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Education Expenditure and Human Capital Development in Nigeria

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Abstract: The paper investigates the effect of government expenditure on education on human capital development in Nigeria. The method of Ordinary Least Squares (OLS) - otherwise known as the Classical Least Squares (CLS) – was used to estimate the specified model of the study which was analyzed using the regression analysis, having carried out the ADF test for unit root and cointegration test. Findings revealed that there is a significant relationship between education expenditure and human capital development in Nigeria. However, with the exception of life expectancy index and corruption which were not significant, education expenditure, health expenditure, and government effectiveness have significant effect on human capital development. Based on the findings of the study, the study recommends that: the government should adequately fund education in line with the international benchmark of 25% of the nation's annual budget. This will help enhance the standard of education in the country. The government should also adequately finance the health sector. This will improve the country's life expectancy and reduce the increasing medical tourism abroad. Adequate and functional laws should be put in place to help tame the systemic corruption that is eating into the bones and fabrics the nation's economy.

Keywords: Education expenditure, Life expectancy index, Health expenditure, Government effectiveness, Corruption.

1. INTRODUCTION

The human capital concept is relatively new owing to the fact that tangible capital had overtime been given more prominence and played key role in economic affairs and growth of nations (Garba, 2011). This prominence is however dwindled today by the realization that economic processes leading to economic growth and the growth of the tangible capital is further buttressed by the activities of the human capital elements in the production process. Thus, today, there is a greater dependence on the human capital element and the need to continuously develop this aspect of the production process to bring about skilled, up to date and knowledge driven workforce in the work environment. The quality and quantity of human capital helps to deepen the educational system of a nation (Bratti, Bucci, & Moretti, 2004). As a consequence, Nigeria ought to strategically increase her expenditure in the educational sector in order to

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fast track the development of her human capital. This means that the two, human capital and education go hand in hand to booster national economy. This has led to increased study on the role of human capital in the growth and development of an economy.

Education no doubt is vital for the developmental processes of nations and very key to imbuing human capital with the requisite skill, knowledge and abilities for economic growth. Technological transfers and improved technical knowhow are effectively imports of quality education. Essentially, sound education and a well-structured educational system aids not just economic growth but hastens the developmental process. (Odia, &. Omofonmwan, 2007; Coulombe, Tremblay, & Marchand, 2004)). Thus, there is that urgent need to adequately fund education in order to shun out the right skilled human resources who in turn will impact on the educational system for national development (Gupta, Marijn, & Erwin, 2002). Basic education increases people‘s knowhow and capacity to learn and to effectively interpret and make good use of information gathered. Consequently, nations desirous of economic growth and development must take to heart the development of this critical sector.

Developing the educational sector requires increased educational expenditure at various levels of government. It requires a deliberate attempt to increase the number of school enrollment from primary to the secondary level while not ignoring the tertiary level; physical infrastructures to be erected to absorb the number of students, more teachers to be trained and absorbed into the system to adequately cater for the educational needs of students and general overhaul of the educational sector to better position it for meaning contribution to the development (Olaniyi, & Adam, 2003; Gustav, & Stewart, 2010; Anyanwu, & Erhijakpor, 2008). Extant literature summed it that developing and providing quality education is a boost for human capital and major driveway to economic prosperity. This boost is observed in education’s ability to increase the productivity of existing labour force in different ways to impact national economy. Education thus is a catalyst for human capital development which is needed for national development to be realized and sustained (Ogujiuba, & Adeniyi, 2005; Lawanson, 2009; Todaro, & Smith, 2009). Developing human capital through effective education gifts a nation with people with the ability for diverse thinking and stimulates the resourcefulness of citizens. It provides a nation with a ready pool of human resource to fully participate and contribute meaningfully to national development (Aigbokhan, Imahe, & Aileman, 2007). It thus behoves on the Nigerian nation to invest in education in order to maximize her human capital potentials for economic growth and development.

Statement of the problem

This study was informed by the inability of Nigeria to achieve economic growth through education despite her attempt at deploying resources to become a knowledge-based economy. World Bank (2014) report revealed the reasons as challenges bedeviling the national educational system including outdated teaching techniques and curriculum, incessant strikes by university lecturers due to poor funding, administrative bottlenecks, corrupt education officials, lack of educational infrastructure and general low educational budgets by successive administrations. These challenges the report summed up have resulted in poor access to education by the youths of the country leading to low school enrollment, poor quality of education due to lack of qualified teachers and honest education officials and poor funding of education due to budgetary deficits in the educational sector.

