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Trade and Human Capital as Determinants of Economic Growth in Nigeria

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Abstract
This paper on trade and human capital is based on the belief that both variables have a positive effect on national development, but the impact of the two variables together has not been adequately discussed.This study investigated the role of human capital formation and trade on economic growth during the period 1992 – 2019. Data were sourced from World Bank data base and Central Bank of Nigeria. The Augmented Dickkey Fuller (ADF) test was used to check the stationarity properties of the variables. Long-run relationship among the variables was confirmed through Johansen cointegration test whereas the long-run and short-run dynamics were observed using the ordinary least square methodology. The ADF result show that all variables were integrated of order one I(1). The cointegration result indicates the presence of a long run relationship with 'at most 1' cointegrating equation in the system. The long-run regression output shows that the index of trade has an insignificant direct impact on GDP growth in the economy. It also shows a significant inverse impact of human capital on economic growth within the period under study. However, the parsimonious ECM result indicates that trade have a significant direct impact on the growth of the economy. Also, Labour force and human capital at first difference was found to have a significant direct impact on the economy. Finally, the study concludes that human capital and trade interactions are important determinants of growth and hence, supports the idea of knowledge and technology diffusion. The study suggests the introduction of policies that favours education supervision to ensure quality and encourages open trade. Lastly, the study suggests the full implementation of UNESCO recommendation for countries to use 26% of their annual total budget on education.

Keywords: *Open Trade, Human Capital and Economic Growth*

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I. Introduction

The Nigerian government's post-civil war emphasis was on providing physical capital, which was seen as the most critical missing component for achieving economic growth and development.As a result, physical infrastructure development became a top priority. Following several loans from the World Bank and its subsidiaries aimed at infrastructure provision without corresponding economic growth and development, it was realized that major capital injections into quantitative infrastructures would not necessarily kick-start a sustainable economic development process.For this reason, emphasis started shifting from investment in physical capital to human capital. Human Capital is perceived to provide the required training and critical skills to execute development programmes. This is because Thirwall (1986) asserts in Soderbom and Teal (2010) that human capital development must be made the focal point of any development program in order to achieve economic growth and development in any nation. According to them, in the long run growth process, human capital is responsible for the coordination of other resources.Mankiw, Romer and Weil (1992) explained that health, nutrition and education forms part of the broad concept of human capital. To this extent, provision of education and health services is perceived to be a major requirement for improving the quality of human resources beside Trade.Trade is seen as an efficient channel of knowledge transfer (Yin, 2001). The three provides an economy with healthy and trained human resources necessary for the occurrence of economic growth and development.

Education according to Lucas (1988) ensures the acquisition of knowledge and skills which enables the individual to increase productivity. The well-educated, such as scientists and technicians, are better positioned to have a comparative advantage in the understanding and adapting new ideas in the production process and in Research and Development (R&D). In the context of the computer-based knowledge society, human capital is becoming increasingly critical in determining labour productivity. The modern economy will increasingly need workers with new skills and competencies beyond those of the traditional economy as trade in technological services and knowledge increases.As a result, for continued economic growth and development, an effective education that can adapt to changes in technical skills is essential. Through complex benefits from trade, the

amount of education combined with the volume of trade influences labour productivity. Trading countries are exposed to the goods of their trading partners and therefore gain knowledge of them. In other words, they learn the corresponding production processes which might help them to increase their own productivity. Competition is stimulated by an open market's orientation. According to the 2018 World Trade Report, economies that are more open to trade develop faster. This is because trade encourages investment and creativity, as well as foreign technical spillovers, which can lead to institutional structural reforms.

1.2. Statement of the problem

In the past economic planning was primarily focused on accumulation of physical capital for rapid growth without due attention to the role of human capital and trade in the development process(Ogunade, (2017). Having realised that a substantial part of economic growth of the advanced countries is related to a stream of technical innovations borne of human capital, the developing countries are hence striving to achieve growth through improvement in health, education and trade. So far, the literature examined have not found a correlation between human capital and economic development.The main objective of this study is to examine the impact of international trade and human capital on the growth of the Nigerian economy. The specific objectives are to examine: the impact of trade and education expenditure on the growth of the Nigerian economy.

