IOSR Journal Of Humanities And Social Science (IOSR-JHSS)
Volume 27, Issue 12, Series 6 (December, 2022) 60-71
e-ISSN: 2279-0837, p-ISSN: 2279-0845.
www.iosrjournals.org

Analysis of the Impact of Human Capital on Inclusive Growth in Nigeria: An ARDL Approach

Haruna Yunusa[1], Ahmad Muhammad Tsauni[2] &Faisal Hafiz Abubakar[3]
Postgraduate Student, Department of Economics, Bayero University, Kano, Nigeria[1]
Department of Economics, Bayero University, Kano, Nigeria[2&3]

Abstract
Development economics is now paying attention on the issue of inclusive growth, what the countries need is not just increase in economic growth but rather, growth that touches and improvesthe life of everybody. In line with this therefore, this study aims at constructing an index of inclusive growth and analyze the impact of human capital on inclusive growth in Nigeria using the time series data (1981 -2019). An ADRL-Cointegration technique was applied in the study.The resultsshow that, there is a long run relationship between human capital and inclusive growth in Nigeria. It was also found that, government education expenditure has positivelong run significant impact on inclusive growth while government health expenditure has long run insignificant impact on inclusive growth in Nigeria. Moreover, the ARDL short run test shows that, government health expenditure has significant positive impact on inclusive growth while government education expenditure has insignificant on inclusive growth in Nigeria. The study therefore suggests that, government need to inject more funds to health sector and this can be done by increasing the budgetary allocation to the sector, which may result in improving health care services, working conditions of health workers and finally results in treating the patients with efficiency and effectives. The study also recommends that, for achieving rapid and sustained inclusive growth in the long run in Nigeria, government should increase the budgetary allocation of educational sector to at least meet 26% (UNESCO's standard). This can be achieved through restructuring the budgetary allocations of other sectors that are less important than education.

Keywords: Human Capital, Inclusive Growth, Autoregressive Distributed Lag (ARDL).

I. Introduction

Human capital plays significant roles in boosting human capabilities, economic growth and development of nations. Countries that give priority to the building capacity of their human capital attain high level of progress. Human capital hassince been related to the nations' building and how they change from the level of underdevelopment to the level of developmentespecially when boosted as it determines how sustainability can be realized through promotion, innovation and adaptation of modern technology (Peter, 2013).Schultz (1961) emphasized on the role played by human beings in the production, people have long been recognized as part of wealth and their contribution in the production is greater than all other factors put together. Human capital refers to people provided with quality education, skills and health (Ahuja, 2015). Hence, education and health are the two aspects of human capital that promote development in people.This notion tallies with what Todaro and Smith (2015) agreed upon that, education and health set the objectives for development,as health determines our welfare while education is needed for satisfying and rewarding our mental effort. Thus, for improvement in human capabilities there is need to give proper attention to health facilities and services, on the job training, formal education, organized programs by firms for the adults and migration of families to adjust to changing job opportunities (Schultz (1961).

The concept of inclusive growth refers to the pattern and pace of growth expending the size of the economy through investment and increasing productive employment opportunities (Ianchovichina & Gable, 2009). Accordingly, for achieving sustainable growth given the increasing natural endowment which may result in poverty reduction and employment opportunities is highly needed in Nigeria (Okafor, 2016). World Economic Forum (2018) reported that, Nigeria was ranked as the 63rd out of 77 emerging economies in achieving inclusiveness, despite the progress it achieved in its economic growth, but such growthdid not promote standard of living because poverty rate, net income Gini and the daily median income of its citizens stood at 77.6%, 39.0% and $1.80 respectively.

To the best knowledge of the researchers, no study conducted addressing the same problem in Nigeria, except a work by Oluwadamilola, Akinyemi and Adediran published in 2018 on the topic "human capital development and inclusive growth: implication for achieving SDG-4 in Nigeria" which is quite different from this study. Oluwadamilola et al., (2018) used per capita income growth as the index for inclusive growth which might be considered asa poor proxy, as increase in per capital income alone might not result in inclusiveness in the country. Therefore, this study contributes to literature by constructing an index of inclusive growth and analyzesthe impact of human capital on inclusive growth from 1981 to 2019 in Nigeria.

II. Literature Review

2.1 Theoretical Literature

In economic literature, many theories were developed that examine the relationship between human capital and economic growth. However, reviewing such theories is significant to analyze the impact of human capital and inclusive growth in Nigeria. Solow (1956) developed a growth model which is considered as the core framework that accounts for economic growth. The model focuses on exogenous technical population factors that determine output-input ratios. But this growth model was not able to capture human capital (Abbas, 2001).According to Mankiw, Romer and Weil (1992) "economists have long stressed the importance of human capital to the process of growth; one might expect that ignoring human capital would lead to incorrect conclusions"

But it was in the early 60s and 70s that human capital started taking new shape. For example, Mincer (1958) and Becker (1962, 1975) had distinct opinions on human capital as many factors directly or indirectly influence the formation and exploitation of human capital (Osiobe, 2019). Uzawa (1965), Rosen (1976), Romer (1986) and Lucas (1988) emphasized on the role of stock of human capital to determine economic growth. Furthermore, in the 1990s when the standard neoclassical model was developed by Mankiw, et ail (1992). They presented an extension of the Solow model to incorporate human capital and stress the role of knowledge on economic growth. They made some important contributions by postulating that people invest in human capital just like in physical capital and that human capital is depreciated at the same constant rate with physical capital. They specified their model as; $Y(t) = K(t)^{\alpha} H(t)^{\beta} \ (A(t)L(t))^{1-\alpha-\beta}$,where H is the stock of human capital, Y is output, K is capital, L is labor, and A the level of technology.

2.2 The Human Capital Theory

Human capital theory emanated and developed from the discipline of macroeconomics in the mid-20th century through works of economists; Mincer (1958), Schultz (1961), and Becker (1962). Their works made an effort in making simpler explanation of individual income, that labour gain skills that make them more productive which will finally lead to greater income (Fix, 2018). The rationale for human capital program is the notion that people tend to invest in themselves differently for the purpose of future returns (Mark, 1976 cited in Moki, 2017). In its early stage of development, human capital theory focused attention to decision on investment in new technology and skill, but later extended in making further decisions on areas involving occupational choice, migration, health care and planning the family size (Wyttenbach, 2010). In addition, the theory allows for determining the level of economic growth when education is used as a tool (Victoria, 2015).

