AN ANALYSIS OF THE IMPACT OF HUMAN CAPITAL DEVELOPMENT ON ECONOMIC GROWTH IN NIGERIA

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ABSTRACT
The study examines the impact of Human Capital Development on Economic Growth in Nigeria from 1989 to 2023. The Zivot-Andrew unit root test indicates that real gross domestic product, interest rate and secondary school enrolment are stationary at first difference while growth capital formation, labour force and tertiary school enrolment are stationary at level. ARDL model shows that that growth capital formation has a positive and statistically significant effect on the real gross domestic product in Nigeria. The labour force shows a positive and statistically significant effect on the real gross domestic product in Nigeria. Secondary school enrolment shows positive and statistically significant effect on the real gross domestic product in Nigeria. Tertiary school enrolment indicates positive and statistically significant effect on the real gross domestic product in Nigeria. The study recommended Nigeria should invest more in human capital development process and endeavours prioritize the education sectors budgeting considering its growth driving potentials in Nigeria. Similarly, government should endeavour to pay attention to the issue of school enrolment.
Keywords: Human capital development, Economic growth
JEL Classification O15, O40

1. INTRODUCTION
In response to myriads of problems such as declining quality of education and relevance, under-employment, low absorptive capacity, shortage of professionals, and brain-drain, a number of policy and reforms initiatives were undertaken to improve human capital formation and utilization in Nigeria. These included the National Policy on Education 1977 revised in 1981, 1998 and 2004, the Universal Basic Education (2004), the Dakar framework for Action/Education for All (1990), the Millennium Development Declarations and Goals (2000), the National Economic Empowerment and Development strategy (NEEDS, 2005) and Sustainable Development Declarations and Goals (2015). Public spending on education and health has also risen steadily between 1988 and2018. CBN annual reports (1988 -2018) revealed that public expenditure on education average 6.4% between the period 1999 – 2018 and as a proportion of gross domestic product (GDP) rose from an average of 1.5 per cent between 1981 and 1991 to 2 and 15 percent. In addition to public resources, households contribute around 25 percent of total national education expenditure. United Nations Educational, Scientific and Cultural Organization (UNESCO) National Education Index 1989 – 2018). Human capital consists of the knowledge, skills, and health that people invest in and accumulate throughout their lives, enabling them to realize their potential as productive members of the society (World Bank, 2021). Better standard of living in the form of good healthcare, quality education, availability of jobs and skill acquisition help develop human capital and therefore a key to ending extreme poverty and creating more inclusive societies. Human capital development requires more than good education, health care and skills. This is because, the circumstances preceding, surrounding and succeeding conception of a human being will all influence and determine the kind of human capital the child will become in future. Despite the rising trends of investment in education, Nigeria's share for education diverges sharply from regional and international norms. For instance, UNESCO World Education

Report 2018 indicates that for 19 other countries in Sub- Saharan Africa, education expenditure average 18% of GDP. This implies Nigeria's funding efforts and its budgetary priority for education is lower than that of Sub Saharan Africa. Similarly, between 1988 and 2018, health expenditure as a percentage of GDP, in Nigeria, grew by a mere 1 per cent. Total public health expenditure in 2018 was 3.6%. The impact of reforms in health sector is slow as indicated by major health care indicators in Nigeria. According to the midpoint assessment of the Millennium Development Goals (2008), infant mortality rate decline from 113 per 1000 in 1990 to 75 per 1000 in 2017. Maternal mortality ratio has worsened from 289 in 1999 to 814 in 2017. Access to basic sanitation marginally improved from 24.5% in 2001 to 26.6% in 2016. Access to safe drinking water marginally improved too from 15.7% in 2001 to 20.1% in 2016.From the foregoing, investment in human capital formation has remained inadequate and has slowdown attainments of the objectives of national development and those of the Dakar framework for Action/Education for All (1990), the Millennium Development Declarations and Goals (2000) and Sustainable Development Declarations and Goals (2017).Therefore, the process of human capital formation has remained unimpressive because of the myriads of problems such as quality/relevance of education and the ability of increased investment in human capital to stimulate growth and development may be hindered because of the dysfunctional process of human capital formation and utilization in Nigeria. According to Garba (2003), the dysfunction has created and sustained great divides between theory and practice, between formal and informal skills and knowledge forming and using centre, and between local and foreign components which constitute formidable obstacles to Nigeria's development process. This may explain the sluggish growth of the non-oil sectors of the economy. Similarly, human capital utilization in Nigeria has not been impressive. This is because employment growth rates failed to keep pace with expansion in economic activities. According to the National Bureau of Statistic's annual abstract of statistics (2018) growth rates of employment were 9.69%, 10.44%, 14.23%, 20.4%, and 23.1% for the years 2011, 2012, 2013, 2014 and 2015 respectively compared to growth rates of real GDP of 6.06%, 6.69%, 6.76%, 8.04% and 9.13% for the same periods. The trend shows that when the country experienced sustained growth rates, employment responded rather sluggishly. This is because the value addition in the real sector has been limited and so has been the employment effect. Also available data from National Bureau of Statistics (2018) revealed that underemployment rate is significantly high. Underemployment rate was 19.7% in 2018. Similarly, growth during this period has not resulted in appreciable decline in unemployment. Unemployment figures continue to rise. Unemployment rose from 5.96% in 2011 to 14.23% in 2016. The presence of these problems in spite of the various policy formulation and response requires detail empirical analysis. The main objective of this study is to examine the impact of human capital development on economic growth in Nigeria. The rest of the paper is organized as follows: literature review which is the second part of the paper, methodology which discussed the model employed in the study and is the third part of the paper, part four of the paper is presentation and analysis of the empirical findings and the part five discussed the conclusion and recommendations of the study.