II. Literature Review

Human capital is the accumulated stock of skills and talents. It manifests itself in the educated and skilled workforce, it can be increased through education and training;practical learning that takes place on the job, as well as non-traditional technical training regimes that enhance skill development (Ogunade, 2017).According to Ogunade workers with more human capital are more productive than those workers with less. It further contributes to a pool of general knowledge that is of benefit to all workers.Training resulting from open trade may facilitate the diffusion and transmission of knowledge needed to understand and process new information needed to adapt new technologies necessary ingrowth promotion. Since open trade stimulates competition, it enhances the demand for high skilled labour and encourages the use of modern technology.

The works of the classics show that open trade leads to efficient and mutual welfare for the entire world. They believe open trade constitutes a dynamic force capable of enhancing human capital through improved skills workers. Alfonso (2014) pointed out that the determining causes of economic progress of nations belong to the study of international trade.

Endogenous Growth Theory holds that investment in human capital innovations and knowledge are significant contributors to economic growth. Endogenous Growth models treat technology and knowledge as economic goods in the growth process based on learning-by-doing through investment in human capital and new technologies.

The Romer(1986)endogenous growth model,assumes that growth processes are derived from the firm or industry level and that technology is endogenously produced as a side-effect of private investment decisions.The model assumes that technological knowledge is labour augmented enhancing their productivity. The production function is expressed as $Y = AK^{\alpha}L^{1-\alpha}$such that '**AL'** denotes a knowledge adjusted work-force. The larger the existing stocks of knowledge 'A', the more new ideas are produced. Hence, the rate of technical progress will be determined by the stock of human capital. This matches the neoclassical Solow model, except that it assumes that technology is exogenous. The Romer model differs from the neoclassical model on the assumption that the economy capital stock positively influences output at the firm or industry level, by exhibiting increasing returns to scale. 'A' (TFP) in the Solow model spills-over to other firms through learning by doing, but in the Romer model 'A' is a public good (in the absence of an effective patent market) and is treated as learning by investing, without spill-overs.The Solow model assumes constant returns to scale implying no technological progress, but the Romer model assumes that the production of goods from new knowledge exhibits increasing returns. Since new knowledge is produced from investment, each profit-maximizing firm or industry invests in knowledge creation and hence incurs research and development costs in his investment. Hence, technical change is endogenously responsive to fiscal policies, such as tax and subsidies. The Lucas (1988) model of endogenous growth show that aggregate production is a function of two consumption goods and one production factor (human capital), whose rate of accumulation depends on the quantity of labour (skilled by learning) connected with production. Thus with international trade, trading nations would specialise in the production of goods for which autarky endowments permits. Hence, different learning in different nations is the cause of differences in economic growth of nations.

BIAC (2003) explains that sustainable growth globally, is no longer based on exploitation of raw materials, energy sources and physical products but on intangible creation of values in form of critical skills, creativity, services and inventions. In constructing his model of endogenous growth,Izushi and Huggins (2004) shows that the world growth rate is driven by discoveries of developed nations. The imitator countries (LDC)

would converge partially towards the leaders in the presence of ideas and international knowledge spill overs through trade.

2.1 Human Capital Development and Economic Growth in Nigeria

Bakare (2016) investigated the growth implications of human capital investment in Nigeria using VECM methodology. The study revealed that there is a significant relationship between the investment in human capital and economic growth in Nigeria. The results show that a 1% change in human capital investment, led to a 48.1% change in gross domestic output in Nigeria within the study period.