The challenges in the educational sector may have affected human capital development with the loss of the right skills and knowledge needed for economic development. To develop the educational sector which will translate to the acquisition of modern skills and knowledge no doubt requires proper funding which could be achieved through adequate budgetary allocations to the sector. Nigeria currently falls short of the United Nations Educational, Scientific and Cultural Organization (UNESCO) provisions on government expenditure in the educational sector with an abysmal total budget expenditure on education

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below 9% as against 15% to 20% recommended by UNESCO (World Bank 2014). Worst still, there are no serious efforts by government to address the issue, thus further compounding the problem. These issues bring to fore the imperative to understudy the impact of education expenditure on human capital development in Nigeria.

Objectives of the study

The main objective of the study is to examine the effect of education expenditure on human capital development in Nigeria. The specific objectives are to:

1. Determine the effect of education expenditure on human capital development
2. Ascertain the effect of life expectancy index on human capital development
3. examine the effect of health expenditure on human capital development
4. determine the effect of government effectiveness on human capital development
5. ascertain the effect of corruption on human capital development

Statement hypothesis

Ho_1: Education expenditure has no significant effect on human capital development

Ho_1: Life expectancy index has no significant effect on human capital development

Ho_1: Health expenditure has no significant effect on human capital development

Ho_1: Government effectiveness has no significant effect on human capital development

Ho_1: Corruption has no significant effect on human capital development

2. METHODOLOGY

Theoretical Framework

The model for this study was adapted from Nkolika (2010), where she developed the model to examine the effect of education expenditure on human capital development on the Nigerian economy. This model tried to establish the mathematical relationship between education index (the measure of education capital, used as a proxy of human capital development) and its determinants, especially education expenditure which is the focus of this study. In the model, education index is the dependent variable (regressand) while its determinants are the independent variables (regressors).

In this section, an attempt is made to specify the effect of education expenditure on human capital development in a mathematical form called a model.

Thus, she specifies the model as;

$EI = b_0 + b_1TEE + b_2LEI + b_3TEH + b_4GOV + U_i$ …….. (1)

Where:

EI = Education Index

TEE = Total Expenditure on Education

LEI = Life Expectancy Index

THE = Total Expenditure on Health

GOV= Government Effectiveness

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μ_i = Stochastic disturbance (error term)

b_0 & b_i = the intercept and the coefficients of the slopes respectively.

Model Specification

The model adopted from Nkolika (2010) was modified. This modification was the inclusion of the corruption (COR) in the model. Also, human capital development was captured using secondary school enrolment (SSE). Hence, the model equation for this study is stated as follow.

The functional form of the model is:

HCD = f(TEE, LEI, THE, GOV, COR) ……..…..… (2)

The mathematical specification of the model is:

$HCD = \beta_0 + \beta_1 TEE + \beta_2 LEI + \beta_3 THE + \beta_4 GOV + \beta_5 COR$ ……..….. (3)

The mathematical specification of the model is:

$HCD = \beta_0 + \beta_1 TEE + \beta_2 LEI + \beta_3 THE + \beta_4 GOV + \beta_5 COR + \mu_i$ …… (4)

Where: HCD = Human Capital Development

TEE = Total Expenditure on Education

LEI = Life Expectancy Index

THE = Total Expenditure on Health

GOV = Government Effectiveness

COR = Corruption

μ_i = Stochastic disturbance (error term)

b_0 & b_i = the intercept and the coefficients of the slopes respectively.

Model estimation

The method of Ordinary Least Squares (OLS) - otherwise known as the Classical Least Squares (CLS) - shall be used to estimate the above specified model. OLS is a very popular method and in fact, one of the most powerful methods of regression analysis. It is used exclusively to estimate the unknown parameters of a linear regression model. The Economic view (E-view) software will be adopted for regression analysis.

