C	-126.7868	-4.49	0.000
PCI	13.95519	5.61	0.000
GEE	0.6341498	3.23	0.001
URP	.2690729	2.74	0.006
HEX	1.128273	4.40	0.000
INF	-.0212976	-2.49	0.013
EA	.0526031	0.68	0.494
PTR	.0109785	0.13	0.895

* indicates that the t-stat is statistically significant at the 5% and ** indicates 10% level

Thus

$$EDU_t = -12.678 + 13.96PCI_t + 0.634GEE_t + 0.269URP_t + 1.23HEX_t - 0.021INF_t + 0.53EA_t + 0.011PTR_t$$

The above result shows the impact of government education expenditure on primary school in West African Countries. The result further shows that a unit increase in per capita income in the long-run will leads to approximately fourteen percent increase in primary school enrolment within West African Countries. This result conformed to its theoretical expectations as increase in per capita income will increase the chances of parents being able to give quality education to their children. The result also conformed to the empirical works of Woessmann (2006) and Yousra et al., (2014). Hence the research concludes that per capital income has a positive impact on primary school enrolment in the region.

Government educational expenditure (GEE) also shows a significant and positive relationship with primary school enrolment. The result shows that a unit increase in government education expenditure will leads to 0.6 percent increase in primary school enrolment. This result also conformed to its theoretical expectation as stipulated in Stiglitz (1956) and Keynes (1936) which both emphasized the role of government expenditure in promoting a healthy economic performance. The result further supports the empirical works of Iyer (2009), Johnson and Wasu (2016). Hence, the research concludes that government education expenditure has a positive impact on primary school enrolment in West African countries.

Urban population (URP) also shows a positive and significant relationship with primary school enrolment in the region. The result shows that a one percent increase in urban population will leads to 0.27 percent increase in primary school enrolment. This result also conformed to its theoretical

expectation as increase in urban population should increase primary school enrolment since they live in a more civilized environment.

Health expenditure within the region also shows a positive and significant relationship with primary school enrolment. The result shows that a one percent increase in the funds allotted to educational sector will leads to 1.23 increases in primary school enrolment. This result shows that health expenditure is an important factor in boosting primary school enrolment. The result conformed to the theoretical expectations of Stiglitz (1956) and the empirical works of Iyer (2009) and Johnson and Wasu (2016). Hence, the research concludes that government health expenditure has a positive impact on primary school enrolment in West African countries.

Inflation shows a negative and significant relationship with primary school enrolment. The result shows that a one percent increase in inflation rate, in the long run, will leads to 0.02 percent decrease in primary school enrolment. This result conforms to its theoretical expectations as increase in inflation reduce the real value of money, and among other things leads to decrease in purchasing power of household income. This in turn could leads to withdrawal of pupils from school.

External aids and pupils to teachers’ ratio show a positive relationship with primary school enrolment, but the relationship is not significant. These variables do not conform to their a priori expectations. The reason being that external aids are not often meant for education; rather, they are meant for projects based on the donor’s specifications.

Model 2 (Equation 8)

Table 7: Educational expenditure and secondary school enrolment in West African countries

Variables	Coefficient	t – value	Prob.
C	-16.85065	-1.74**	0.082
PCI	2.541349	3.26*	0.001
GEE	0.0768233	2.35*	0.019
URP	0.3319005	5.22*	0.000
HEX	1.070291	6.94*	0.000
INF	-0.3644193	-6.76*	0.000
EA	.0031713	0.55	0.584
SPR	.0642907	0.75	0.456

* indicates that the t-stat is statistically significant at the 5% and ** indicates 10% level

Thus

$$SSE_t = -16.85 + 2.54PCI_t + 0.08GEE_t + 0.33URP_t + 1.07HEX_t - 0.36INF_t + 0.003EA_t + 0.64SPR_t$$

The above result shows the impact of government education expenditure on secondary school enrolment in West African

Countries. Therefore shows that a unit increase in per capita income in the long-run will leads to approximately 3 percent increase in secondary school enrolment within the selected West African countries. This result conformed to its theoretical expectations as it was initially explained in the section above that an increase in per capita income will increase the chances of parents being able to give quality education to their children. The result also conformed to the empirical works of Woessmann (2006) and Yousra et al., (2014). Hence the research concludes that per capital income has a positive impact on secondary school enrolment in the region.

Government educational expenditure (GEE) also shows a significant and positive relationship with secondary school enrolment. The result shows that a unit increase in government education expenditure will leads to 0.08 percent increase in primary school enrolment. The impact of government educational expenditure is felt more on primary school enrolment than for secondary school enrolment. This result also conformed to its theoretical expectation as stipulated in Stiglitz (1956) and Keynes (1936) which both emphasized the role of government expenditure in promoting a healthy economic performance. The result further supports the empirical works of Iyer (2009) and Johnson and Wasiu (2016). Hence, the research concludes that government education expenditure has a positive impact on secondary school enrolment in West African countries.