Chaudhry(2010)carried out a study on Exploring the Causality Relationship between Trade Liberalization, Human Capital and Economic Growth: Empirical Evidence from Pakistan. The paper investigates empirically the causal relationship between trade liberalization, human capital and economic growth in Pakistan by applying cointegration and Granger causality techniques on time series data for the 1972-2007 period. The empirical results reveal that there exist short run and long run cointegration and causal relationships among variables in the growth model implying that education and trade openness supports sustained economic growth. It is also found that causality runs from trade liberalization and human capital to economic growth.

Adawo (2017) in his study examines the contributions of primary education, secondary education and tertiary education to economic growth of Nigeria. These variables were proxied by school enrolments at various levels. Other variables included physical capital formation, health measured through total expenditure on health. In all primary school input, physical capital formation and health were found to contribute to growth. Secondary school input and tertiary institutions were found to dampen growth.

Li (2013) in his paper assesses the welfare impact of trade and technology diffusion as well as the change in the cross-country distribution of GDP due to removal of trade costs and diffusion barriers. Emmanuel,Wujung and Emmanuel (2014) examine the mechanisms through which human capital influences economic growth in the CEMAC region. The effect of human capital on economic growth was estimated using a two stage least square (2sls) multiple regression model for the individual countries and the method of generalized least square for the whole sub region. The results show that secondary education improves human capital development. A good health system strengthens/increases the quality of capital. Knowledge acquired on the job increases the productivity of the workers and the accumulated human capital significantly impacts positively on the economic growth of the CEMAC region.

Adegboyega and Odusanya (2014) examine the nexus between trade openness, foreign direct investment (FDI), capital formation, and economic growth rate in Nigeria over a period of 25 years (1986 – 2011). Stationarity tests were conducted on the time series data and were found to be stationary at first difference. The Johansen-Juselius procedure is applied to establish the co-integrating relation between variables of interest. The result of the study shows a long-run equilibrium relationship among the explanatory variables. The study shows a significant positive effect between the degree of trade openness, level of capital formation while a positive but insignificant relationship exists between the volume of FDI and gross domestic product growth rate.

Samar and Waqas(2014) examine the role of human capital formation in economic growth of Pakistan using annual data from 1979 to 2010. The variables such as fixed capital formation, infant mortality rate, education enrolment index and GDP are used for the analysis. In order to test the stationarity of Variables under study, ADF unit root tests were used to determine the long-run and short-run relationship (co-integration and error correction methods). Study found that human capital formation in terms of health and education services is crucial for economic growth in Pakistan.Results show that human capital formation has a significant impact on GDP.

Ayara and Jaiyeoba (2015) in their study, the role of human capital in the growth process of Nigeria, investigated the relationship between investment in education, health and economic growth in Nigeria, using time series data from 1982 to 2011. The paper employed the Johansen cointegration and ordinary least square technique in her analysis. The empirical findings indicate that there is a long-run relationship between government expenditure on education, health and economic growth.

III. Materials And Methods

3.1 Theoretical framework

Endogenous growth theory as developed by Lucas (1988) is an extension of Solow's (1956) neoclassical growth model. Models of economic growth vary in the ways they predict production factors in order to cause an economy to grow. The Solow model had predicted that growth of per capita income in an economy arises from accumulation of capital until steady state is reached. At the steady state growth, per capita income becomes a function of technical progress which incidentally is not explained by the model. The endogenous growth model sets Research and Development (R & D) at the centre of their framework, such that per capita income growth is determined by the number of resources devoted to R&D. The Neoclassical perceive

sources of economic growth as the amount of change in capital accumulation. But endogenous growth models assume that the level of capital stock devoted to R&D decides economic growth (Jhingan, 2005).