2. LITERATURE REVIEW

2.1 Conceptual literature

OECD (2001) defined human capital as the knowledge, skills, competencies and attributes embodied in individuals that facilitates the creation of personal, social and economic well-being. Harbison (1973) "Human resources constitute the ultimate basis for the wealth of nations. Capital and natural resources are passive factors of production; human beings are the active agents who accumulate capital, exploit natural resources, build social, economic and political organization, and carry forward national development. Clearly, a country which is

unable to develop the skills and knowledge of its people and utilize them effectively in the national economy will be unable to develop anything else" Marimuthu (2009) human capital simply refer to the "processes that relate to training, education and other professional initiatives in order to increase the levels of knowledge, skills, abilities, values, and social assets of an employee which will lead to the employee's job satisfaction and performance."

2.2 Theoretical literature

Romer Research and Development Model: Romer (1990) formulated an explicit growth model with technical progress resulting from deliberate actions taken by private agents who respond to market incentives. A key feature of Romer's model is the introduction of imperfect competition in the capital goods sector, which makes it possible to model a firm's behaviour as engaging in deliberate research activities and thereby being compensated with monopoly rents for a successful innovation. By introducing profit-seeking research behaviour in the growth model, Romer generates an explanation for technological progress inside the model. Accumulation of knowledge (innovations) forms the engine of growth and this accumulation can be unlimited because of the very nature of knowledge, which is a non-rival good with partially exclusive use. Nevertheless, self-maintained growth is based on the hypothesis of linear increase in knowledge stock. The key property of the research process in the Romer model is a twofold influence of knowledge on the economy. First, the limits of knowledge determine the range of intermediate goods, which in turn influences the efficiency of final goods production. Secondly, knowledge determines also the productivity of human capital in the research sector, allowing for faster technological progress. In this way, knowledge is the essential factor of economic growth.

2.3 Empirical literature

Temilade, Bgenga and Babatunde (2024) examined the effect of human capital flight on economic growth in the Sub- Saharan African (SSA) region. The technique adopted for this study is the Panel Corrected Standard Error Method. This method was employed because it controls for heteroscedasticity and auto correlation. The result revealed that there exists a direct relationship between net migration and economic growth in SSA. This shows that the net migration enhances economic growth in SSA region. Thus, net migration positively impacts economic growth in the SSA region. Investment in education and training is important for SSA countries as it can aid individuals in improving their skills and progressing in their professions. Afang, Kumai, and Kwaji (2023). All public tertiary institutions in Kaduna State, including Ahmadu Bello University Zaria, Kaduna State University, Nuhu Bamalli Polytechnic Zaria, and Kaduna Polytechnic, comprised the study's population. Gidan Waya of Kaduna State College of Education and National College of Education Zaria. Each public entity received twenty-five questionnaires. The sample size was determined by administering 150 questionnaires and retrieving 112 from the responders. Thus, the importance and influence of human capital development in Kaduna State's public tertiary education system will undoubtedly improve learning and growth in all spheres of human endeavour.