Estimation techniques

The estimates obtained from the model shall be evaluated using three (3) criteria. The three (3) criteria include:

1. The Economic a priori criteria.
2. The Statistical Criteria: First Order Test
3. The Econometric Criteria: Second Order Test

The economic a priori criteria

This shows whether each independent variable in the equation is comparable with the postulations of economic theory; that is, if the sign and size of the parameters follow with the expectation of the economic

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theory. Thus, the parameters obtained from OLS will be evaluated to ascertain whether they are in accordance with the expected signs shown table 1.

A priori expectations

This section portrays the expected signs of the independent variables in the model specified in accordance with economic theory.

Table 1: **a priori expectations**

Independent variables	Parameters	Expected Relationships	Expected Coefficients
Intercept	β_0	Positive/ Negative (+/-)	$0 < \beta_0 > 0$
TEE	β_1	Positive (+)	$\beta_1 > 0$
LEI	β_2	Positive (+)	$\beta_2 > 0$
THE	β_3	Positive (+)	$\beta_3 > 0$
GOV	β_4	Positive (+)	$\beta_4 > 0$
COR	β_5	Negative (-)	$\beta_5 < 0$

Source: Authors compilation

Any parameter estimated with a positive sign indicates that the independent variable in question has a direct relationship with the dependent variable. This means that if that particular independent variable increases, the dependent variable will increase too. Thus, they move in the same direction. However, a negative sign implies an inverse relationship meaning that if the independent variable increases, the dependent variable will decrease, and vice versa. Thus, they move in opposite directions.

3. EMPIRICAL RESULTS AND ANALYSIS

Stationary Unit Root Test

Establishing stationarity is essential because if there is no stationarity, the processing of the data may produce biased result. The consequences are unreliable interpretation and conclusions. We test for stationarity using Augmented Dickey-Fuller (ADF) tests on the data. The ADF tests are done on level series and first order differenced series. The result of ADF stationary unit root test is presented in table 2 below.

Table 2: ADF Test for Unit Root

Variables	ADF Statistics	Lagged Difference	5% Critical Value	Order of Integration
HCD	-4.384527	1	-2.960411	Stationary at first difference *1*(1)
TEE	-4.559649	1	-2.960411	Stationary at first difference *1*(1)
LEI	-5.190458	1	-2.960411	Stationary at first difference *1*(1)
THE	-5.494965	1	-2.960411	Stationary at first difference *1*(1)
GOV	-6.731107	1	-2.960411	Stationary at first difference *1*(1)
COR	-6.022239	1	-2.960411	Stationary at first difference *1*(1)

Source: Authors computation

The ADF results in Table 2 show that all the variables are non-stationary in levels, that is, *I*(0). However, they are all stationary at their first differences, that is, they are *I*(1). Since the ADF absolute value of each of these variables is greater than the 5% critical value, they are all stationary at their first differences.

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There is need to conduct the cointegration test. The essence is to show that although all the variables are non-stationary, the variables have a long run relationship or equilibrium between them.

Cointegration Test

Since the unit root test shows that the entire variables are stationary at their first other difference 1(1), we therefore test for cointegration among these variables. The result is presented in tables 3 and 4 below.

Table 3: Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.750081	118.0148	95.75366	0.0006
At most 1 *	0.611495	75.02955	69.81889	0.0181
At most 2 *	0.521839	45.72061	47.85613	0.0783
At most 3	0.416668	22.84856	29.79707	0.2536
At most 4	0.143775	6.139617	15.49471	0.6790
At most 5	0.041926	1.327724	3.841466	0.2492

Table 4: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.750081	42.98522	40.07757	0.0229
At most 1 *	0.611495	29.30894	33.87687	0.1594
At most 2	0.521839	22.87205	27.58434	0.1790
At most 3	0.416668	16.70894	21.13162	0.1862
At most 4	0.143775	4.811893	14.26460	0.7654
At most 5	0.041926	1.327724	3.841466	0.2492

Table 4 indicates that there are only 3 cointegrating variables in the model whole table 4.3 indicated only two cointegrating variables. Both the trace statistics (table 4) and Eigen value statistics (table 4) reveal the rejection of the first and second null hypotheses at 5% level of significance based on our decision rule. Therefore, there is a long run relationship between the variables. That is, the linear combination of these variables cancels out the stochastic trend in the series. This will prevent the generation of spurious regression results.