Urban population (URP) also shows a positive and significant relationship with secondary school enrolment in the region. The result shows that a one percent increase in urban population will leads to 0.33 percent increase in secondary school enrolment. The impact of increase in urban population on school enrolment is grater for secondary than in primary enrolment. This result also conformed to its theoretical expectation as increase in urban population should increase secondary school enrolment since they live in a more civilized environment.

Health expenditure within the region also shows a positive and significant relationship with secondary school enrolment. The result shows that a one percent increase in the funds allotted to educational sector will leads to 1.07 increases in secondary school enrolment. This result shows that health expenditure is an important factor in boosting secondary school enrolment. The impact of health expenditure on school enrolment is greater for primary school than secondary school. The result conformed to the theoretical expectations of Stiglitz (1956) and the empirical works of Iyer (2009) and Johnson and Wasiu (2016). Hence, the research concludes that government health expenditure has a positive impact on primary school enrolment in West African countries.

Inflation shows a negative and significant relationship with secondary school enrolment. The result shows that a one percent increase in inflation rate, in the long run, will leads to 0.36 percent decrease in secondary school enrolment. This

result conforms to its theoretical expectations as increase in inflation reduce the real value of money, and among other things leads to decrease in purchasing power of household income. This in turn could leads to withdrawal of pupils from school.

External aids and pupils to teachers’ ratio in secondary schools show a positive relationship with primary school enrolment, but the relationship is not significant. These variables do not conform to their a priori expectations. The reason being that external aids are not often meant for education; rather, they are meant for projects based on the donor’s specifications.

Granger Causality Test

The result presented in this section represents the granger causality of the key variables of interest. The result is presented in the table below:

Table 4.7: Granger causality test matrix

Test	W – bar	Z - bar	Prob.	Z - bar tilde	Prob.
PSE does not Granger-cause GEE	7.7113	6.94552	0.0843	6.57823	0.0921
GEE does not Granger-cause PSE	6.7321	14.6141	0.0000	12.6225	0.0000
PSE does not Granger-cause HEX	3.4790	6.3203	0.0000	5.3615	0.0000
HEX does not Granger-cause PSE	4.8306	9.7663	0.0000	8.3783	0.0000
SSE does not Granger-cause GEE	6.9234	8.6523	0.0019	7.69324	0.0020
GEE does not Granger-cause SSE	9.5314	21.7508	0.0000	18.8704	0.0000
SSE does not Granger-cause HEX	3.7113	6.9124	0.0000	5.8799	0.0000
HEX does not Granger-cause SSE	14.9343	35.5256	0.0000	30.9297	0.0000

Decision Rule: $H_0: \theta_1 = \theta_2 = \theta_3 = \dots = \theta_i = 0$ (X does not Granger-cause Y).

$H_1: \theta_1 = \theta_2 = \theta_3 = \dots = \theta_i \neq 0$ (X Granger-cause Y for at least one panel var (country1)).

Dumitrescu-Hurlin (2012) for panel data Granger causality test was employed in this analysis. The result shows that there is a unidirectional causality running from GEE to PSE. This is shown by the Z - bar tilde of 12.6 which is greater than the W-bar of 6.7. Hence we reject the null hypothesis of GEE does not granger-cause PEE and we conclude that government educational expenditure Granger-causes primary school enrolment for at least one country.

Furthermore, the result shows an existence of bi-directional causality between primary school enrolment and government

health expenditure. This is shown by the significant value of Z – bar tilde of PSE and HEX of 5.4 which is greater than the W -bar of 3.5 and Z -bar tilde for HEX and PSE of 8.4 which is greater than the W -bar of 4.8. Hence, the research concludes that the variations in primary school enrolment could be explained by variations in health expenditure and vice versa.

More also, the result shows an existence of bi-directional causality between secondary school enrolment and government educational expenditure. The SSE does not Granger-cause GEE can be rejected given that the Z -bar tilde of 7.69 is greater than the W -bar of 6.9. Furthermore, the null hypothesis of GEE does not Granger-cause SSE can be safely rejected since the probability is less than 0.05 percent.

In conclusion, the result shows the existence of bi-directional causality between secondary school enrolment and government health expenditure. The result indicates that the Z -bar tildes for the two analyses are 5.87 and 30.9 which is greater than the W -bar of 3.7 and 14.9. Therefore, we reject the non hypothesis of SSE does not Granger-cause HEX and vice versa. Hence, the research concludes that variations in SEE could be explained by the variations in HEX and vice versa.