Susan and Ogozi (2023) examined the nature of the structural break in labour productivity in the aftermath of the Covid pandemic, particularly given investment in health and education. The data for the study which covers the period of 1991-2022 were obtained from the World Development Indicators and the Central Bank Statistical Bulletin of various years. The Chow test was used in this study to test for the presence of structural breaks in the productivity model. Findings from the estimation of the model reveal the presence of significant structural breaks due to the pandemic. This implies that the period of the Covid-19 pandemic significantly impacted the level of productivity within the economy measured by the output per worker. Findings also revealed that mobile subscriptions which allow access to the internet had a

significant positive effect on productivity. Government spending on health and education did not have a significant impact on productivity before and after the pandemic. Ogunleye, Owolabi, Sanyaolu, and Lawal (2017) examined the impact of human capital development on economic growth of Nigeria, using annual time series date from 1981 to 2015. The empirical results show that human capital development has significant impact on economic growth, as proxy by the gross domestic product. In line with theory, the human capital development indicators namely secondary school enrolment, tertiary school enrolment, total government expenditure on health and total government expenditure on education exhibit positive and statistically significant impact on economic growth of Nigeria which implies that these indicators are indispensable in the achievement of growth in the Nigerian economy. However, life expectancy and primary school enrolment exhibit a negative and statistically insignificant impact on economic growth of Nigeria. The study concluded that the Nigerian government should ensure to allocate adequate resources for the development of human capital in order to enhance economic growth in Nigeria.

Idenyi, Onyekachi and Ogbonna (2016) examined the effect of human capital development on the growth of Nigeria economy using co integration techniques to investigate the effect of human capital development and economic growth in Nigeria. The results show that there is significant long-run relationship between human capital development and economic growth in Nigeria. This is confirmed by the Johansen co-integration. It was estimated from the VECM, 1% increase in the government expenditure on education (TEDU), on the average led to 23.8% increase in GDP while. 1% increase in the government expenditure on health (THEA) caused 37.6% decrease in GDP. The two variables as human capital development factor were found to have significant effect on economic growth. However, government expenditure on education has positive relationship with GDP. This implies any increase in expenditure on education contributes positively to the growth of the economy.

Adeyemi and Ogunsola (2016) examined the impact of human capital development on economic growth in Nigeria using time series data spanning from 1980 to 2013 which were sourced from the World Bank Indicator and National Bureau of Statistics. It was set out to explore the relationship between human capital indices (education and health) and economic growth. The study employed ARDL Co-integration analysis to estimate the relationship among the variables used in the study. The study established long-run co-integration among the variables. The findings from the study revealed that there is positive long-run relationship among secondary school enrolment, public expenditure on education, life expectancy rate, gross capital formation and economic growth but it is statistically insignificant. The results also showed that there is negative long-run relationship among primary, tertiary school enrolment, public expenditure on health and economic growth. In line with the findings, the study recommended that government should put in place the required education and training policy that would guarantee quality schooling for primary and tertiary education. Government should also commit more funds to health sector to enhance human capital development.

Anyanwu, Adam, Obi, and Yelwa (2015) examined the impact of human capital development on economic growth in Nigeria. Theoretical growth models and macroeconomic evidence suggest that human capital accumulation is an important determinant of per capita income growth. Adopting the endogenous modelling approach cast within the autoregressive distributed lag (ARDL) framework, the bounds testing analysis indicated existence of co integration between economic growth and human capital development indicators. Findings also show that human capital development indicators had positive impact on economic growth in Nigeria within the reviewed periods; however, their impacts were largely statistically insignificant. Further evidence indicated that equilibrium is fully restored for any distortion in

the short-run. Johnson (2011) evaluates human capital development and economic growth in Nigeria by adopting conceptual analytical framework that employs the theoretical and ordinary least square (OLS) to analyze the relationship using the GDP as proxy for economic growth; total government expenditure on education and health, and the enrolment pattern of tertiary, secondary and primary schools as proxy for human capital. The analysis confirms that there is strong positive relationship between human capital development and economic growth.

2.4 Literature Gap and Value addition

The majority of the reviewed literature used time series such ARDL and panel data like GMM analysis but none of them considered the significant effect of break in the series. Therefore, the current study considered the break in the series by employing Zivot-Andrew unit root test which none of the previous study take a look at.