Data Presentation

Recall our model:

$HCD = \beta_0 + \beta_1 TEE + \beta_2 LEI + \beta_3 THE + \beta_4 GOV + \beta_5 COR + \mu_i$

The data for the study is presented in the Appendix 1. The result of the regression test is presented in appendix 4, and the summary of the model is shown in Table 5 below.

Table 5 Summary of Regression Results

Dependent variable: HCD Included observations: 25				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2575067.	1.041498	12.47246	0.0200

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TEE	3.509370	2.075520	8.690839	0.0001
LEI	3418.276	2.039696	0.001676	0.0087
THE	26.14395	0.535287	3.268875	0.0005
GOV	7.210415	4.052092	5.779431	0.0064
COR	-8.027395	4.905403	-1.677211	0.1050
R-squared	0.844756	F-statistic		15.75627
Adjusted R-squared	0.797489	Prob(F-statistic)		0.000000
S.E. of regression	0.784629	Durbin-Watson stat		0.395194

Source: Authors computation

Mathematically, our model becomes:

HCD = 2575067 + 3.509370TEE + 3418.276LEI + 26.14395THE + 7.210415GOV – 8.027395COR

Evaluation of regression results

To analyze the regression results, we employ economic a prior, statistical and econometric criteria.

Evaluation based on economic a priori criteria

From the regression result above, it can be clearly seen that all the parameters of the model conform to the a-priori expectation. In others words, the sign of the variable COR is negative which was the expected sign or the a priori expectation. The expected and obtained signs of the parameters of the model can be seen in table 4.5 below.

Table 6: Summary of a priori test

Variable	Expected sign	Obtained sign	Remark
TEE	+	+	Conforms
LEI	+	+	Conforms
THE	+	+	Conforms
GOV	+	+	Conforms
COR	-	-	Conforms

Source: Authors computation

The result above shows that there is positive relationship between all the components; total education expenditure (TEE), life expectancy index (LEI), total expenditure on health (THE), government effectiveness (GOV) and human capital development captured by secondary school enrolment (SSE); and then, a negative relationship between corruption (COR) and human capital development.

The results imply that total education expenditure and human capital development move in the same direction. Thus, they are directly related. This means that if education expenditure in Nigeria increases, human capital development will increase (improve). On the other hand, if education expenditure decreases, human capital development will fall. It then follows that efficient expenditure on education can promote and support human capital development in Nigeria since they have a positive relationship. This is exactly the same with total expenditure on health, life expectancy index and government effectiveness.

However, the results for corruption (COR) show that there is low practice of corruption in Nigeria. How? A negative relationship between corruption and human capital development indicates that, in Nigeria, if corruption increases, human capital development will fall and if it decreases, human capital development will rise.

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Thus, they move in opposite directions. In other words, they are inversely related. This should be the case. Normally, as expected, there should be a negative relationship between corruption and human capital development.

Evaluation based on statistical criteria

The Coefficient of Determination (R^2)

The coefficient of determination (R^2) from our regression result is 0.844756.

This implies that 84.48% of the total variation in human capital development (captured by secondary school enrolment, SSE) is explained by Total Education Expenditure (TEE), Life Expectancy Index (LET), and Total Expenditure on Health (TEH), Government Effectiveness (GOV) and Corruption (COR). This shows that the explanatory power of the variables is high and strong.

The Adjusted R^2

The Adjusted R^2 supports the claim of the R^2 with a value of 0.797489 indicating that 79.75% of the total variation in the dependent variable - human capital development proxied by secondary school enrolment - is explained by the independent variables (the regressors). Thus, this supports the statement that the explanatory power of the variables is high.

Standard Error Test

The standard errors for all the explanatory variables were all low. The low values of the standard errors in the result show that some level of confidence can be placed on the estimates.

The F-statistic

The F-test is applied to check the overall significance of the model.

$F_{0.05(k-1,d.f)}$

Where k-1 = 6-1 (***Hint***: k is the number of parameters i.e. 6)

= 5

Degree of freedom (d.f) = n-k

Where n (number of observation) = 33

And k (number of parameters) = 6

Thus, d.f = 33-6 = 26

Therefore,

$F_{0.05(5,16)}$ = 2.21 (from the F table) …… F-table

F-statistic = 15.75627 (from the regression result) …….. F-calculated

Decision Rule

Since the F-calculated > F-table, we reject H_0 and accept H_1 that the model has goodness of fit and is statistically different from zero. In other words, there is significant impact between the dependent and independent variables in the model.