VI. EVALUATIONS AND POLICY IMPLICATIONS

The first objective posed in this analysis is to examine whether government educational expenditure has a significant impact on primary school enrollment in West African countries. The result obtained shows that increase government educational expenditure and health expenditure have positive and significant relationship with primary school enrolment. The implication of this finding is that an increase in health expenditure is more potent in increasing primary school enrolment. It therefore signifies that health care is paramount in promoting primary school enrolment within the region.

The second objective posed in this paper is to examine the impact of government educational expenditures on secondary school enrollment in West African countries. With the result obtained from the regression, we accept the fact that government expenditure has a significant impact on secondary school enrolment as both government expenditure on education and health shows a positive and significant relationship on secondary school enrolment. Hence, the research concludes that government educational expenditure and health expenditure has a positive impact on secondary school enrolment. The implication of this is that government must take adequate measures to ensure proper allocations and utilization of funds in education and health sector in order to achieve a meaningful human capital development.

The third objective focused on examining the causal relationship between government expenditure, primary school enrolment and secondary school enrolment in West Africa. Given the Granger causality result obtained shows a unidirectional causality running from government education expenditure to primary school enrolment. It was also found

that there is bidirectional causality between government health expenditure and primary as well as secondary school enrolment. It result also shows that there is bidirectional causality between government educational expenditure and secondary school enrolment. Therefore, the research concludes that there is causality between government expenditure and education outcomes in those selected West African countries. The implication of this finding is that the low level of human capital development could be attributed to low government finance on educational sector.

VII. SUMMARY AND CONCLUSION

This research work examine the effect of public education spending on education outcomes in selected West African countries with the aim of accessing the impact of government expenditure on primary school enrolment, examine the impact of government expenditure on secondary school enrolment, to examine the determinants of education outcomes and to examine the causality between government expenditure and education outcomes in the region. The analysis uses data from 1985 to 2016 (32 years), and obtain its data across 13 counties in the region. These countries are Nigeria, Ghana, Senegal, Cote d’voire, Niger, Benin, Sierra Leone, Guinea, Mali and Togo. The choice of the countries and the period is informed by data availability. The variables to be employed are Government education expenditure (GEE), per capita income (PCI), education outcome proxy by primary school enrolment (PSE) and secondary school enrolment (SSE), Pupil-teacher ratio (PTR), Urban Population (URP), Public health spending (HEX), Inflation rate (INF), and External aid (EA).

The result shows that the variables were integrated of order zero and one. In line with the different order of integration obtained, the research conducted a cointegration test to examine the long run of the variables used in the model, and the result confirmed an existence of long run relationship among the variables. Hausman test was also carried out to examine the correct model for the analysis, and the result confirmed the used of fixed effect in the model of two equations.

The regression result shows that government educational expenditure, health expenditure, urban school enrolment, , per capita income shows a positive and significant relationship with both primary school enrolment and secondary school enrolment. While inflation rate has a negative relationship with both primary and secondary school enrolment. External aids show no significant relationship with education outcome because an external aid was not meant for education finance in the first place, but to the appropriate project in line with donor specifications. The result also shows existence of granger causation between government expenditure and education outcome within the period examined.

VIII. POLICY RECOMMENDATION

Having observed the effect of public education spending on education outcomes in selected West African countries, the

research will recommend the following policies to promote sustainable human capital development in region.

Since the study found that an increase in both government expenditure on health expenditure and educational expenditure will promote human capital of the region, the research therefore recommends that capital/solid infrastructural development and recurrent expenditure in the education and health sector, such as good workable conditions schools and hospital should be prioritized. This should be narrowed down to the primary health care. The government should also encourage private sector participation in education and health funding, as these proved to have significant impact on human capital development in the region. Also, there should be access to better technology – through technological transfer –, rehabilitation of the class rooms to create good working conditions, pipe bone water; electricity; access road etc. Also in the medical sector, there should be an improvement in the access to better education given the current deterioration state of health care services in the region. All these can be achieved if the ratio of capital expenditure improves in the budget.

More also, since both pupils to teacher's ratio proved to have positive impact on school enrolment in the primary and secondary schools, the research recommends that government should encourage training and more trainings of professionals in the educational sector. The government can do this by increasing the salaries of teachers to motivate the current teachers and to make the job more attractive and lucrative. This will boost teachers to pupils ratio and encourage more school enrolment.

Since the research found that per capita income promotes human capita development, the research recommends that small and medium scale enterprises should be encourage to boost the income level of the citizens, especially those in the rural areas.

Finally, I recommend that some international bodies formed by these countries employ inflation rate targeting just as those practiced in the European countries. This can be achieved through the introduction of common currency, and fixing the exchange rate to this currency. This will help in the achievement of interest and exchange rate targeting as it is being done in European countries. This will hence, strengthens the region as a whole against external shocks.

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