Lucas (1988) model of endogenous growth is based on the idea that growth is primarily driven by the accumulation of human capital. The model seeks to explain that differences in growth rate of per capita income among countries are accounted for by differences in rates that nations accumulate Human Capital. In the Lucas model, individuals choose how to allocate their time between current production and skills acquisition. The Lucas (1988) model can be summarized as:

$Y_i = A.K^{\alpha}(\psi hL)H_a^{\gamma}$……(1)

where Y_i is the output of *ith* firm; A is the technology parameter (Total Factor Productivity); ψ denotes the time individuals allocated to production; h denotes the current human capital stock (skill level); L_i is the size of labour force; Ki is physical capital of firm *ith* and H_a^{γ} is the average positive external effect of human capital in the economy. In this model, ψhL_i (effective labour input) replaces the simple labour input as specified in Solow (1956) growth model, while H_a^{γ} is the externality effect of human capital, which raises economy wide labour productivity. According to Haldar and Mallik (2010) at the aggregate level, export trade is considered as a variable augmenting output which is determined endogenously through labour productivity. Earlier on Marshall (1890) as cited in Alfonso (2014) pointed out that the determining cause of economic progress of nations belongs to the study of international trade. Thus, the source of endogenous growth is the existence of constant marginal returns to technology accumulation.

3.2 Model specification

The general form of augmented Solow (1956) model as extended by Mankiw, Romer and Weil (1992) could be specified as adopted from Schutt (2010) as follows:

$Y_t = A_t, K_t^{\alpha}, H_t^{\beta}, L_t^{1-\alpha-\square}\ \varepsilon_t$ ----------(2)

Where: Y_t is aggregate production of the economy at time t. A_t is Total Factor Productivity at time t; K_t is Real capital stock at time t; L_t is Labour force at time t; H_t is human capital at time t; ε_t is error term, while α and β are elasticities of production with respect to the variables. Since this study aims at investigating the impact of human capital and international trade affect growth of per-capita gross domestic productivity through increases in output. We assume trade (T) as a proxy for 'A'(TFP) in equation 2 above and other exogenous variables (constant).So 'A' can be expressed as:

$A_t = T_t, C_t$ …… (2B)

Substituting equation 2B into equation 2, we have

$Y_t = C_t, T_t^{\rho}, K_t^{\alpha}, H_t^{\beta}, L_t^{\varpi}\ \varepsilon_t$. ……..… (3)

The superscript ρ, α, β and ϖ are constant elasticities of production with respect to variables and ε_t as error term. Taking the natural log of the equation 3above, we have an estimable linear equation as:

$LnY_t = C_t + \square LnT_t + \alpha LnK_t + \beta LnH_t + \varpi LnL_t + \varepsilon_t$ …….(4)

All the coefficients and variables are as defined above. From the foregoing, the following model is specified in order to determine the impact of human capital formation and international trade on economic growth performance in Nigeria. Beginning with the functional form, the model for this study could be specified from the foregoing as follows:

GDP = *f*(TRAD, GFCF, HCS, LABF, BTRA)……(5)

Where: GDP is gross domestic product; TRAD is index of trade volume; HCS is total education expenditure as a proxy for Human Capital; GFCF is gross fixed capital formation as a proxy for physical capital; LABF is Labour Force; BTRA is balance of trade.

The operational form of the model could be specified as follows:

$GDP = \beta_0 + \beta_1 TRAD + \beta_2 HCS + \beta_3 GFCF + \beta_4 LABF + \beta_5 BTRA + U$…… (6)

While the econometric model with all the **variables taken in their natural log could be** written as: $LGDP = \beta_0 + \beta_1 LTRAD + \beta_2 LHCS + \beta_3 LGFCF + \beta_4 LLABF + \beta_5 BTRA + U$……(7)

The apriori expectations: **$\beta_1>0$, $\beta_2>0$, $\beta_3>0$, $\beta_4>0$ $\beta_5>0$.**The error correction model could be specified as follows:

$(LGDP) = \beta_0 + \beta_1 D(LTRAD) + \beta_2 D(LHCS) + \beta_3 D(LGFCF) + \beta_4 D(LLABF) + \beta_5 D(BTRA) + ECT(-1)$ …(8)

3.3 Data Sources and Description of Variables

In order to examine the relationship between human capital and international trade on the growth of GDP in Nigeria, the study employs annual time series data from 1992 to 2019. Data were sourced from the Central Bank of Nigeria (CBN) statistical bulletins various issues and World Bank DataBase (WDI), 2020. The dependent variable is GDP. The independent variables are labour force (LABF); Human Capital (HCS) proxied byPublic expenditure on education. Public education expenditure includes government spending on educational institutions (both public and private), education administration, and subsidies for private entities

(students/households and other private entities). Other variables of the model include Gross Fixed Capital Formation (GFCF), Labour Force (LABF), and Balance of Trade (BTRA).

