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Determinants of Human Capital Development in Nigeria: An ARDL Methodology

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Abstract

The research work analyses the likely determinants of human capital development in Nigeria. Methodologically, the Autoregressive Distributed Lagged Model (ADRL) was modeled to examine the nature of relationship, where Human Capital Development Index (HCI) is presumed to depend upon changes in various list of Independent Variables estimators which were estimated over the period 1990 to 2018. Data were sourced from the National Bureau of Statistics, Word Development Indicators (WDI) as well as those provided by the Central Bank of Nigeria Statistical Bulletin. Empirical results showed that the relationship between tertiary school enrolment and human capital development was positive but insignificant. Therelationship between government expenditure on education (GXE), government expenditure on health (GXH), life expectancy (LI) on human capital development (HC)was positive and significant while the relationship between Fertility Rate and human capital development in Nigeria was negative and significant. This succinctly indicates that increased fertility rate with attendant population growth can hamper human capital development. Furthermore, a trade-off exists between increasing fertility rate and the pursuit of human capital development. The research recommended increased budgetary allocation to the educational and health sector in Nigeria.

Introduction

1.1 Background to the Study

The conspicuous pursuance of human capital development is no longer confined to the agendas of developing countries struggling to overcome the legacies of economic history, including the consequences of arbitrarily imposed dependence on traditional natural resources as a precursor to sustainable development. It is now a challenge for the growing cosmopolitanism of developed countries. In a rather candid approach, international commitment has reinforced the roles of human capital development in form of the Human Capital Project, which is a methodological framework, designed to strengthen and accelerate effective policies and strategy towards expanding human capital investment (World Bank, 2018). As noted in the World Development Report (WDR) (2019) titled "The Changing Nature of Work", the frontier for skills is moving rapidly, bringing both opportunities and risks. Mounting evidence abound signaling that without strengthening human capital, countries cannot sustain economic growth, will not have a workforce prepared for the more highly skilled jobs of the future, and will not compete effectively in the global economy. The cost of inaction on human capital development is increasing in the "Knowledge economy" which is the new normal.

Human capital is the most valuable intangible asset that needs to be mobilized and harnessed (Awopegba, 2003). Capital accumulation and natural endowment constitute the static element of production, which remains largely unutilized without human intervention while the human capacities represent the dynamic element of production. Admittedly, the human capital represents the end and means of every developmental trajectory.

The Federal Government of Nigeria in tandem with global best practice incorporated human capital development into the Economic Recovery and Growth plan (ERGP), a medium term plan for 2017-2020 advanced to restore sustained economic growth while leveraging on the ingenuity and resilience of the Nigerian people – the nation's most priceless assets (Ministry of Budget and National Planning, 2017). Quite antithetical to expectations, investment in human capital development witnessed no substantial improvement. For instance, budgetary allocation to the health sector is comparatively inconsequential to other African countries. The total health expenditure(THE) as proportion of the gross domestic product (GDP) from 1998 to 2000 was lesser than 5 percent dwindling behind the THE/GDP ratio in other developing countries such as Kenya (5.3 percent), Zambia (6.2 percent) , Tanzania (6.3 percent), Malawi (7.2 percent) and South Africa (7.5 percent) (Gideon, G. Goshit& Rosemary, A. Anga, 2014).

Health expenditure, public (percent of government expenditure) in Nigeria was reported at 131 percent in 2014 while the government expenditure in tertiary institutions counterpart as percent of GDP (percent) in Nigeria was reported at 0.50335 percent in 2003 (World Bank, 2020). The percentage of government allocation to education steadily declined from 7.14 percent in 2018 to 7.11 percent in 2019 and 6.48 percent in 2020 while aggregate expenditure on health was less than five percent (BudgiT, 2020). This is a far cry from the UNESCO recommended minimium benchmark which is 26% budgetary allocation to education while WHO recommended at least 15% allocation to health. So long as investment in human development remains scars, sustainable economic development will remain illusionary in Nigeria.