3 METHODOLOGY

3.1 Theoretical framework

The model to be used in this study is the human capital theory model based on Romer (1990). The theory states that growth is influenced by not only labour and capital but also human capital as is shown in equation 3.1

$Y_t = f(K_t\ L_t\ H_t)$…….. (3.1)

Where *Yt* is output, *Kt* is capital , L_t is the labour and *Ht* is human capital. Introducing technology explicitly into the model (Equation 3.1), we have the following:

$Y_t = f(K_t\ L_t\ H_t\ T_t)$……..(3.2)

3.2 Model Specification

The model of the study is specified as

$GDP\ F(GCF, SEE, TSE, LB)$……..……(3.3)

The econometric model of ARDL is specified as:

$RGDP_t = \alpha_0 + \alpha_1 InGCF_t + \alpha_2 InSEE_t + \alpha_3 InLB_t + \alpha_4 InTSE_t + \varepsilon_t$……..(3.4)

Where

$RGDP_t = Real\ Gross\ domestic\ product$

$InGCF_t = Gross\ Capital\ Formation$

$InSEE_t = Secondary\ School\ Enrollment$

$InLB_t = Labour\ Force$

$InTSE = Tertiary\ School\ Enrolment$

$\varepsilon_t = is\ the\ error\ term$

$\alpha_0, \alpha_1, \alpha_2, \alpha_3, and\ \alpha_4,$ are the parameters to be estimated whereas, the a priori expectations are <> 0.

3.3 ARDL Model and Error Correction Mechanism

The appropriate test for such a model is ARDL when variables are shown to be stationary at different orders of co-integration. To guarantee a long-term link between the variables and that the data-generation process complies with the model, it is necessary to test for both co-integration and stability. If the variables are co-integrated then there is the need to test for ECM which shows how much of the disequilibrium is being corrected over a period; what is called 'adjustment effect' (Asteriou and Hall, 2007). ECM possesses advantages of resolving the problem of spurious regression because it eliminates trend in the variables involved; and that the disequilibrium error term is stationary variable, which is prevented from exploding over

time (Asteriou and Hall, 2007). The general autoregressive distributed lag (ARDL) ECM is presented in equation.

$$\Delta y_t = \mu + \sum_{i=1}^{n-1} a_i \Delta y_{t-i} + \sum_{i=0}^{m-1} \Upsilon_i \Delta x_{t-i} - \pi \hat{e}_{t-1} + \varepsilon_t \quad \text{.....(3.5)}$$

Where Δ is the difference operator, y_t is a vector of dependent variable, $x_{t-1}$is the matrix of lag values of explanatory variables and π is the adjustment effect or error correction coefficient which is expected to be negative for the error to be corrected. Specifically, the ECM model to be tested is specified in equation

$$\Delta RGDP_t = \mu + \sum_{i=1}^{n-1} a_i \Delta RGDP_{t-1} + \sum_{i=0}^{m-1} \beta_i \Delta\, GCF_{t-i} + \sum_{i=0}^{m-1} \Upsilon_i \Delta LB_{t-i} + \sum_{i=0}^{m-1} \Upsilon_i \Delta\, SEE_{t-i} + \sum_{i=0}^{m-1} v_i \Delta\, TSE_{t-i} - \pi \hat{e}_{t-1} + \varepsilon_t \quad \text{.....(3.6)}$$

If π = 1 then 100% of the adjustment takes place within single period (instantaneous/full adjustment). If $\pi = 0$ then there is no adjustment. Thus, any other value is interpreted accordingly; a value of π closer to *1* implies quick adjustment, and value closer to0implies slow adjustment. To select the most fitted model lag length are chosen automatically by Akaike Information Criterion (AIC).
The null and alternative hypothesis for bound test concerning the test for cointegration is:

Ho: a_i=β_i=ϒ1=$u_i = v_i = \omega_i$= 0 (No long run relationship).

H1:$a_i \neq \beta_i \neq \Upsilon 1 \neq u_i \neq v_i \neq \omega_i \neq 0$ (there is long run relationship).

4 RESULT AND DISCUSSION

4.1 Descriptive statistics

Table 4.1 Descriptive statistics

Statistics	LRGDP	LGCF	LLB	LTSE	LSSE
Mean	3.292407	0.763481	1.452604	-0.186776	1.495993
Median	3.303903	0.818069	1.478941	-0.150335	1.491644
Maximum	3.428063	1.610062	1.506681	-0.099666	1.728453
Minimum	3.155036	-0.283884	1.371788	-0.489254	1.328882
Std. Dev.	0.103233	0.410537	0.047788	0.108534	0.138687
Skewness	-0.105673	-0.282791	-0.567238	-0.595997	0.035890
Kurtosis	1.316911	2.937833	1.552517	4.348996	1.388193
Jarque-Bera	4.196291	0.472132	4.932440	17.51257	4.196291
Probability	0.122684	0.789729	0.084905	0.000157	0.122684
Sum	115.2342	26.72183	50.84115	-6.537177	115.2342
Sum Sq. Dev.	0.362341	5.730376	0.077644	0.400510	0.362341
Observations	35	35	35	35	35

Source: Researchers' computation using E-views 12.