T-statistic

Here, we compare the estimated or calculated t-statistic with the tabulated t-statistic at $t_{\alpha/2} = t_{0.025} = t_{0.025}$ (two-tailed test).

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Degree of freedom (d.f) = n-k

= 33-6

= 26

So, we have:

$T_{0.025(26)}$ = 2.056 ….. tabulated t-statistic

Decision Rule

For Total Education Expenditure, since t-calculated is greater than t-table (2.940477 > 2.120), we reject the null hypothesis that there is no significant relationship between Total Education Expenditure (TEE) and Education Index (EI) and accept the alternative that there is a significant relationship between Total education Expenditure and Education Index in Nigeria.

The other variables can be interpreted likewise. All the variables are significant except Life Expectancy Index (LEI) and corruption (COR). See table 7 below.

Table 7: Interpretation of the t-statistic results

Variable	t-calculated	t-tabulated	Conclusion
Constant	12.47246	2.056	Significant
TEE	8.690839	2.056	Significant
LEI	0.001676	2.056	Non-significant
THE	3.268875	2.056	Significant
GOV	5.779431	2.056	Significant
COR	-1.677211	2.056	Non-significant

Source: Authors computation

Table 7 above shows that there is significant relationship between education expenditure, health expenditure, government effectiveness and human capital development in Nigeria respectively whereas there is no significant relationship between life expectancy index, corruption and human capital development in Nigeria respectively.

Evaluation based on econometric criteria

In this subsection, the following econometric tests are used to evaluate the result obtained from our model: autocorrelation, multicolinearity and heteroscedasticity.

Autocorrelation test

Using Durbin-Watson (DW) statistic which we obtain from our regression result in appendix 4, it is observed that DW statistic is 0.395194 or 0.40%, which indicate the absence of autocorrelation in the series so that the model is reliable for predications.

Multicolinearity test

This means the existence of an exact linear relationship among the explanatory variable of a regression model.

Table 8: Correlation Matrix Result

	TEE	LEI	THE	GOV	COR
TEE	1.000000	0.389084	0.877555	0.316782	0.863408

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LEI	0.389084	1.000000	0.198195	0.119338	0.273166
THE	0.877555	0.198195	1.000000	0.292049	0.742037
GOV	0.316782	0.119338	0.292049	1.000000	0.396725
COR	0.863408	0.273166	0.742037	0.396725	1.000000

Source: Authors computation

Decision Rule: If correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity.

From table 8, there is multicolinearity between

i. TEE and THE

ii. TEE and COR

Heteroscedasticity

It was observed that the probability of F- statistic of the white test is 0.3628. Since the probability of F-test is greater than the 0.05 significance level, we accept the null hypothesis that there is heteroscedasticity in the residuals. To solve this, we employed the Newey-West method. This crucial technique produces Heteroscedasticity and Autocorrelation Consistent (HAC) standard error is used to solve it.

4. CONCLUSION AND RECOMMENDATIONS

In the final analysis, it was revealed that there is a significant relationship between education expenditure and human capital development in Nigeria. Also, it could be seen that the relationship between education expenditure and human capital development is positive. This means that education expenditure has a direct impact with human capital development. In other words, increases in education expenditure will likely result in a rise in human capital development whereas a decrease in education expenditure will probably result in a fall in human capital development. In addition, the results showed that life expectancy, health expenditure and government effectiveness also have positive relationships with human capital development in Nigeria respectively. Corruption has negative relationship with human capital development in Nigeria. This means that corruption and human capital development move in opposite directions in Nigeria. An increase in corruption will decrease human capital development in Nigeria. Thus, corruption has an adverse effect with human capital development in Nigeria. Consequently, with the exception of life expectancy index and corruption which was not significant, education expenditure, health expenditure, and government effectiveness have significant effect on human capital development.

Based on the findings of the study, the study recommends that: the government should adequately fund education in line with the international benchmark of 25% of the nation's annual budget. This will help enhance the standard of education in the country. The government should also adequately finance the health sector. This will improve the country's life expectancy and reduce the increasing medical tourism abroad. Adequate and functional laws should be put in place to help tame the systemic corruption that is eating into the bones and fabrics of the nation's economy.

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