3.4 Estimation Procedures

The study is conducted on Eviews software platform. First, we examined the stationarity properties of the series under consideration in order to establish their order of integration. All the variables in the model are expressed in their logarithm format. The data frequency for this study is annual and covers the period 1992 to 2019. In order to examine the impact of the variables of study on growth performance of GDP a four-step procedure was followed.First, the data series were tested for stationarity using the Augmented Dickey-Fuller (ADF) test with constant. All variables are found to be integrated in the same order,*I* (1). In the second stage we tested for long run relationship using the Johansen cointegration testing procedures. Next to this, is the estimation of the long run equation and finally the ECM model.

IV. Presentation and analysis of Results

In order to test for the unit root properties of the variables the Augmented Dickkey-Fuller testing were applied the results show that all the variables of the study are stationary at first difference and thus integrated of order one *I*(1).Next, we applied the Johansen procedure to identify the long run relationship among the variables of study. The result shows that the dependent variable (GDP) is cointegrated with the independent variables. The results of the Trace Statistic indicate a rejection of the null hypotheses of no cointegration (None); 'At Most 1'; 'At Most 2'; and 'At most 3' cointegrating equations between the variables. Both λ-Trace and λ-Max Statistics denote that there are at most three cointegrating equations at 5% critical value, indicating the presence of a long run relationship as presented in the table below.

TABLE 1: Cointegration Test Results

Date: 10/02/21 Time: 14:25
Sample (adjus... 1992-2019)
Included observations: 25 after adjustments
Trend assumption: Linear deterministic trend
Series: LGDP LGFCF LHCS LLABF LTRAD LBTRA
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.919866	171.6265	95.75366	0.0000
At most 1 *	0.858167	108.5250	69.81889	0.0000
At most 2 *	0.758387	59.69729	47.85613	0.0026
At most 3	0.500346	24.18683	29.79707	0.1927
At most 4	0.166707	6.840834	15.49471	0.5962
At most 5	0.087222	2.281571	3.841466	0.1309

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.919866	63.10150	40.07757	0.0000
At most 1 *	0.858167	48.82767	33.87687	0.0004
At most 2 *	0.758387	35.51046	27.58434	0.0039
At most 3	0.500346	17.34600	21.13162	0.1563
At most 4	0.166707	4.559263	14.26460	0.7961
At most 5	0.087222	2.281571	3.841466	0.1309

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's compilation from Eviews9 output

4.1 Long Run OLS Estimation

The long run ordinary least square results are presented below as:

TABLE 2: Showing the Long run Test Results

Dependent Variable: LGDP
Method: Least Squares
Date: 10/02/21 Time: 23:48
Sample: 1992 2019
Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.247648	1.084499	3.916693	0.0007
LGFCF	0.053216	0.118903	0.447559	0.6588
LHCS	-0.112024	0.116117	-0.964752	0.3452
LLABF	0.248699	0.056123	4.431353	0.0002
LTRAD	1.074076	0.321175	3.344208	0.0029
LBTRA	0.364610	0.050261	7.254394	0.0000

R-squared	0.934857	Mean dependent var	11.34860
Adjusted R-squared	0.920052	S.D. dependent var	1.091483
S.E. of regression	0.308618	Akaike info criterion	0.673984
Sum squared resid	2.095391	Schwarz criterion	0.959457
Log likelihood	-3.435778	Hannan-Quinn criter.	0.761256
F-statistic	63.14371	Durbin-Watson stat	1.812864
Prob(F-statistic)	0.000000		