Recently, the United Nations Development Programmes (UNDP) 2019 report placed Nigeria in the 158th positions underneath the low, Human Development category (UNDP report, 2019). By the UNDP ranking, Nigeria lagged behind Ghana, Kenya, Cabo Verde, Angola, Namibia, Cameroun, Equatorial Guinea, Zimbabwe and Congo among others, which featured in the medium Human Development category. Equally worrisome is the fact that the joint wealth of Nigeria's five richest men - $29.9 billion - could end extreme poverty at a national level yet 5 million people face hunger (Oxfam, 2018). The accrued earnings from the wealth of the richest man in Nigeria are sufficientto lift 2 million people out of the scourge of poverty. Perhaps the growing inequality is explicable by daunting investment in human capital development.

Available Strands of literature on the determinants of human capital development remain scanty despite the seeming importance of the indicator to national development. The focal emphasis of available literature such as Adamu (2003), Adelakun O. J. (2011), Fuente (2009), Ibok and Ibanga (2014) was on the link between human capital and economic growth while these studies have enunciated the germane role of human capital development on economic growth, quite surprisingly, little attention has been paid to appreciating the determinants of human capital development. This paper contributes to this literature by exploring the determinants of human capital development rather than its effect. As such, the investigation on the determinants of human capital development is well timed and profoundly critical. The resilient association between human capital development and human welfare provoked inquiry into the determinants of human capital development in Nigeria. After all, crucial to the entire development process today is the development by, of and for people regardless of the prevailing political economic milieu. In view of the unfolding realities coupled with prolonged debate, it is therefore necessary to carry out in-depth examination of the determinants of human capital development in Nigeria to identify the plausible reason for the low productivity level.

2.1 Conceptual Review

Awopegba (2003) defined Human resources to connote the aggregate stock of a nation's human beings which can be drawn upon for present and future production and distribution of goods and services. Put differently, human resources are the important variables within the aggregate nation's human resource stock. Ayodele, (2003) sees human resources as the energies, skill, knowledge and ingenuity of human applied to the exploitation of raw materials and the production of final goods and services for the improvement of people's standard of living and hence foster national cohesion. Human resources constitute the ultimate basis for the wealth of nations (Okojie, 2003).Indeed; the quality of human resources- being the embodiment of mental and physical power of people is viewed as the sine qua non of development (Medupin, 2013). This explains increased attention to educational advancement. Education creates technological progress, and literate and knowledgeable workers are able to do their job efficiently (Nidahib, 2000). However, the concept human capital development is enshrined with many facets and complexities. According to Kairo, MangOkeke and Aondo (2017), any index of human progress must incorporate a range of indicators to capture these complexities. Hansson (2008) noted that Organization for Economic Corporation and Development (OECD) measurement on human capital is closely linked to international comparable statistics considering investment in human capital, quality adjustments, and result of education. On the one hand, the human capital development is commonly measured using a composite index called the human development index (HDI). This index comprises health, knowledge, and standard living components using life expectancy at birth, expected years of schooling and quality of life as proxy, respectively. The HDI is an improvement on the traditional income indicator. The basis of the HDI is that human development goes beyond the improvement in income to the wider terrain of the choices open to an individual (Iganiga& Obafemi, 2014). Aside the HDI, there are other human development composite indices like the inequality-adjusted human development index, gender inequality index and multi-dimensional poverty index (Kairo, MangOkeke&Aondo, 2017). In another dimension Human capital is represented by the aggregation of investment in activities, such as education, health, on-the-job training and migration that enhance an individual's productivity in the labour market. Frank &Bemanke (2007) as cited in OECD (2009) conceptualizes human capital as an amalgamation of education, experience, training, intelligence, energy, work habits, trustworthiness, and initiative that affect the value of a worker's marginal product.

Human capital is an enabler which amplifies the people latent capacities to realize their full potential, and is the primary element driving nations' economic growth and competitiveness on a global scale. World Bank (2018) aptly posited that human capital connotes the summation of a population's health, skills, knowledge, experience, and habits, and forms the basis for individual and societal well-being.