2.3 Empirical Literature

As literature show, scanty of empirical studies were conducted on human capital and inclusive growth especially in Nigeria, but notwithstanding, the study first reviewedsome studies that are relatedto human capital, human capital development and economic growth. Boztosun, Aksoylu and Ulukomeni (2016) in Turkey using cointegration and causality techniquesestablished a long run relationship between human capital and economic growth and a bidirectional causality was found between human capital and economic growth.Oladipulo,Oluwarodimi, Sanyaolu, and Lawal (2017) found that,human capital development has significant impact on economic growth in Nigeria. Patricia and Olugu (2016) using cointegration approach found long run relationship between human capital and economic growth in Nigeria. Imide and Dania (2019) also applied cointegration method in establishing this relationship in Nigeria. They study found that, investment in education has positive impact on economic growth while health investment has negative impact on economic growth in Nigeria.

For the studies that are related to inclusive growth,Asif and Amjad (2018) conducted a study on inclusive growth and macroeconomic situations in South Asian (Pakistan, India, Sri Lanka and Bangladesh) using panel ARDL. They found that, per capita income and level of education reduced inclusiveness while macroeconomic situations, population growth and female labor force promoted inclusive growth. Zulfiqar (2018)studied the link between fiscal policy and inclusive growth using VAR methodology in Pakistan. He found that, current expenditure has positive effect on income inequality. With a 1% shock to current expenditure income inequality

increases by 0.06% and the relationship between GDP growth and increase in the level of inclusiveness is not strong.

III. Methodology

3.1 Sources and Data

Relevant time series data were sourced from different sources, such as; World Bank Development Indicators (2021), National Bureau of Statistics report (2019), Federal Office of Statistics (2000), Global Consumption and Income Project (GCIP) (2019) and Central Bank of Nigeria Statistical Bulletin (2021).

3.2 Indicators andMeasurement of Inclusive Growth

Mckinley (2010) in case studies of 6 countries; Bangladesh, Cambodia, India, Indonesia, the Philippines, and Uzbekistan and Enang & Ebi (2016) in Nigeria made efforts in constructing inclusive growth index for the countries differently using some suitable indicatorsand measurements in the areas of: (i) growth (given 25% weight), productive employment (given 15% weight)and economic infrastructure (given 10% weight); (ii) income poverty and equity, including gender equity (given 15% weight to poverty 5 % to gender equality); (iii) human capabilities (10% weightto education, and 10% weight to health); and (iv) social protection (given 10% weight). This study applied the same methodology for weights and scores as used by(Mckinley 2010;Enang & Ebi 2016).

3.3 Construction Index for Inclusive Growth

To construct an index of inclusive growth, ranks are assigned to each inclusive growth indicator based on the scales from 0 to 10 in terms of the performance of each indicator for each year from 1981-2019. For example, to arrive at the inclusive growth for 1981, growth is given rank 0 with weight (0.25), productive employmentis given rank 1with (0.15) weight, economic infrastructure is given rank2 with weight(0.10), poverty is given rank 9 with weight (0.15), gender equity is given rank 3 with weight (0.05), human capabilities (education) is given rank 1 and weight (0.10), human capabilities (heath) is also given rank 1 with weight (0.10) and finally social production is given rank 1 with weight (0.10). (See, appendicesB and C). Moreover, the product of those ranks and the weights assigned give a score indicator and the summation of all these scores on the indicators for year 1981, produce the composite inclusive growth index for 1981. Therefore, to get the inclusive growth index for 1981, the score of income growth is 0, productive employment is 0.15, economic infrastructure is 0.2, poverty is 1.35, gender is 0.15, education is 0.1, heath is 0.1 and social protection is 0.1.Therefore, the summation of all these scores is 2.15 which is the inclusive growth index for 1981. The same procedures were followed to obtain the inclusive growth indices for rest of the years (See Appendix D).Therefore, to sum up,a score 1-3 is considered as unsatisfactory progress on inclusive growth, score of 4-7 as satisfactory progress while score of 8-10 as superior progress.

3.4 Model Specification

The model specified in this is similar to the studies of Vitoria (2015), Osoba & Tella (2017), Shobande & Elukomeni, (2017) and Imide & Dania (2019). However, the modification made is on the dependent variable which is inclusive growth. The justification is that, most of their studies applied the augmented growth model and the fact that, their models yielded robust results. The modelis specified as:

$$IG = F\ (\ GEH, GEE) \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

While the econometric model is also specified as:

$$IG_t = \beta_0 + +\beta_1 GEH_t + \beta_2 GEE_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(2)$$

From equation (2) the error term (ε_t) is assumed to be normally, identically and identically distributed with zero mean and constant variance [i.e. $\varepsilon_t \sim NIID\ (0, 1)$].
IG_t = A composite index for Inclusive growth
GEH_t = Government Health Expenditure as % of GDP
GEE_t = Government Education Expenditure as % of GDP
β_1 and $\beta_2$are all > 0, on the a priori ground.

3.5 Model Estimation Techniques

Before model estimation, this study conducted the traditional unit root tests of Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests in order to find out the order of integration among the variables. In case where the variables are found to be mixture of I(0) and I(1), then the ARDL technique will be applied with diagnosis tests

such as, serial correlation, heteroscedasticity, normality, and Ramsey Reset and ARDL stability tests will be carried out to ensure the statistical adequacy of the model.

3.6 Unit Root Tests

Spurious regression is a serious problem if it is not taken into account. To avoid this problem, this study applied the Augmented Dickey and Fuller (1981) and Phillips Perron (1988) unit root tests to ascertain the level of integration among the variables.

3.6.1 Augmented Dickey-Fuller (ADF)Test

The possible form of ADF test is presented in the equation (3) below:

$$\Delta y_t = \rho y_{t-1} + \sum_{i=1}^{p-1} \pi_i \Delta y_{t-i} + \varepsilon_t \quad \text{.....(3)}$$

Equation (3) is tested whether the parameter $\rho = 0$ or otherwise. If ρequals zero, the series contain a unit root and if it is not, the series are stationary.