Table 4.1 shows the result of descriptive statistics of the study, it indicates that the standard deviations of the variables employed are far away from their means. The Skewness of the distribution shows negative values of real gross domestic product, growth capital formation, labor force, and tertiary school enrolment while positive value of secondary school enrolment, this means that all the variables employed are normally distributed. Kurtosis in the table shows that all the variables employed are normally distributed because their values are less than 3 except tertiary school enrolment. The Jarque-Bera test for normality is also estimated. It indicates that all the variables employed are normally distributed as their p-values are greater than 5% except tertiary school enrolment.

4.2 Zivot and Andrew Unit Root Test

The study used Zivot and Andrew unit root test in order to confirm the order of integration among the variables employed, because ignoring unit root test with break may lead the acceptance of null hypothesis where is supposed to be rejected.

Table 4.2 Zivot-Andrew Unit Root Test

	Level		First difference	
Variables	Statistics	Break point	Statistics	Break point
LRGDP	-4.013696	2013	-5.446066	2002
LGCF	-6.532709	2008	-	-
LLB	-7.246657	2011	-	-
LTS	-8.783670	1999	-	-
LSSE	-3.571573	2009	-8.449486	2014

Source: Researcher computation using E-views 10.

Table 4.2 presents the Zivot-Andrew unit root test indicates that real gross domestic product, interest rate and secondary school enrolment are stationary at first difference i.e. they are I(1) process, the break dates are 2013 and 2014. The variables such as growth capital formation, labour force and tertiary school enrolment are stationary at level i.e. they are I(0) process, the break date is 2008, 2011 and 1999.

4.3 Bound Test for Long Run

The test is conducted to ensure that the variables employed are related in the long run.

Table 4.3 Result of cointegration Bound test

Statistics	Value		Critical bound			
F-statistics	13.15518**		1%	2.5%	5%	10%
		I (0) Bound	4.4	3.89	3.47	3.03
		I (1) Bound	5.72	5.07	4.57	4.06

Source: Researchers' computation using E-views 12.

From table 4.3, the result of the cointegration bound test indicates a higher value of F-statistics than any of the critical values of all bounds. Therefore, there is strong evidence of cointegration in the model. This provides evidence of adopting Autoregressive Distributive Lag model (ARDL) in the study.

4.4 Results of the Autoregressive Distributed Lag (ARDL) Model

After conducting the unit root tests, it suggests the use of the ARDL model, this section presents the results of the model as demonstrated in chapter three. The appropriate model (number of lags) is selected automatically using the Akaike Information Criterion (AIC) which is seen as more parsimonious. Below, both short-run and long-run parameters of the model are presented. The results of the diagnostics checks are also presented.

4.4.1 Short Run Relationship

Table 4.4 presents the short-run parameters of the ARDL tests conducted. AIC suggests a 4, 4, 3, 3, 4, model after testing for up to 2500 different models (see appendix for the results of the top 2500 models).

Table 4.4 Short run parameters of the ARDL Model

Variables	Coefficient	Std error	t- statistics	Prob.
D(LRGDP(-1))	-0.226848	0.114941	-1.973609	0.0590
D(LRGDP(-2))	-0.380694	0.114497	-3.324913	0.0127
D(LRGDP(-3))	-0.989523	0.136295	-7.260180	0.0002

D(LGCF)	-0.018703	0.003478	-5.377121	0.0010
D(LGCF(-1))	-0.035214	0.006430	-5.476414	0.0009
D(LGCF(-2))	-0.028373	0.005036	-5.634020	0.0008
D(LGCF(-3))	-0.009571	0.003024	-3.165317	0.0158
D(LB)	0.001479	0.001382	1.070209	0.3200
D(LB(-1))	-0.004057	0.001772	-2.289655	0.0558
D(LB(-2))	-0.005433	0.001525	-3.561677	0.0092
D(LSSE)	0.037890	0.037575	1.008409	0.3468
D(LSSE(-1))	-0.159490	0.047062	-3.388924	0.0116
D(LSSE(-2))	-0.118128	0.040587	-2.910469	0.0226
D(LTSE)	-0.072408	0.032458	-2.230842	0.0609
D(LTSE(-1))	-0.261826	0.039124	-6.692166	0.0003
D(LTSE(-2))	-0.190355	0.027806	-6.845888	0.0002
R-squared	0.999270			
Adjusted R-squared	0.996870			
S.E. of regression	0.005763			
Sum squared resid	0.000232			
Log likelihood	138.9228			
F-statistic	416.3569			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	2.873609			

Source: Researchers' computation using E-views 12.