2.3 Review of Empirical Literature

Jameel and Naeem (2016) investigated the impact of human capital on economic growth using panel modeling of eleven (11) countries for the period of 1992 to 2014. The econometrics analysis inferred that there is a long term relationship between the real gross domestic product (GDP) and human capital in fixed effect model. Similarly, Hanif and Arshed (2016) examined the role and contribution of primary, secondary and tertiary education on economic growth of the SAARC region between 1960- 2013. The methodological approach employed was the Ordinary Least Squares (OLS) and the fixed effect model (FEM). Findings emanating from the studies showed that education had a significant positive effect on economic growth. It was recommended that the Government can achieve better results by investing heavily in educational sector.

Odo et. al. (2016) examined the relationship between expenditure on education and health in Nigeria premised on the Cointegration techniques. The empirical findings affirmed that the VECM, 1 percent increase in the government expenditure on education (TEDU), on the average resulted to 23.8 percent increase in GDP while, 1 percent significant increase in the government expenditure on health (THEA) caused 37.6 percent significant decrease in GDP. Obialor (2017) provided empirical evidence that substantiated the impact of government human capital investment on the economic growth using panel data from three Sub-Sahara African (SSA) countries namely, Nigeria, South Africa and Ghana from 1980 to 2013. The Cointegration techniques and Vector Error Correction mechanism (ECM) was employed as the empirical methodology to estimates the parameters. The results indicated that Health, (GIH), and Education (GIE), showed significant positive effect on growth in Nigeria, while literacy ratio (LR) was insignificantly positive in the countries considered for the study.

Adeyemi and Ogunsola (2016) examined the relation between human capital indices and economic growth in Nigeria for the period of 1980 -2013. The ARDL Co-integration analysis was used for the econometrical analysis. The findings from the study revealed that an insignificant positive long-run relationship existed among secondary school enrolment, public expenditure on education, life expectancy rate, gross capital formation and economic growth. The results also affirmed a negative long-run relationship among primary, tertiary school enrolment, public expenditure on health and economic growth.

Lawanson (2015) in a similar vein empirically analyzed the role of the educational and health components of human capital on economic growth. The study employed the dynamic Difference-Generalized Method of Moment (D-GMM) panel technique to estimate panel data from sixteen West African countries over the period 1980 to 2013.Findings indicate that the coefficients of education and health had positive statistically significant effects on GDP per capita.

3.0 Methodological Framework and Sources of data

3.1 Model Specification

The study adopted the model of Becker (2007) model as transformed by Ubi-AbaiItoro and Chioma (2018) with slight modification for our analysis. The functional relationship of the model of Becker (2007) model as transformed by Ubi-AbaiItoro and Chioma (2018) is stated in equation 3.7 below;

HC = f (GXE, GXH) 3.8

The author modified by adding TER, LI and FER. Thus equation (3.8) with additional variable gives:

HC= f (TER, GXE, GXH, LI, FER) 3.9

HC = f (TER, GXE, GXH, LI, FER) 3.10

Stating the equation 3.10 in an econometric form gives equation 3.11 below;

$$HC_t = \beta_0 + \beta_1 TER_t + \beta_2 GXE_t + \beta_3 GXH_t + \beta_4 LI_t + \beta_5 FER_t + \varepsilon_t \quad 3.11$$

Where;

HC = human capital (Human capital development or HDI),

TER = Tertiary school enrolment at time t as proxy for technological advancement,

GXE = Government expenditure on education,

GXH = government expenditure on health,

LI = Life Expectancy at time t,

FER = Fertility Rate at time t,

β_0 = constant, β_1 - β_5 is the slope of the independent variables while ε_t is the error term at time t.

3.2. Sources of Data and Measurement of Variable

This study relies on historical quantitative data sourced from CBN Statistical Bulletin, National Bureau of Statistics National Abstract of Statistics, and World Bank Development Index for the period 1990 to 2018.