3.6.2 Phillips Perron (PP) Test

Phillips-Perron (1988) modified the ADF test to incorporate a structural change into the test for unit root. The test solves the wrong assumption made by ADF that "the error terms are statistically independent and have a constant variance" (Asteriou & Hall, 2007). The PP test is given in the form of AR (1) process.

$$y_i = \alpha + \rho y_{i-1} + \varepsilon_i \quad \text{.....(4)}$$

The test is based on the t-statistic:

$$\tilde{t}_\rho = t_\rho (\gamma_0 / f_0)^{1/2} - \frac{T(f_0 - \gamma_0)(se(\hat{\rho}))}{2 f_0^{1/2} s} \quad \text{.....(5)}$$

where $\hat{\rho}$ is the estimate of ρ, t_ρ is the t-ratio of ρ, $se(\hat{\rho})$ is the coefficient's standard error, *s* is the standard error of the test regression, γ_0 is a consistent estimate of the error variance and f_0 is an estimator of the residual spectrum at frequency zero respectively.

3.7 ARDL Cointegration Test

For the purpose of this study, the Autoregressive Distributed Lag (ARDL) model ofPesaran and Shin (1999)and Pesaran, Shin and Smith, (2001) was employed. This technique is used if the series in the model are found to be a mixture of I(1) and I(0) and none of the series is integrated of the second order I(2). Moreover, ARDL method is flexible in incorporating variables of different order of integrations and insensitive to integration properties of the variable (Pesaran & Pesaran, 1997). From equation (6), the ARDL specification is given as;

$$\Delta IG_t = \eta_1 + \sum_{i=1}^{p} \varphi_{1i} \Delta IG_{t-i} + \sum_{i=1}^{p} \varphi_{2i} \Delta GEH_{t-i} + \sum_{i=1}^{p} \varphi_{3i} \Delta GEE_{t-i} + \theta_{1i} IG_{t-i} + \theta_{2i} GEH_{t-i} + \theta_{3i} GEE_{t-i} + \varepsilon_t \quad \text{.....(6)}$$

The parameters of the differenced parts of the equation (6) are the short run parameters and the other parts without lags are the long run parameters. Therefore, the null hypothesis that,H_0: $\theta_1 = \theta_2 = \theta_3 = 0$, that is no cointegration is tested using the Wald F-statisitic. An F-statistic above all the bounds is the rejection of null hypothesis which means presence of cointegration.

IV. Results and Discussion

4.1 Unit Root Tests

It can be seen from table 4.1.1that, all the variables except government education expenditure (GEE) are not stationary at level. But the variables are all stationary when tested at first difference. Therefore, the variables are mixture of I(1) and I (0) which allow the study to test for ARDL long run cointegration.

Table 4.1.1: ADF and PP Unit Root Tests

Level seriesΔFirst Difference

Variables (%)	ADF	PP	ADF	PP
IG	-2.717	-2.775	-6.778**	-6.784**
GEH	-1.193	-1.193	-12.711**	-12.659**

GEE	-4.550*	-4.511*	-6.972**	-15.154**

Source: Authors' Computations (2022)
Note: * & ** imply rejection of H_0 at 5% and 1% level of significance.

4.2 ARDL Test Result

The result of the ARDL bounds testing to cointegration is presented on the table 4.2.1 below. The F-statistic value exceeds any of the upper critical bounds when IG is used as the dependent variable in the study. This confirms the presence of cointegration among the three variables. This implies that, there is a long run relationship between human capital and inclusive growth in Nigeria.

Table 4.2.1: Result of the ARDL Bounds Test

Estimation equation $IG_t = F(GEH_t, GEE_t)$
Optimal lag structure (1, 4, 4)
F-Statistic 5.372924***
Significance level

	Lower bounds, I(0)	*Upper bounds, I(1)*
10%	2.17	3.19
5%	2.72	3.83
2.5%	3.22	4.5
1%	3.88	5.3

Source: Authors' computation (2022).
Note: AIC (-0.787406) is used in determining optimal lag structure.
*** means integration at 10%, 5%, and 1% significance levels.

4.3 ARDL Long Run and Short Run Estimates

Since cointegration is established among the variables, the next task is to estimate the long run and short run coefficients and the speed of adjustment. As table 4.3.1 below shows, government health expenditure has negative long run insignificant impact on inclusive growth while government education expenditure has positive long run significant impact on inclusive growth in Nigeria. Though, this positive long impact is not consistent with the findings of Asif and Amjad (2018).Furthermore, the short run test shows that, government health expenditure has positive significant dynamic on inclusive growththough has insignificant impact at lag one but has significant impact at lag two.

In addition, the impact of government education expenditure on inclusive growth is positive but insignificant. But when its first and second lagged values are taken, it has negative significant impact.This is not in consistence with Oluwadamilola et al, (2018) that found government capital expenditure on education has significant positive short run impact on inclusive growth in Nigeria, butis consistent with Gabriel and Oluseye (2017) that government consumption and education expenditure have negative impact on inclusive growth in both short run and long run.Moreover, the speed of adjustment coefficient (-0.44) is negative and statistically significant. This implies that, approximately 44% of the disequilibrium in inclusive growth will be corrected within one year.

Table 4.3.1:ARDL Long Run and Short Run Estimates

Long Run Estimates: Dependent variable is *IG*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEH	-0.025204	0.030729	-0.820214	0.4202
GEE	1.638141*	0.375782	4.359285	0.0002

Short Run Estimates: Dependent Variable isΔIG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ(GEH)	0.206150**	0.086111	2.393990	0.0256
Δ(GEH(-1))	0.002000**	0.039319	0.050867	0.9599

Δ(GEH(-2))	0.085846	0.040653	2.111686	0.0453
Δ(GEE)	0.131844	0.127088	1.037422	0.3099
Δ(GEE(-1))	-0.487619*	0.163273	-2.986524	0.0064
Δ(GEE(-2))	-0.379904**	0.146660	-2.590368	0.0160
CointEq(-1)*	-0.440063*	0.106303	-4.139686	0.0004
R-Squared0.527198				
D-W Stat2.228478				

Source: Authors' computation (2022).
Note: * and ** imply and 1% and 5% level of significance respectively.