Source: Author's compilation from Eviews9 output

The table above shows that contrary to the a'priori expectations LHCS exerts a negative influence on the growth of GDP in Nigeria. This is indeed a paradox though consistent with the result of Ayara and Jaiyeoba (2015) who also found a negative and insignificant relationship between education expenditure and growth. The signs of other variables such as LTRAD, LGFCF, LLABF and LBTRA conform to a'priori expectations and are all significant at 5% probability value with the exception of LGFCF and LHCS.The negative sign on (LHCS) government education expenditure could be explained from two fronts. UNESCO (2012) recommended that developing nations should invest at least 26% of their budgetary allocation to education, but contrary to this, Nigeria's budgetary allocation to education as a percentage of total budget was 8.4% in 2012 (CBN Annual Report). Another reason while education may not take its place in the economic growth process is that it is seen as a profit-making institution instead of a social institution. To this end, in the quest for profit,management of most schools foster corruption and breed poor products. Again, the non-contribution of education to GDP could also be attributed to structural and institutional defects as well as poor infrastructures in terms of research and equipment among others.

The R^2 of 0.9348 indicates that over 93.5% variations in the growth of GDP can be explained by the exogenous variables under study. The F-Statistic with a PV of 0.0000 is significant and indicates that both the R^2 and adjusted 'R' are significant in explaining variations in the dependent variable. The DW Statistics of 1.81 indicates no autocorrelation as it tends to 2.

In all, the result indicates that a 1% change in GFCF will bring about a 5.32% change in GDP. Moreso, a percentage increase in government expenditure on education (HCS) will reduce GDP by 11.2% annually. Similarly, a one percent change in labour force (LLABF) and balance of trade (BTRA) will lead to a 24.87% and 36.46% change in GDP respectively. Lastly, a change in Trade volume (LTRAD) by say 1% will lead to a 107.41% change in GDP annually. The ECM model result estimate could be presented below.

TABLE 3: SHORT-RUN ECM PARSIMONIOUS REGRESSION RESULTS

Dependent Variable: D(LGDP)
Method: Least Squares
Date: 10/02/21 Time: 00:12
Sample (adjusted): 1992 2019
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.151961	0.017492	8.687480	0.0000
D(LGFCF)	-0.073482	0.029725	-2.472073	0.0280
D(LTRAD(-2))	0.269080	0.076542	3.515443	0.0038
D(LTRAD(-3))	0.227828	0.062490	3.645831	0.0030
D(LHCS)	0.054887	0.021624	2.538239	0.0247
D(LHCS(-1))	0.061004	0.024552	2.484735	0.0274
D(LHCS(-2))	0.061869	0.021246	2.912029	0.0121
D(LLABF(-1))	-0.073154	0.015952	-4.585925	0.0005
D(LBTRA(-1))	-0.094617	0.026948	-3.511133	0.0038
D(LBTRA(-2))	-0.051173	0.016648	-3.073787	0.0089
ECT(-1)	-0.261644	0.087866	-2.977747	0.0107

R-squared	0.719237	Mean dependent var	0.103002
Adjusted R-squared	0.503266	S.D. dependent var	0.079281
S.E. of regression	0.055877	Akaike info criterion	-2.627778
Sum squared resid	0.040589	Schwarz criterion	-2.087836
Log likelihood	42.53333	Hannan-Quinn criter.	-2.484531
F-statistic	3.330245	Durbin-Watson stat	1.729553
Prob(F-statistic)	0.022807		

Source:Author's Compilation from Eviews9 output

The table above gives the short run parsimonious dynamic relationship.The AIC and SIC criteria were observed and used in selecting the lag length. The Coefficients of the variables explain changes in the growth of GDP. The result indicates that most of the estimated coefficients of the parsimonious error correction model are significant in explaining the dependent variable. Despite the significance of these variables, their a'priori expectation sign of D(LTRAD); D(LGFCF); D(LHCS(-1); and D(LLABF) does not conform to apriori expectations of greater than zero.