3.3 Econometric Framework

3.3.1 Unit Root Test for Stationarity of Series

The process involves examining the stationarity status of all variables under consideration. This determines the order of integration of a stochastic process order whether stationary or non-stationary. The test is adjudged to conform to stationarity premised on the condition that the F-stat exceeds the critical value at 10%, 5% or 1% significance level respectively. It is test at levels or first difference. Statioanrity at levels is known as integration of order 1 or I (1). Stationarity at first difference is known as integration of order 2 known as I(2). The need for the variables to be checked for stationarity either at first difference or levels order is germane to avoid a spurious regression. The universally acceptable methodology for verifying unit root is Augmented Dickey-Fuller (ADF) test pioneered by the works ofDickey and Fuller (1979, 1981), and the Phillip-Perron (PP) attributable to Phillips (1987) and Phillips and Perron (1988). ADF adjust higher order serial correlation by incorporating lagged difference term on the right hand side rejecting a null hypothesis of unit root (the series are non-stationary) in juxtaposition for the alternative hypotheses of stationarity. The tests are also amenable to experimentation with and without a deterministic trend (t) for each of the series.

3.3.2 The ARDL estimation technique

In order to choose a plausible time series model, the investigation of the time series data to verify the stationarity and cointegration tests is central. This research paper adopted the autoregressive distributed lag (ARDL) bounds testing approach to cointegration developed by Pesaran and Shin (1995). The technique is advantageous in comparison to other estimation techniques like Engle and Granger (1987) and Johansen (1991). Firstly, the technique is amenable for empirical investigation regardless of the order of the integration of the regressors (either I(1) and/or I(0)). In addition, the aforementioned technique is also a more statistically robust approach for examining correlation especially in the event of small data size as other techniques require large data size for validity. Furthermore, the variables can possess different optimum lags, which is not applicable in other techniques. The technique also employs a single reduced form equation to empirically determine both the long-run and short-run relationship among variables under consideration (Babajide and Lawal, 2016; Babajide et al., 2015; Bahmani-Oskooee and Ng, 2002, 2010; Pesaran and Shin, 1999). The ARDL model which follows equation 3.8 is stated below;

$$\Delta HC = \varphi_0 + \sum_{i=0}^{p} \varphi_1 \Delta HC_{t-1} + \sum_{i=0}^{p} \varphi_2 \Delta TER_{t-1} + \sum_{i=0}^{p} \varphi_3 \Delta \ln GXE_{t-1} + \sum_{i=0}^{p} \varphi_4 \Delta GXH_{t-1} + \sum_{i=0}^{p} \varphi_5 \Delta LI_{t-1}$$

$$+ \sum_{i=0}^{p} \varphi_6 \Delta FER_{t-1} + \beta_5 TER_{t-1} + \beta_4 GXE_{t-1} + \beta_3 GXH_{t-1} + \beta_2 LI_{t-1} + \beta_1 FER_{t-1} + \mu_t \quad \text{.....(3.15)}$$

The notations expressed on the right side from $\beta_5 - \beta_1$ affirmed the long-run relationship among the variables, while the notations from $\varphi_1 - \varphi_6$ with the summation signs corresponding to the short-run dynamics of the variables while α_0 connotes constant and ε_t is the disturbance term. The stages of estimating the Autoregressive Distributed Lagged Model bounds test is outlined as follows; the null hypothesis in Eq. (xi) is H_0: $\varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = \varphi_6$. This means the nonexistence of long run relationship while the alternative is H_1: $\varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq \varphi_6$ implying the existence of long run relationship among variables of interest.

4.1: Empirical Analysis

The data analysis is presented in this chapter. The first section is subdivided into introduction, descriptive statistics of the data; the unit root test and post estimation test such as stability and normality tests. The study also carried out a cointegration test which is a precondition for estimating the error correction model. The Autoregressive Distributed Lagged model was the econometric technique employed for estimation. The data on the study range from 1990 to 2018. The data were sourced from the CBN statistical Bulleting and the World Bank Development Indicators, 2019 version.