4.4 Diagnostic Tests of the ARDL

For ARDL model to be liable, rubout with consistent estimates, it must pass all the diagnostic tests.These tests are presented on the table 4.4.1 below. The diagnostic tests indicate that, our model is free the problems of serial correlation, heteroskedasticity, misspecification and non-normality of the error term.

Table 4.4.1: ARDL Diagnostic Tests Result

Tests	**Prob. Values**
Breusch-Pagan-Godfrey Heteroscedasticity LM Test	0.1635**
Breusch-Godfrey Serial Correlation LM Test	0.0663**
Remsey Reset Test	0.5564**
Normality Test (JB)	0.76812**

Source: Authors' computations (2022).
** imply Acceptance of null hypothesis at 5% level of significance.

In order to check the stability of the research model, this study employed the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) tests. From figure 1, the plot of CUCUM test shows that, the graphs do not exceed the critical bounds, this establishes that, the ARDL estimates are reliable and consistent. Also, from figure 2, the plot of CUSUMQ testshows that, the plots lie inside the critical bounds at 5% level of significance.This implies that, the model is stable.

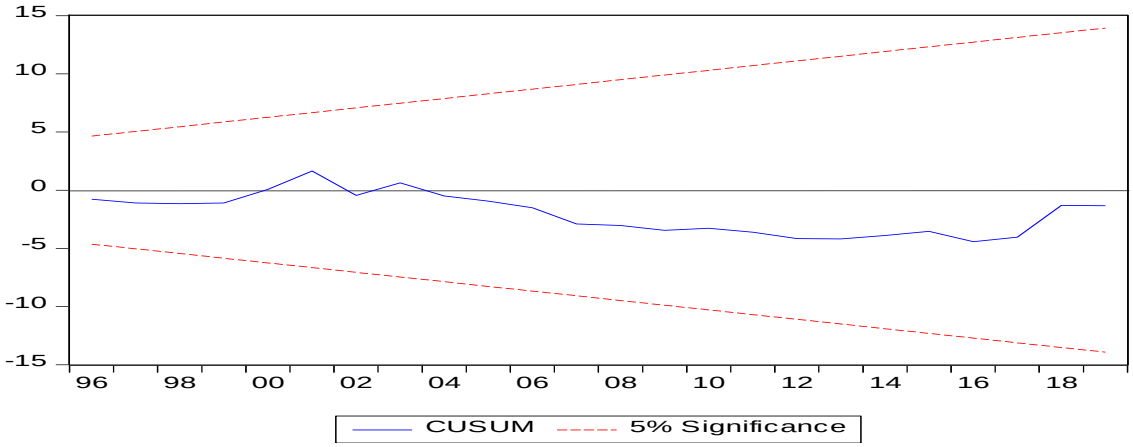

Figure1: Plot of CUSUM

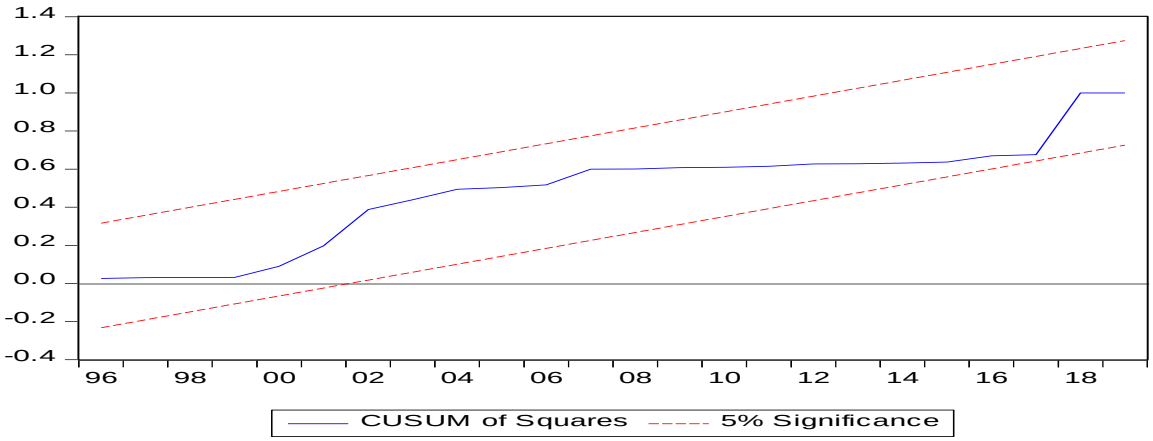

Figure2: Plot of CUSUMQ

V. Conclusion and Recommendations

This study applied an ADRL-Cointegration techniqueto analyze the impact of human capital on inclusive growth in Nigeria. Based on the findings, it can be concluded that, a long run relationship was established between human capital and inclusive growth in Nigeria. Another long run relationship existed between government education expenditure and inclusive growth. However, it can be deduced that, expenditures made on education do not yield immediate returns but rather, accumulate slowly and manifest in the future. Short run impact was established between government health expenditure and inclusive growth in Nigeria.

The study therefore suggests that, government need to inject more funds to health sector and this can be done through increasing the budgetary allocation to the sector, which may result in improving the health care services, working conditions of the health workers and finallyresults in treating the patients with efficiency and effectiveness. The study also recommends that, for achieving rapid and sustained inclusive growth in the long run, government should increase the budgetary allocation of educational sector to at least meet 26% (UNESCO's standard). This can be achieved through restructuring the budgetary allocations of the other sectors that are less important than education.

