HUMAN CAPITAL DEVELOPMENT, INCOME INEQUALITY AND PUBLIC SECTOR INVESTMENT IN NIGERIA

Evelyn Nwamaka OGBEIDE-OSARETIN[*] iD
Edo State University, Nigeria

Ifeanyi SHEDRACK
University of Delta, Nigeria

Timothy ALIU iD
Edo State University, Nigeria

Abstract. Human capital development of any country is believed to be the bedrock for sustainable economic development which seems to be linked to the level of income inequality. But there seems not to be an implied acceptance of flow of the linkage as evident from the high level of income inequality and low level of human capital development. Suspected among the causes of this is the role of the public sector. Thus, the objective of this study is to determine if there exists a dynamic feedback impact between human capital development and income inequality given public sector investment in Nigeria. The study employed the ARDL and NLARDL estimation method using data on human capital development index, income inequality, government expenditure in health and educational sector, among other variables for the period 1991-2022. Human capital development and income inequality were found to have feedback impacts. Public sector investment was found to be crucial while the existence of Kuznet's hypothesis was established. Hence, the study strongly advocates for policy measures of pro-poor growth, reduction of unemployment, population growth and the degree of trade openness for the effective reduction in the country's inequality gap and the development of human capital.

JEL Code: C22, D63, H51, H52

Keywords: Generalized Method of Moment, human capital development, income inequality, public sector

1. Introduction

There seems to be a general agreement that human capital development is a major requirement for the achievement of economic development. The level of development of human capital is strongly linked to the productivity of the individual,

---

[*] Corresponding author. Address: Department of Economics, Edo State University, Uzairue, Auchi, Edo State Nigeria. Email: iyokoevelyn@gmail.com

resulting in economic growth and development (Keji, 2021, Eicher). However, there seems to be a link between the level of development of human capital and the level of income inequality in that society. As noted by Lee and Lee (2018), the level of educational attainment and health status of a worker, often indicate the earnings of the individual, and income level. Lee and Lee (2018) further observed that an increase in human capital, contributes to the reduction of income inequality. Many developing countries have been characterized with high level of income inequality and low level of human capital development. Suspected among causes is the role of the public sector.

The case of Nigeria in Africa reveals a paradoxical situation. Irrespective of the high amount of human and physical resources, Nigeria is still ranked in the poorest countries of the world with many challenges of high rate of unemployment, all forms of inequality, low health system and lack of skilled labour among others. This may be attributed to a low level of human capital investment. Although several policies have been put in place (Education for All" in 2000, look or recent human capital development policies) towards enhancing the development of human capital, the outcome in Nigeria is still far beyond expectation. On education, Nigeria has one of the lowest school enrolments. Tertiary gross enrolment was 12 (for 2018) as compared to 20 for Ghana; secondary gross enrolment was 44 as compared to 77 for Ghana and 141 for Rwanda; while primary school gross enrolment was 86 (2019 data) as compared to 103 for Ghana, and 141 for Rwanda (World Bank, 2022). National adult literacy rate is as low as 77.62% compared to other developing countries; Kenya (82.62%) and Lesotho (f 81.02%) in 2021 (GlobalData, 2023). About 40% of school age children of age 6-11 do not attend primary school, while about 30% are primary school dropout (World Bank, 2021).

The health sector, on the other hand is not left out. United Nation in Macrotrends (2023) reported that 56 deaths per 1000 live birth are recorded for Nigeria which was the third highest in the world and a child is more likely to die than attend school. Nigeria's health system was ranked 144 out of 167 countries by WHO in 2020 (World Population Review, 2023). Only about 63% of the Nigerian population have access to safe health, 60% of under 5 and the maternal mortality rate is recorded due to mal-nutrition rate, and life expectancy rate is as low as 54years as compared to 80 years found in most developed counties. The medical doctors and nurses per 1,000 people stood at 0.4 and 1.5 respectively which is less than World Health's 10% recommendation of (Macrotrends, 2023[a]; World Bank, 2023). All these tends to reflect the low level of human capital development in Nigeria.

According to World Bank (2023a), on human capital index, Nigeria ranks 163 in 2022 out of 191 countries that was ranked and also among the countries in the world with the highest level of income inequality. Nigeria Gini index was found to be 44% in 2019 which is the highest in SSA countries and the world. Nigeria was ranked the last of Africa 45 countries and 157th globally ranked assessment of government's obligation to the reduction of income inequality (Seery, Okanda and Lawson, 2019; World Bank, 2020).