Table 4.1:Descriptive statistics of the data

	HC	TER	GXE	GXH	LI	FER
Mean	0.463345	8.682749	85.51184	85.51184	48.76821	5.990034
Median	0.463000	9.924160	40.62142	40.62142	47.71700	6.011000
Maximum	0.534000	26.64641	296.4428	296.4428	55.20000	6.490000
Minimum	0.378000	0.740920	0.150161	0.150161	45.84100	5.457000
Std. Dev.	0.049055	6.557661	95.01464	95.01464	3.028132	0.288686
Skewness	-0.091007	0.606441	0.863231	0.863231	0.587065	-0.173545
Kurtosis	1.777631	2.952866	2.287834	2.287834	1.940626	2.178734
Jarque-Bera	1.845505	1.780242	4.214485	4.214485	3.021866	0.960564
Probability	0.397424	0.410606	0.121573	0.121573	0.220704	0.618609
Sum	13.43700	251.7997	2479.843	2479.843	1414.278	173.7110
Sum Sq. Dev.	0.067379	1204.082	252777.9	252777.9	256.7484	2.333517
Observations	29	29	29	29	29	29

Source: Author, 2020

Table 1 shows that all the means and the medians of the variables lie within their minimum and the maximum. Meeting this criterion implies the data are good enough to be adopted for estimation and for projections.

Table 4.2: The Results of Augmented Dickey-Fuller (ADF) and Phillips Perron (PP)

	Augmented Dickey-Fuller (ADF)		**Phillips Perron (PP)**		
Variable	Level	1st difference	Level	1st difference	Remark
HC	-1.4485	-2.2371***	-1.7406*	-2.3496	I(1)
TER	1.6075	-4.5179***	-0.6083	-4.9838***	I(1)
GXE	1.3689	-3.1433**	0.3285	-5.219***	I(1)
GXH	-2.372	-4.6176***	-7.9818	-3.0304**	I(1)
LI	-8.7954*	1.3462	-7.2681***	-1.265125	I(0)
FER	-0.51657	-6.84975***	1.502218	-6.9218***	1(1)

Source: Computed by the Author

Note; Asterisks (*), (**) and (***) show the significance level at 10%, 5% and 1% level of significance respectively.

The statonarity test on Human capital, tertiary education enrolments, government expenditure on education, government expenditure on health, and Fertility rate have shown to be stationary at first difference. On the other hand, the unit root test on the life expectancy has shown to be stationary at level. This means that the stationarity level of the variables of the study are mixture of stationarity at levels and first difference. None of the variables adopted in this study is stationary at second difference as this has a high tendency of leading to a spurious result. They are stationary because the ADF and PP calculated statistics are lesser in comparison to the critical values of the ADF and PP at 5% levels of significance.

Table 4.3: Test for Cointegration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.176050	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Author, 2020

The value of the F-statistic (6.176) is greater than the critical values at 10% and 5%, 2.5% and at 1% levels of significance. Thus, the null hypothesis of no co-integration is rejected, implying long run co-integration relations among the variables (table 4.3).

Table 4.4: ARDL Long Run Form and Bounds Test
Sample: 1990 2018

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TER	0.000326	0.000328	0.993314	0.3345
GXE	0.372574	0.047438	7.853908	0.0000
GXH	22.38666	2.878334	7.777646	0.0000
LI	0.006036	0.001647	3.664980	0.0019
FER	-1.722141	0.201578	-8.543292	0.0000
C	-7.518546	1.159124	-6.486403	0.0000

R-squared	0.996361	Mean dependent var	0.469370
Adjusted R-squared	0.994435	S.D. dependent var	0.045206
S.E. of regression	0.003372	Akaike info criterion	-8.268310
Sum squared resid	0.000193	Schwarz criterion	-7.788370
Log likelihood	121.6222	Hannan-Quinn criter.	-8.125598
F-statistic	517.2176	Durbin-Watson stat	2.106115
Prob(F-statistic)	0.000000		

Source: computed by the Author from Eviews 10.