References

[1]. Abbas, Q. (2001).Endogenous Growth and Human Capital: A Comparative Study of Pakistan and Sri Lanka. The Pakistan Development Review, 40: 4 Part II (Winter 2001) pp. 987–1007.
[2]. Ahuja, H.L . (2015). Modern Economics, (19th ed.), Delhi: S. Chand.
[3]. Becker, G. S. (1975). Human Capital: A Theoretical Empirical Analysis with Special Reference to Education (2nd Edition), NBER. pp.13-44.
[4]. Asif, S., and Amjad, A. (2018). Inclusive Growth and Macroeconomic Situations in South Asia:An Empirical Analysis. Munich Personal RepEc Archive (MPRA), No. 90661.
[5]. Asteriou, D., and Hall, S. G. (2007). Applied Econometrics, (2nd ed.), UK: Palgrave Macmillan.
[6]. Becker, Gary S. (1962) Investment in Human Capital: A Theoretical Analysis. Journal of Political Economy Vol. 70, pp. 9–49.
[7]. Boztosun, D., Aksoylu, S and Ulucak, Z. S. (2016). The Role of Human Capital in Economic Growth. Economics World, Vol.4, No.3.
[8]. Dickey, D. and Fuller, W. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root, Econometrica, Vol. 49, pp. 1057 – 1072.
[9]. Enang, U. B and Ebi, B. O. (2016). Diagnosis of Nigeria Inclusive Growth: A Composite Index Approach. British Journal of Economics, Finance and Management Sciences, Vol.12, No.2
[10]. Fix, B. (2018).The Trouble with Human Capital Theory. Real-World Economics Review, World Economics Association, Bristol, Vol.86, pp.15-32, http://bnarchives.yorku.ca/568/
[11]. Gabriel, A. A and Oluseye, I. C. (2017). Determinants of Inclusive Growth in Nigeria: An ARDL Approach. American Journal of Economics. Vol. 7 No.3, pp.97-107
[12]. Imide, I. O and Dania, E. N. (2019). Human capital Investment and Economic Growth in Nigeria. International Journal Economics, Commerce and Management . Vol. VII. Issue 4.
[13]. Ianchovichina, E. and Gable, S .L. (2009). Inclusive Growth Analytics: Framework Policy Research Working paper. World Bank, Economic policy and Debt Department, Economic Policy Division, No. 4851.
[14]. Lucas, Robert E. Jr. (1988) On the Mechanic of Economic Development. Journal of Monetary Economics Vol. 22, pp. 4–42.

[15]. Mankiw, N. G., Romer, D., and Weil, D. (1992). A Contribution to the Empirics of Economic Growth, Quarterly Journal of Economics, Vol. 107, pp.407-437.
[16]. Mckinley, T. (2010). Inclusive Growth Criteria and Indicators: An Inclusive Growth Index for Diagnosis of Country Progress. Asian Development Bank (ADB) Working paper series No.14, June, 2010.
[17]. Mincer, J. (1958). Investment in Human Capital and Personal Income Distribution. Journal of Political Economy, Vol. 66, No. 4, pp.281 – 302. https://doi.org/10.1086/258055
[18]. Moki, P. (2017). Effects of Human Capital Accumulation on Economic Growth in Kenya. A Masters Dissertation submitted to the School of Business, KCA University, Kenya.
[19]. Okafor, H. O. (2016). Economic Growth, Poverty and Income Inequality in Nigeria: A Further Investigation, Nigeria: CBN
[20]. Oladipupo, O. O., Oluwarodimi, O. A., Sanyaolu, A. O and Lawal, O. O. (2017) Human Capital Development and Economic Growth in Nigeria. IJRDO-Journal of Business Management. Vol.3.
[21]. Oluwadamilola, O., Akinyemi, O and Adediran, O. (2018). Human Capital Development and Inclusive Growth: Implications for achieving SDG-4 in Nigeria. African Population Studies. Vol. 32, No.1
[22]. Osiobe, E. (2019). A Literature Review of Human Capital and Economic Growth. Business and Economic Research Vol. 9, No. 4
[23]. Osoba, A.M and Tella, S. A. (2017). Human Capital Variables and Economic Growth in Nigeria: An Interactive Effect. Euro Economica, Vol. 36, No. 1, pp.1-11.
[24]. Patricia, Oru and Olugu, K. H. (2016). Human Capital Development and Economic Growth: The Nigerian Experience. Journal of Humanities and Social Science, Vol. 21, No. 3, pp. 78-84.
[25]. Perasan, M, H., and Pesaran, B. (1997).Working with Microfit 4.0: Interactive Econometric Analysis. Oxford: Oxford University Press.
[26]. Pesaran, M.H and Shin, Y. (1999). An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis: Econometrics and Economic Theory in the 20th Century. The Ragnar Frisch Centennial Symposium, (ed.) Steinar Stom. Cambridge: Cambridge University Press.
[27]. Pesaran, H. M., Shin, Y and R. J. Smith. (2001). Bounds Testing Approaches to the Analysis of level Relationships. Journal of Applied Econometrics, Vol. 16, No. 3, pp.289-326.
[28]. Peter, A. A. (2013). Building for Sustainable Development: Role of the University. A paper delivered on the occasion of the 2013 University of Ibadan Registry Discourse 26th , Sept. 2013.
[29]. Phillips, P. C. B and Perron (1988). Testing for a Unit root in Time Series Regression. Biometrika, Vol.75, pp.311-340.
[30]. Romer, Pual M. (1986) Increasing Returns and Long-run Growth. Journal of Political of Economy 94, 1002–37.
[31]. Rosen, S. (1976) A Theory of Life Learning. Journal of Political Economy Vol. 84, pp.45– 67.
[32]. Schultz, T. (1961). Investment in Human Capital, American Economic Review, Vol. 51, No1, pp.1-17.
[33]. Shobande, A. O and Etukomeni, C. (2017). Financing Human Development for Sectorial Growth: A Time Series Analysis. Timisoara Journal of Economics and Business. Vol. 10, No1, pp. 51-67.
[34]. Solow, R. M. (1956). A contribution to the Theory of Economic Growth. Quartely Journal of Economics, Vol. 70, No. 1, pp.69-94.
[35]. Todaro, M. P and Smith, S. C. (2015). Economic Development (12th ed.), United Kingdom: Pearson Education Limited.
[36]. Uzawa H. (1965) Optimal Technical Change in an Aggregate Model of Economic Growth. International Economic Review 6, pp.18–31.
[37]. Victoria, J. S. (2015). Human Capital Investment and Economic Growth in Nigeria. Developing Country Studies. Vol. 5, No.21.
[38]. World Economic Forum (2018). The Inclusive Development Index 2018 Summary and Data Highlights.
[39]. Wyttenbach, C. (2010). Human Capital and Brain Drain in the Regional Development: A case study of Incentives. A Masters Dissertation submitted to the School of Economics and Management, Lund University, Sweden.
[40]. Zulfiqar, K. (2018). Fiscal Policy and Inclusive Growth: A case Study of Pakistan, Pakistan Economic and Social Review, Vol. 56, No.1, pp.21-46.