The result from Table 4.4 indicates a negative autoregressive and statistically significant impact of the dependent variable (real gross domestic product), this means that real gross domestic product largely depends on itself in the short run. Growth capital formation shows a negative but statistically significant effect on gross domestic product in Nigeria, at lag 1, 2 and 3 also indicates a negative and statistically significant effect on gross domestic product in Nigeria. labour force indicates a negative and statistically insignificant effect on gross domestic product in Nigeria, at lag 1 and 2 also indicates a negative and statistically significant effect on gross domestic product in Nigeria. Secondary school enrolment indicates a positive and statistically insignificant effect on gross domestic product in Nigeria, at lag 1 and 2 also indicates a negative and statistically significant effect on gross domestic product in Nigeria. Tertiary school enrolment shows negative and statistically insignificant effect on gross domestic product in Nigeria, at lag 1 and 2 also indicates a negative and statistically significant effect on gross domestic product in Nigeria. The R-squared and its adjusted value are very high The R-squared and its adjusted value are very high 0.999270, this implies that 98% change in gross domestic product is explained by growth capital formation, labour force, tertiary school enrolment and secondary school enrolment in Nigeria. The p-value of f-statistics indicates (0.000000), this means that growth capital formation, labour force, tertiary school enrolment and secondary school enrolment have 100% significance influence on the real gross domestic product in Nigeria.

4.4.2 Long Run and Error Correction Result

Evidence from the bound test result in Table 4.4, indicates a long-run relationship among the variables in the ARDL model; hence, the next task is to compute the cointegrating and long-run form of the model. This is done to enable the researcher to observe whether there exists a long-run among trade openness, industrial output and economic growth in Nigeria. Thus, the result is presented in table 4.5.

Table 4.5 ARDL Cointegrating and Long Run Form Results

Variables	Coefficient	Std error	t- statistics	Prob.
LGCF	0.172615	0.228617	0.755044	0.0449
LB	0.045986	0.039787	1.155780	0.0257
LSSE	0.752630	1.707331	1.612242	0.0509
LTSE	0.024309	2.873458	1.052498	0.0275
ECM	-0.148021	0.014559	-10.16672	0.0000

Source: Researchers' computation using E-views 10

The result from Table 4.5 indicates that growth capital formation has a positive and statistically significant effect on the real gross domestic product in Nigeria, by implication one-unit increase in growth capital formation will result 17% increase in gross domestic product in Nigeria all things being equal. The positive finding is in line with the finding of Ogunleye et al (2017) and Adeyemi et al (2016). The labor force shows a positive and statistically significant effect on the real gross domestic product in Nigeria in the long run, this means that if the Labor force increases by a single digit the real gross domestic product in Nigeria will increase by 4%. Secondary school enrolment shows positive and statistically significant effect on the real gross domestic product in Nigeria, this means that a unit increase in school enrolment will result 75% increase in gross domestic product in Nigeria. The positive finding is in line with the finding of Ogunleye et al (2017) and Adeyemi et al (2016). Tertiary school enrolment indicates positive and statistically significant effect on the real gross domestic product in Nigeria, by implication one-unit increase in tertiary school enrolment will result 2% increase in gross domestic product in Nigeria all things being equal. The positive finding is in line with the finding of Ogunleye et al (2017) and Johnson (2011). The error correction term (ECT) meets all the theoretical and statistical requirements both in the sign and size. The ECT coefficient is -0.148021 and the significance at 5%. This indicates that 14.80% of the disequilibrium due to the shock in the previous years is adjusted back to the long-run equilibrium in the current year.