The long run test statistics (Table 4.4) reveal that government expenditure on education (GXE), government expenditure on health (GXH), life expectancy (LI) and Fertility rate (FER) are the key determinant of human capital development in Nigeria. The finding is in line with the results of Matthew, Ogunnaike and Fasina (2008) and Sieng and Yussof (2015). The coefficient of these variables stood at 0.37 for government expenditure on education (GXE), 22.38666 government expenditure on health (GXH), 0.006036 for life expectancy (LI) and -1.722141 for Fertility rate (FER) and they are all statistically significant at 1% level. Precisely, the coefficient of government expenditure on education (GXE) shows that in the long run a 1% increase in government expenditure on education (GXE) will result to 0.3% increase in human capital. Government expenditure on health (GXH) and life expectancy (LI) had similar positive influence on human capital development in Nigeria. The Fertility rate (FER) coefficient, though significant, has a negative impact on level of human capital in Nigeria, suggesting that the country's high fertility rate, explosive population growth coupled with chronic underinvestment in health and education and high unemployment have dangerous implications for economic development (World bank, 2018). The coefficient of Tertiary School enrolment (TER) stood at 0.000326 and unfortunately, is statistically insignificant. This further lends credence to the fact that the ever increasing students in higher institutions of learning are not tantamount to improved quality of human resources in Nigeria. Previous studies have attributed this positive but insignificant coefficient of tertiary school enrolment to public and private corrupt practices which divert scarce resources from productive activities to underfunding, dearth of infrastructures, corruption, examination malpractice, " Brain Drain, among other factors. (Ifejika, 2017; AlukoAluko, 2012; and Jaiyeoba,2015). This result corroborates the conclusions of Aigbokhan, Imahe and Ailemen (2007).

Table 4.5: Serial correlation, model

Null Hypothesis: No serial correlation
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.292085	Prob. F(2,15)	0.7509
Obs*R-squared	1.012092	Prob. Chi-Square(2)	0.6029

The correlation result from figure 4.6 above shows it is statistically insignificance (0.05) at 5%, this implies we accept the null hypothesis that no correlation exists among the variables. There absence of correlation shows the data of the study are good and fit for estimation.

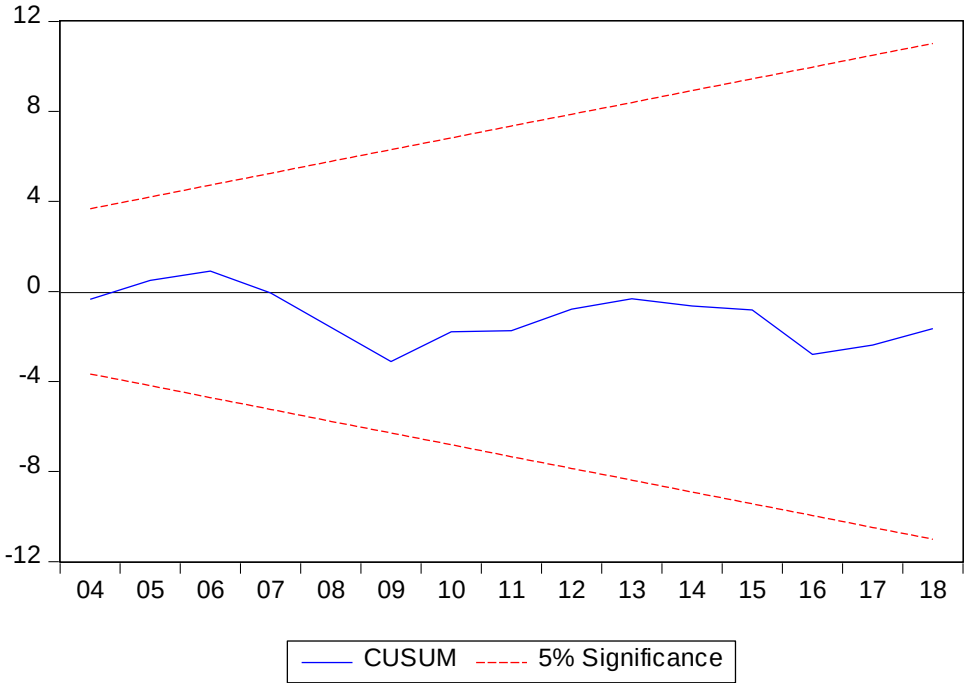
It is important data are free from correlation because if correlation exists in the data adopted for the analysis the result may be a spurious one. A spurious result is one that we can rarely make sense out of it.