Appendices

AppendixA:Data on Inclusive Growth Indicators

Year	GDP per Capita Growth	GDP Per Person employed	Electric power consumption In KWh per capita	Poverty Headcount Ratio	School enrollment Primary and Secondary (GPI)	Secondary School Enrollment	Mortality Rate Under-5	Coverage of Social safety net

1981	-15.45	1741.72	81.90	41.88	0.75	17.11	210.3	0.8
1982	-9.20	1581.56	81.74	41.96	0.75	21.03	208.4	1.0
1983	-13.15	1373.54	62.06	43.03	0.70	25.18	207.6	1.2
1984	-3.58	1324.30	80.45	44.6	0.68	28.84	207.7	0.9
1985	3.23	1367.12	90.89	46.3	0.73	29.33	208.3	1.5
1986	-2.51	1332.81	89.30	43	0.80	27.22	209.2	1.7
1987	0.53	1339.81	87.14	47.3	0.81	27.21	210.2	2.8
1988	4.55	1400.73	97.07	48.3	N/A	N/A	210.7	3
1989	-0.71	1390.81	87.08	43.9	0.83	24.25	211.1	1.8
1990	8.93	1515.01	89.60	41.2	0.78	24.72	210.9	2.5
1991	-2.16	9840.62	90.05	58.6	0.80	23.90	210.5	3
1992	2.03	10058.39	100.89	42.7	0.79	24.60	209.8	1.8
1993	-4.46	9602.14	95.56	48	0.74	26.15	209	3.1
1994	-4.23	9179.89	91.49	53.9	0.81	24.04	207.8	3
1995	-2.53	8929.32	85.90	64.9	0.68	25.31	205.9	3.5
1996	1.63	9083.28	82.00	65.6	0.83	27.23	203.3	3.3
1997	0.41	9119.78	76.97	60.6	0.84	23.78	199.6	3.1
1998	0.06	9117.16	75.77	61.9	0.81	24.17	195.2	3.4
1999	-1.90	8929.42	74.49	63.1	0.82	23.55	190.1	3
2000	2.42	9136.11	75.57	64.4	0.82	24.61	184.8	2.8
2001	3.29	9446.29	104.66	65.7	0.83	27.03	179.2	2.9
2002	12.46	10661.50	101.93	55.9	0.81	29.61	173.4	3.5
2003	4.66	11165.35	123.63	53.5	N/A	N/A	167.5	3.3
2004	6.49	11898.78	129.33	54.4	0.83	35.00	161.7	3
2005	3.72	12335.55	111.75	53.5	0.84	34.96	156.2	3
2006	3.33	12750.22	138.91	51.5	0.85	34.46	151.1	3
2007	3.82	13238.23	127.24	53.0	0.86	31.87	146.3	3.5
2008	3.97	13768.03	120.64	56.4	0.87	35.39	142	3.5
2009	5.20	14518.64	136.43	53.5	0.89	44.22	138.8	3.5
2010	5.16	15287.57	150.20	54.43	0.90	44.22	135.2	3.5
2011	2.53	15687.62	156.80	54.9	0.91	45.56	132.5	3.5
2012	1.47	16604.52	142.73	55.01	0.95	47.18	130.5	3.5
2013	3.85	18004.65	144.53	55.21	0.95	56.21	128.6	4
2014	3.51	18989.32	146.27	55.9	0.96	45.62	126.9	4
2015	-0.03	19133.18	150.30	55.8	0.91	46.78	125.4	4
2016	-4.17	19124.62	N/A	57.2	0.93	42.00	123.9	4
2017	-1.79	18690.85	152.76	39.1	0.95	44.16	122.1	4
2018	-0.68	18225.08	141.61	N/A	N/A	45.36	119.9	4
2019	-0.38	17846.67	151.82	40.1	0.93	43.70	120.3	4

Sources: World Bank Development Indicators 2021, National Bureau of Statistics report 2019, Federal Office of Statistics 2000 and Global Consumption and Income Project (GCIP) 2019.

Appendix B: Ranks for Indicators of Inclusive Growth

1. Income growth 2. Productive employment 3. Economic Infrastructure

Interval	**Rank**	**Interval**	**Rank**	**Interval**	**Rank**
-15.45 to -12.45	0	N/A	0	N/A	0

-12.44 to -9.44	1	1340 – 3120	1	62.06 – 71.06	1
-9.43 to -6.43	2	3121 – 4901	2	72.06 – 81.06	2
-6.43 to -3.42	3	4902 – 6682	3	82.02 – 91.06	3
-3.41 to -0.41	4	6683 – 8464	4	92.06 – 101.06	4
-0.40 to 2.60	5	8465 – 10244	5	102.06 – 112.06	5
2.70 - 5.70	6	10245 – 12025	6	112.06 – 120.06	6
5.8 - 8.8.0	7	12026 – 13806	7	121.06 – 130.06	7
8.9 - 11.9	8	13807 – 15587	8	131.06 – 140.06	8
12. - 15.0	9	15588 – 17368	9	141.06 – 150.06	9
15.1 – 18.1	10	17369 – 19149	10	151.06 – 160.06	10

Source: Researchers' computations (2022)