4.4.3 Post-estimation tests

Table 4.6 post-estimation tests

Tests	P-value
Serial correlation	0.8532
Heteroscedastic	0.2335
Normality	0.8450
Ramsey test	0.2904

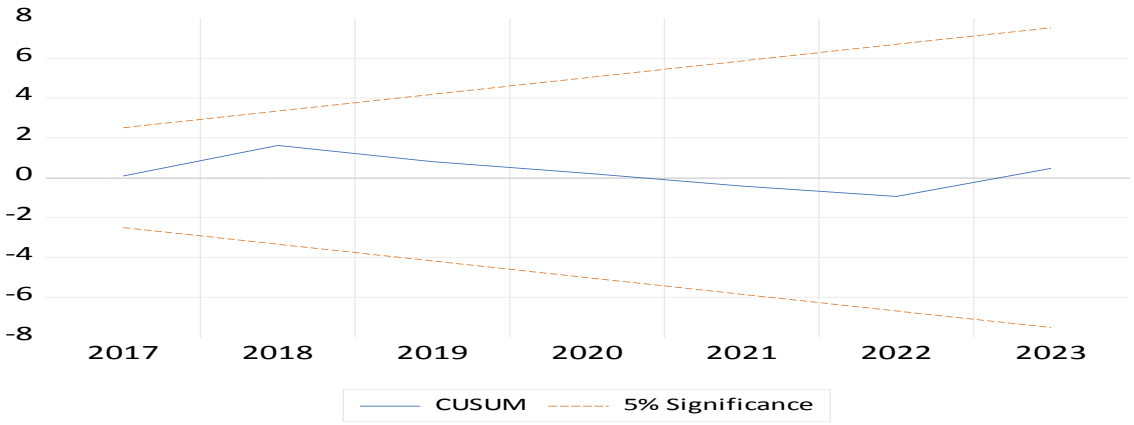
Source: Researchers' computation using E-views 12.

The model passed all post-estimation tests such as serial correlation, Heteroscedasticity, Normality and Ramsey reset test, as their probability values are greater than 5%. We can conclude that the model is robust.

4.4.4 Stability

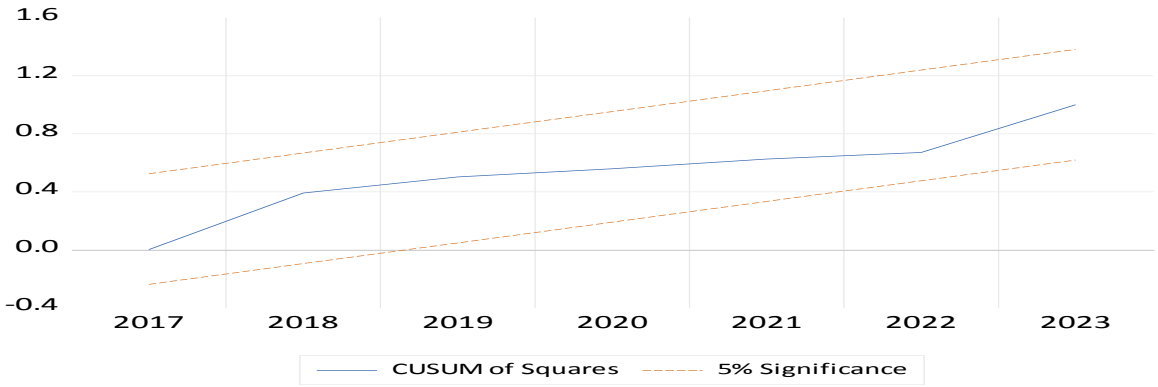
A stability test of the model is employed to ensure the data-generating process is compatible with the estimated coefficient of the model.

Figure 4.1 CUSUM Plot Recursive Residuals of ARDL model.



Source: Researchers' computation using E-views 12.

Figure 4.2 CUSUM SQUARE Plot Recursive Residuals of ARDL model.



Source: Researchers' computation using E-views 12.

Cumulative Sum of squares test line lies between two critical lines at a 5% significance level, this means that the model is stable. This shows that there is no chance of having spurious regression.

5. CONCLUSIONS AND RECOMMENDATIONS

The study examines the impact of Human Capital Development on Economic Growth in Nigeria. Variables employed in the study include real gross domestic product, growth capital formation, labour force, tertiary school enrolment and secondary school enrolment. The Zivot-Andrew unit root test indicates that real gross domestic product, interest rate and secondary school enrolment are stationary at first difference while growth capital formation, labour force and tertiary school enrolment are stationary at level. ARDL model shows that that growth capital formation has a positive and statistically significant effect on the real gross domestic product in Nigeria. The labor force shows a positive and statistically significant effect on the real gross domestic product in Nigeria. Secondary school enrolment shows positive and statistically significant effect on the real gross domestic product in Nigeria. Tertiary school enrolment indicates positive and statistically significant effect on the real gross domestic product in Nigeria. The study recommended Nigeria should invest more in human capital development process and endeavours prioritize the education sectors budgeting considering its growth driving potentials in Nigeria. Similarly, government should endeavour to pay attention to the issue of school enrolment.