While being concerned with the above challenges, government's role in terms of public sector investment in the human capital development is of a greater concern. As against the 20% level of investment in educational sector and 15% of budgetary allocation on health as recommended for developing countries by the

United Nations and World Health Organisation respectively, Nigeria is still far below this minimum standard (Onuigbo, 2021). For instance, in 2023, N923.79 bn out of 17.13 trn (5.4%) was allocated to the educational sector (Central Bank Statistical Bulletin, 2023) and budgetary allocation of education has been on the average of about 3% for the past three decades. This is in comparison to some other counties in Sub-Saharan Africa like Ghana with 20%, and Bostwana with 21% (Onuigbo, 2021). Per capita spending on health in Nigeria was $66 in 2018 and $70 in 2020 far below the recommended $3, 400, while as a percentage of total expenditure in budget allocation, the sector received 2%, 1.2%, 3.3%, 7% and 5.8% in 1981, 1990, 2000, 2016 and 2023 respectively (Macrotrends, 2023[b]; Central Bank of Nigeria, 2023).

The connectivity between human capital development and income inequality has not been theoretically and empirically clear and becoming a debate in recent decade that human capital development and income can be inextricably linked. Gaps in income level is suspected to exacerbate the existing low level of development in human capital as many are denied good health and the opportunity of going to school. Also, the inability or denial of access to education and good health of some group of individuals can hamper the employment opportunities of these groups of individual especially in high earning employment. This increases their poor economic situation, increasing the income inequality gap which in the long run affects the general development of human capital. The cycle continues which may result in "generational income inequality gap".

However, while we may argue that low level of human capital development is a foremost contributor to the wider income inequality gap, it may also be argued that the high level of income inequality is contributing to the low level of human capital development. Hence, income inequality may be a root or a corollary of the level of human capital development. Income inequality and level of human capital also seems to observe the dynasty syndrome where the income inequality gap/level of human capital development of previous years may affect the current level of income inequality/level of human capital development. These are gaps that have not been covered particularly in Nigeria. It is also not out of place to begin to question the role public sector investment in human capital development and the reduction of income inequality gaps in Nigeria. Hence, the current study is out to fill this gap and wishes to address these major research questions:

(i) is there a dynamic feedback impact between human capital development and income inequality in Nigeria?
(ii) how significant is the roles of public sector investment in the reduction of income inequality and the development of human capital?

Therefore, the objectives of this study are to determine if there exists a dynamic feedback impact between human capital development and income inequality in Nigeria. Also, to determine the impact to public sector investment reduction of income inequality and the development human capital. This study, therefore, contributes to current literature in the following ways: first, it evaluates the possibility of a feedback impact between human capital development and income inequality which has not been considered in Nigeria Studies. Second, it made use of the efficient measures of human capital development (human capital development index).

2. Literature review

Human capital development is a core topic in the development of an economy. The endogenous growth theory recognizing the role of human capital development noted that output grows in proportion to capital because of the effect of knowledge creation. In Romer's endogenous growth model, he acknowledges human capital as the main driver of technical advancement and, consequently, economic growth. Romer sees researchers as the creators of novel ideas and sources of income (Aghion, Akcigit and Hewitt, 2013). Thus, public investment in human capital is a source of increasing income. Human capital has been noted to be the major causal factor of income inequality.

A quantitative analysis of how related human capital is to income distribution was explored by Lee and Lee (2018) in a data set of East Asian economies for the period 1980 to 2015. Educational attainment was used as a measure of human capital, and it was revealed that equitable distribution of educational expansion substantially reduces income inequality. The study further advocates for public policies and investment that improves social benefits and brings about price stability for the effective reduction of income inequality. On the other hand, the higher the per capita income, the more open the economy is, and the faster the technological progress is, the higher the income and education inequality.