4. Poverty 5. Gender equality 6. Human capabilities (education)

Interval	**Rank**	**Interval**	**Rank**	**Interval**	**Rank**
N/A	0	N/A	0	N/A	0
63.4 – 66.0	1	0.68 – 0.71	1	17.11 – 21.11	1
60.7 – 63.3	2	0.72 – 0.74	2	21.12 – 25.12	2
58.0 – 60.6	3	0.74 – 0.77	3	25.13 – 29.13	3
55.3 – 57.9	4	0.77 – 0.80	4	29.14 – 33.14	4
52.6 – 55.2	5	0.81 – 0.83	5	33.15 – 37.15	5
49.9 – 52.5	6	0.83 – 0.86	6	37.16 – 41.16	6
47.2 – 49.8	7	0.86 – 0.89	7	41.17 – 45.17	7
44.5 – 47.1	8	0.89 – 0.92	8	45.18- 49.18	8
41.8 – 44.4	9	0.92 – 0.95	9	49.19 – 53.19	9
39.1 – 41.7	10	0.95 – 0.98	10	53.20 – 57.20	10

Source: Researchers' computations (2022)

7. Human capabilities (health) 8. Social protection

Interval	**Rank**	**Interval**	**Rank**
N/A	0	N/A	0
209 – 218	1	0.8 – 1.12	1
199 - 208	2	01.13 – 1.45	2
189 – 198	3	1.46 – 1.78	3
179 – 188	4	1.79 – 2.11	4
169 – 178	5	2.12 – 2.44	5
159 – 168	6	2.45 – 2.77	6
149 – 158	7	2.78 – 3.1	7
139 – 148	8	3.2 – 3.52	8
129 – 138	9	3.53 – 3.84	9
119 – 128	10	3.85 – 4.17	10

Source: Researchers' computations (2022)

Note: The indicators of inclusive growth are ranked using Sturges' Rule, $i = \frac{Range}{Number\ \ of\ class}$

Where; i = width of the class, Range = Highest value (H) – Lowest value (L)

1. Income growth 2. Productive employment 3. Economic infrastructure
H= 12.46, L = -15.45, i= 3 H = 19133.18, L = 1332.81, i= 1780 H = 156.80, L = 62.06, i=9

4. Poverty 5. Gender equality 6. Human capabilities (education)
H = 64.9, L = 39.1, i= 2.6 H= 0.96, L= 0.68, i= 0.03 H = 56.21, L = 17.11, i= 4

7. Human capabilities (Health) 8. Social protection
H = 211.1, L = 119.9, i= 9 H = 4, L = 0.8, i= 0.32

Appendix C: Assigning Ranks and Weights of Inclusive Growth Index

Year	Growth (Rank) × Weight 25%	Empl (Rank) × Weight 15%	Infra (Rank) × Weight 10%	Poverty (Rank) × Weight 15%	Gender (Rank) × Weight 5%	(Education) (Rank) × (Weight) 10%	(Health) (Rank) × Weight 10%	Social Protection (Rank) × Weight 10%
1981	0(0.25)	1(0.15)	2(0.10)	9(0.15)	3(0.05)	1(0.10)	1(0.10)	1(0.10)
1982	1(0.25)	1(0.15)	2(0.10)	9(0.15)	3(0.05)	1(0.10)	2(0.10)	1(0.10)
1983	0(0.25)	1(0.15)	1(0.10)	9(0.15)	1(0.05)	2(0.10)	2(0.10)	2(0.10)
1984	3(0.25)	1(0.15)	2(0.10)	8(0.15)	1(0.05)	3(0.10)	2(0.10)	1(0.10)
1985	6(0.25)	1(0.15)	3(0.10)	8(0.15)	4(0.05)	4(0.10)	2(0.10)	3(0.10)
1986	4(0.25)	1(0.15)	3(0.10)	9(0.15)	4(0.05)	3(0.10)	1(0.10)	3(0.10)
1987	5(0.25)	1(0.15)	3(0.10)	7(0.15)	5(0.05)	3(0.10)	1(0.10)	8(0.10)
1988	6(0.25)	1(0.15)	4(0.10)	7(0.15)	0(0.05)	0(0.10)	1(0.10)	7(0.10)
1989	4(0.25)	1(0.15)	3(0.10)	9(0.15)	5(0.05)	2(0.10)	1(0.10)	7(0.10)
1990	8(0.25)	1(0.15)	3(0.10)	10(0.15)	4(0.05)	2(0.10)	1(0.10)	6(0.10)
1991	4(0.25)	5(0.15)	3(0.10)	3(0.15)	4(0.05)	2(0.10)	1(0.10)	7(0.10)
1992	5(0.25)	5(0.15)	4(0.10)	9(0.15)	4(0.05)	2(0.10)	1(0.10)	4(0.10)
1993	3(0.25)	5(0.15)	4(0.10)	7(0.15)	3(0.05)	3(0.10)	1(0.10)	7(0.10)
1994	3(0.25)	5(0.15)	3(0.10)	5(0.15)	5(0.05)	2(0.10)	2(0.10)	7(0.10)
1995	4(0.25)	5(0.15)	3(0.10)	1(0.15)	1(0.05)	2(0.10)	2(0.10)	8(0.10)
1996	5(0.25)	5(0.15)	3(0.10)	1(0.15)	6(0.05)	3(0.10)	2(0.10)	8(0.10)
1997	5(0.25)	5(0.15)	2(0.10)	2(0.15)	6(0.05)	2(0.10)	2(0.10)	7(0.10)
1998	5(0.25)	5(0.15)	2(0.10)	2(0.15)	5(0.05)	2(0.10)	3(0.10)	8(0.10)
1999	4(0.25)	5(0.15)	2(0.10)	2(0.15)	5(0.05)	2(0.10)	3(0.10)	7(0.10)
2000	5(0.25)	5(0.15)	2(0.10)	1(0.15)	5(0.05)	2(0.10)	4(0.10)	7(0.10)
2001	6(0.25)	5(0.15)	5(0.10)	1(0.15)	5(0.05)	3(0.10)	4(0.10)	7(0.10)
2002	9(0.25)	6(0.15)	4(0.10)	4(0.15)	5(0.05)	4(0.10)	5(0.10)	8(0.10)
2003	6(0.25)	6(0.15)	7(0.10)	5(0.15)	0(0.05)	0(0.10)	6(0.10)	8(0.10)
2004	7(0.25)	6(0.15)	7(0.10)	5(0.15)	5(0.05)	5(0.10)	6(0.10)	7(0.10)
2005	6(0.25)	7(0.15)	6(0.10)	5(0.15)	6(0.05)	5(0.10)	7(0.10)	7(0.10)
2006	6(0.25)	7(0.15)	8(0.10)	6(0.15)	6(0.05)	5(0.10)	7(0.10)	7(0.10)
2007	6(0.25)	7(0.15)	7(0.10)	5(0.15)	6(0.05)	4(0.10)	8(0.10)	8(0.10)
2008	6(0.25)	7(0.15)	6(0.10)	4(0.15)	7(0.05)	5(0.10)	8(0.10)	8(0.10)
2009	6(0.25)	8(0.15)	8(0.10)	5(0.15)	7(0.05)	7(0.10)	9(0.10)	8(0.10)
2010	6(0.25)	8(0.15)	9(0.10)	5(0.15)	8(0.05)	7(0.10)	9(0.10)	8(0.10)
2011	5(0.25)	9(0.15)	10(0.10)	5(0.15)	8(0.05)	8(0.10)	9(0.10)	8(0.10)
2012	5(0.25)	9(0.15)	9(0.10)	5(0.15)	9(0.05)	8(0.10)	9(0.10)	8(0.10)
2013	6(0.25)	10(0.15)	9(0.10)	4(0.15)	9(0.05)	10(0.10)	10(0.10)	10(0.10)
2014	6(0.25)	10(0.15)	9(0.10)	4(0.15)	10(0.05)	8(0.10)	10(0.10)	10(0.10)
2015	5(0.25)	10(0.15)	9(0.10)	4(0.15)	8(0.05)	8(0.10)	10(0.10)	10(0.10)
2016	3(0.25)	10(0.15)	0(0.10)	4(0.15)	9(0.05)	7(0.10)	10(0.10)	10(0.10)
2017	4(0.25)	10(0.15)	10(0.10)	10(0.15)	10(0.05)	7(0.10)	10(0.10)	10(0.10)
2018	4(0.25)	10(0.15)	9(0.10)	0(0.15)	9(0.05)	0(0.10)	10(0.10)	10(0.10)
2019	5(0.25)	10(0.15)	10(0.10)	10(0.15)	10(0.05)	7(0.10)	10(0.10)	10(0.10)