REFERENCES

Adeyemi, P. A., Ogunsola, A. J. (2016). The Impact of Human Capital Development on Economic Growth in Nigeria: ARDL Approach. *IOSR Journal of Humanities and Social Science (IOSR-JHSS), 21(3), 1-7.*

Afang, A. H., Kumai G. B., & Favekwaji, K. J. (2023). Human Capital Development in Public Tertiary Education of Kaduna State. *Journal of Economics and Allied Research, 8(2), 19-30.*

Anyanwu, S. O., Adam J. A., Obi, B., & Yelwa, M. (2015). Human Capital Development and Economic Growth in Nigeria. Journal of Economics and Sustainable Development, 6(4), 16-26.

Chimbo, B. (2020). Energy consumption, information and communication technology and economic growth in an African context. *International Journal of Energy Economics and Policy, 10(4), 486-493,* doi:10.32479/ijeep.8118.

Garba, P. K. (2003) Human Capital Formation, Utilization and the Development of Nigeria: A System Analysis in Human Resource Development in Africa. Selected papers for the 2002 Annual Conference of the Nigerian Economic Society. 611-641.

Harbison, F. (1973). Human resources as the wealth of nations. Oxford University Press.

Idenyi, O. S., Onyekachi E. R., & Ogbonna, O. S. (2016). Analysis of the relationship between Human Capital Development and Economic Growth in Nigeria. European Journal of Accounting, Auditing and Finance Research, 4(3), 56-71.

Johnson, A. O. (2011). Human Capital Development and Economic Growth in Nigeria. European Journal of Business and Management, 3(9), 29-38.

Johnson, A., Olabisi, I, A., & Folake, B.-O. (2021). An Empirical Study of the Telecommunication and Economic Growth in Nigeria. Journal of Progressive Research in Social Sciences,11(1),7-21.Retrievedfrom http://scitecresearch.com/journals/index.php/jprss/article/view/2008.

Marimuth, S. (2009). Threshold Accepting and Ant-colony Optimization Algorithms for scheduling m-machine flow shops with lot streaming. Journal of Materials Processing Technology, 209(2), 1026-1041.

National Bureau of Statistics (2008) Annual Abstract of Statistics 1981-2007.Abuja, NBS

National Bureau of Statistics (2009) Social Statistics in Nigeria Abuja, NBS.

OECD, (2001), The Well-being of Nations: The Role of Human and Social Capital, 2001, OECD, Paris.

Ogunleye, O. O., Owolabi, O. A., Sanyaolu, O.A., & Lawal, O. O. (2017). Human Capital Development and Economic Growth in Nigeria. Journal of Business Management, 3(8), 17-37.

Romer, P. M. (1989). Human Capital and Growth: Theory and Evidence. Working paper 3173 National Bureau of Economic Research, Cambridge M.A.

Romer, P. M., (1990). Endogenous Technological Change, Part II. *The Journal of Political Economy, 98(5), 71-102.*

Romer, P.M. (1986). Endogeneous Technological Change. *Journal of Political Economy,* 98(5), S71-S102. http://doi.org/10.1086/261725.

Susan, O. C., & Ogozi, O. F. (2023). Productivity, human capital development and covid-19 pandemic in Nigeria. *Journal of Economics and Allied Research, 8(3), 143-149.*

Temilade, A. A., Bgenga, A. O. & Babatunde, O. A. (2024). Effect of Human Capital Flight on Economic Growth in Sub-Saharan Africa. *Journal of Economics and Allied Research, 9(1), 377-39.*

UNDP, (2009), Human Development Report 2008-2009. Achieving Growth with Equity. UNDP Nigeria

UNESCO, (1993), World Education Report. UNESCO, Paris.

World Bank, (2009 - 2017), World Development Indicators, Washington, DC. World Bank.

World bank. (2022). The Human Capital Project. Retrieved from; https://www.worldbank.org/en/publication/humancapital/ brief/about-hcp.

World Development Indicators (WDI). World Bank, 2000–016. https://data.worldbank.org/