Table 4.6: Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

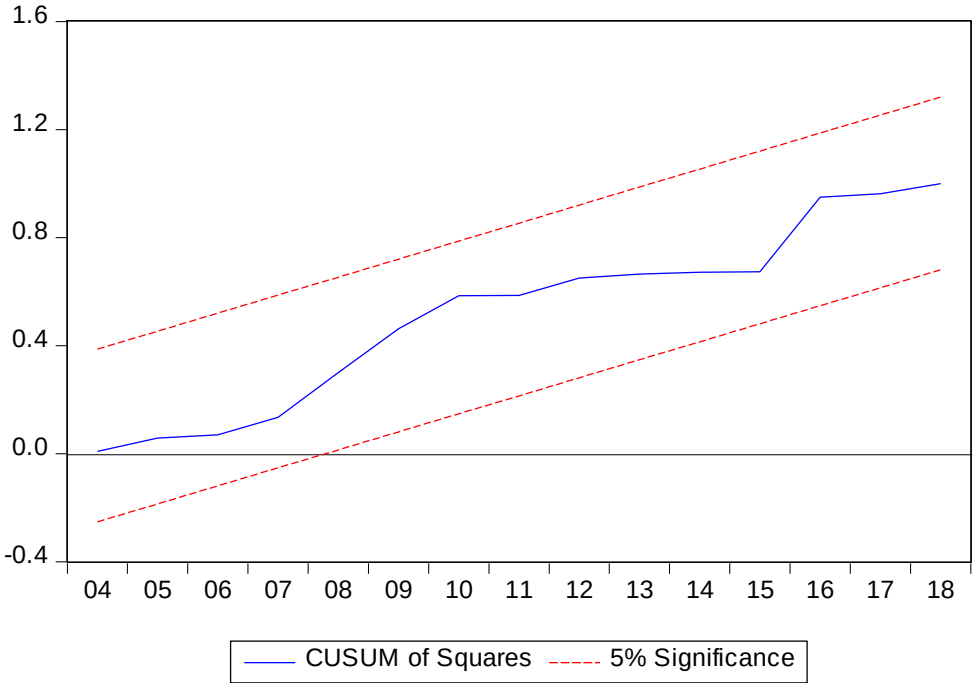
F-statistic	1.222884	Prob. F(9,17)	0.3439
Obs*R-squared	10.61063	Prob. Chi-Square(9)	0.3033
Scaled explained SS	12.13070	Prob. Chi-Square(9)	0.2060

Figure 4.2: Stability test (model 1)



Source: computed by the Author

Figure 4.3: Stability test (model 2)



Source: computed by the Author

The CUSUM and CUSUM of the residual is within the boundaries of the critical line (dotted bounded) without any intersection, this confirms the data of the model are stable. This then implies that the model of the study is stable over time at 5 percent level of significance.

5.1 Conclusion and Policy Recommendations

The finding of the study leads to two main conclusions. First, the determinants of human capital development are deteriorating in Nigerian economy as supported by data. This is premised on the empirical results from the study. This therefore draws attention to the fact that human capital inadequacy has engrossed the economic prospect of the country and need urgent action to surmounting them. However, these determinants are still very much significant to the human capital development process; the economy needs to reinvigorate investment in improving the level of human capital development.Second, combined impacts of the explanatory variables are sufficient enough to explain a 99% variation in human capital development.From the foregoing analysis carried, It is crystal clear that the recent call to scale up the budgetary allocation to minimium threshold of twenty six percent and fifteen percent for educational and health sector respectively is a step in the right direction. The financing gaps could be bridged through effective utilization of the public-private partnership (PPP) framework. The study also recommends sensitization of the populace to help them understand the harms of overpopulation and the need for family planning and finally need for sex education aimed at controlling fertility rate.

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