Source: Researchers' computation 2022

Appendix D: Constructed Composite Index of Inclusive Growth (IG)

Year	Growth	Productive Employment	Economic Infrastructure	Poverty	Gender Equity	Human Capabilities (Education)	Human Capabilities (Health)	Social Protection	**IG**
1981	0	0.15	0.2	1.35	0.15	0.1	0.1	0.1	2.15
1982	0.25	0.15	0.2	1.35	0.15	0.1	0.2	0.1	2.5
1983	0	0.15	0.1	1.35	0.05	0.2	0.2	0.2	2.25
1984	0.75	0.15	0.2	1.2	0.05	0.3	0.2	0.1	2.95
1985	1.5	0.15	0.3	1.2	0.2	0.4	0.2	0.3	4.25
1986	1	0.15	0.3	1.35	0.2	0.3	0.1	0.3	3.7
1987	1.25	0.15	0.3	1.05	0.25	0.3	0.1	0.8	4.2
1988	1.5	0.15	0.4	1.05	0	0	0.1	0.7	3.9

1989	1	0.15	0.3	1.35	0.25	0.2	0.1	0.7	4.05
1990	2	0.15	0.3	1.5	0.2	0.2	0.1	0.6	5.05
1991	1	0.75	0.3	0.45	0.2	0.2	0.1	0.7	3.7
1992	1.25	0.75	0.4	1.35	0.2	0.2	0.1	0.4	4.65
1993	0.75	0.75	0.4	1.05	0.15	0.3	0.1	0.7	4.2
1994	0.75	0.75	0.3	0.75	0.25	0.2	0.2	0.7	3.9
1995	1	0.75	0.3	0.15	0.05	0.2	0.2	0.8	3.45
1996	1.25	0.75	0.3	0.15	0.3	0.3	0.2	0.8	4.05
1997	1.25	0.75	0.2	0.3	0.3	0.2	0.2	0.7	3.9
1998	1.25	0.75	0.2	0.3	0.25	0.2	0.3	0.8	4.05
1999	1	0.75	0.2	0.3	0.25	0.2	0.3	0.7	3.7
2000	1.25	0.75	0.2	0.15	0.25	0.2	0.4	0.7	3.9
2001	1.5	0.75	0.5	0.15	0.25	0.3	0.4	0.7	4.55
2002	2.25	0.9	0.4	0.6	0.25	0.4	0.5	0.8	6.1
2003	1.5	0.9	0.7	0.75	0	0	0.6	0.8	5.25
2004	1.75	1.05	0.7	0.75	0.25	0.5	0.6	0.7	6.3
2005	1.5	1.05	0.6	0.75	0.3	0.5	0.7	0.7	6.1
2006	1.5	1.05	0.8	0.9	0.3	0.5	0.7	0.7	6.45
2007	1.5	1.05	0.7	0.75	0.3	0.4	0.8	0.8	6.3
2008	1.5	1.05	0.6	0.6	0.35	0.5	0.8	0.8	6.2
2009	1.5	1.2	0.8	0.75	0.35	0.7	0.9	0.8	7
2010	1.5	1.2	0.9	0.75	0.4	0.7	0.9	0.8	7.15
2011	1.25	1.35	1	0.75	0.4	0.8	0.9	0.8	7.25
2012	1.25	1.35	0.9	0.75	0.45	0.8	0.9	0.8	7.2
2013	1.5	1.5	0.9	0.6	0.45	1	1	1	7.95
2014	1.5	1.5	0.9	0.6	0.5	0.8	1	1	7.8
2015	1.25	1.5	0.9	0.6	0.4	0.8	1	1	7.45
2016	0.75	1.5	0	0.6	0.45	0.7	1	1	6
2017	1	1.5	1	1.5	0.5	0.7	1	1	8.2
2018	1	1.5	0.9	0	0.45	0	1	1	5.85
2019	1.25	1.5	1	1.5	0.5	0.7	1	1	8.45

Source: Researchers' computation (2022)