The ECT (-1) captures the short run level changes in the variables. The ECT(-1) indicates the speed of adjustment to long run equilibrium. The ECT of 26.16% indicates the speed of annual adjustment to equilibrium in the long run. The R^2 of 0.719237 which is significant at F= 0.022807 PV indicates that the variables of the model explain about 71.92% variations in the dependent variables in the long run. The DW statistics of 1.739 indicates the absence of serial correlation in the model.

Finally, the result shows that a percentage in GFCF will bring about an inverse change in GDP. A percentage change in Trade lags 2 and lag3 about 26.9% and 22.78% change in GDP respectively. Current HCS, and its lag 1 and lag 2 indicate a direct relationship with economic growth (GDP) and are all significant. Labour force (LLABF) lag 1; Balance of trade (BTRA) lag 1 and its lag 2indicates a significant inverse relationship with GDP.

4.2 Diagnostic test

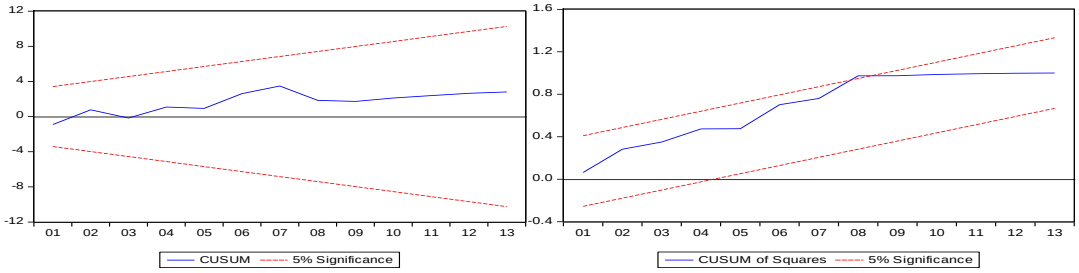
The Breusch-Godfrey LM test of serial correlation was tested. The result shows an F-statistics of 0.5454 and a chi-square value of 0.2156 with both greater than their critical values of 0.595 and 0.338. They both indicate the absence of serial correlation as shown below.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.545414	Prob. F(2,11)	0.5945
Obs*R-squared	2.165267	Prob. Chi-Square(2)	0.3387

4.3 Stability Test

CUSUM and CUSUMQ test of stability result showed that the model is stable as could be presented graphically as below.



V. Findings and Conclusions

5.1 General Summary and Findings

This study is an attempt to provide evidence on the impact of human capital and foreign trade on the growth of GDP in the Nigerian economy. The study applied a four step procedure on annual series from 1992 to 2019. The Augmented Dickey Fuller unit root test was conducted to determine the stationarity and order of integration of the variables. Following this is by the application of Johansen's cointegration test;estimation of long-run coefficients and finally, the parsimonious ECM analysis. The findings of the study could be summarized as follows:

(i) The unit-root test results indicate that all variables were non-stationary at levels but became stationary at first difference hence are integrated of order one I(1).

(ii) The cointegration result indicated the existence of a long-run relationship between the variables under consideration for the period.

(iii) The long-run result shows that the index of trade has an insignificant positive impact on the growth of GDP. Education expenditure as a proxy for Human capital formation, has a significant negative impact on the dependent variable.

(iv) The parsimonious ECM model suggests that trade (-2) has a significant positive impact on the growth of GDP. Also human capital at first difference and labour force was found to have a significant positive impact on the growth of GDP.

In all, this relationship indicates that Human capital and trade interactions are important determinants to growth. This link supports the idea of knowledge and technology diffusion.

5.2 Recommendations

(i) Policies that favour import of factor inputs and export of final goods should be encouraged.

(ii) There is a need for the nation to implement UNESCO recommendations regarding education budget in order to provide adequate educational facilities to institutions of learning at the various levels such as primary, secondary and tertiary levels.

(iii) Policy makers should enhance educational supervision and accountability in both public and private institutions to stem corruption and enhance human capital formation.

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