Suhendra, et al. (2020) examined the impact of human capital and other variables on inequality in Indonesia. They employed a 34 provinces panel data over the time 2013 to 2019 which was estimated using the fixed effect method. Education indexes was used for human capital and the result showed a negative and significant impact of human capital on the level of inequality in income. Increasing human capital results in an enhancement of knowledge and competence as a result of longer average number of years in school year and expectations. This increases the individual's opportunity of acceptability into higher income job hence, lowering income inequality. Inflation was found to increase the income inequality gap

Adan, Muriithi, and Mbaabu, (2023) employing the OLS estimation method investigated on the impact of investment in human capital on Kenya's income inequality over the period 1990 and 2019. This was to explore the validity of widely believed non-compatibility of investment in human capital and inequality in income. Expenditure in health impacted negatively and substantially, while investment in education had a resentful and non-substantial impact on inequality in income. The index of human capital development showed a resentful and substantial consequence on inequality in income. The Kuznets's inverted U was affirmed.

Analyzing the impact of income inequality in an economy, Delbianco, Dabius, and Caraballo (2014) examined the relationship between income disparity and economic development of 20 Caribbean and Latin American nations over the time 1980–2010. They found that there is a level-dependent link between income disparity and economic growth and that income disparity negatively impacts on economic growth. Batuo, Kararach, Malki (2022) explored the income inequality dynamics in Africa with the intent of examining the institutional factors of inequality in income' They employed the Kuznents's curve framework in a panel data of 52 countries in Africa over the time 1980 to 2017. It was revealed that there is a surge in inequality for countries with high income and otherwise for developing countries with and those with low income. Institutions were also found to have slight importance in spelling

out income inequality while policy measures (monetary, fiscal and employment) played prominent roles in the reduction of inequality in countries with high income but failed for countries with low income.

For studies on Nigeria Olowookere, Olanipekun, Sokunbi and Aderemi (2022) investigated on the impact of the development of human capital on poverty reduction in Nigeria. They made use of Fully Modified Least Squares method of estimation on investment in health and capital formation as proxies for human capital development for the period 1981 to 2019. The outcome of the study revealed that human capital development significantly contributes to the poverty reduction in Nigeria. Expenditure in health and capital formation were found to have trickledown effect on poverty reduction in Nigeria.

2.2. Limitation from previous studies and contribution of the study to knowledge

While there exists some strand of literature around the investment in human capital, development of human capital as well as inequality in income, but results have been inconclusive. This may be as a result of the coverage, country specific factors and methodology used. But, the possibility of feedback connectivity between inequality in income and the development of human capital seems to be neglected especially for developing countries having high level of inequality as well as low human capital development. The contribution of income inequality on the level of educational attainment have not been clearly examined. In addition, while some policies on the reduction of inequality in income have been carried out by majority of the developing nations, Nigeria inclusive, the use of investment of the public sector have not been noted to be a major key that can be used.

In addition to the above, the role of the highly recommended international trade for development (through income inequality reduction) which has received little or no attention in Nigeria was also examined. Of important is that while many developing countries are carried away with the recent growths recorded, the impact of the growth weather pro poor or obeying the Kuznents law has not been a major concerned. These are major policy areas that need to be analyzed for effective reduction of income inequality. Hence, this study filed these lacunas in the previous studies.

3. Methodology

3.1. Empirical modeling and estimation technique

The study adopted the framework of Sen's capability following the work of Binder and Georgiadis (2011), Shuaibu and Oladayo (2016), and Suhendra, Istikomah, and Ginanjar (2020) in exploring the interconnectivity between the inequality in the distribution of income and human capital development. But inequality is prone to be hereditary with spillover effects. Thus, we employed the ARDL model. This current study differs from the above studies as it is based on a dynamic model. The model is specified as:

$$Ineq_t = \beta_0 + \beta_1 Ineq_{t-1} + \beta_2 HCD + \beta_3 GEE_t + \beta_4 GEH_t + \beta_5 X_t + \mu_t \ldots\ldots\ldots\ldots 1$$

$$HCD_t = \lambda_0 + \lambda_1 \, HCD_{t-1} + \lambda_2 Ineq + \lambda_3 GEE_t + \lambda_4 GEH_t + \lambda_5 Z_t + e_t \ldots\ldots\ldots\ldots\ldots\ldots.2$$

The term X_t and Z_t are the matrix of other relevant environmental and policy variables of income inequality (unemployment rate, inflation, per capita income measure by RGDP per capita) and relevant control variables of the human capital development (unemployment rate, population growth). From the above, equation 1 and 2, introducing the control variables are transformed to:

$$Ineq_t = \beta_0 + \beta_1 Ineq_{t-1} + \beta_2 HCDt + \beta_3 GEE_t + \beta_4 GEH_t + \beta_5 UNMP_t + \beta_6 INF_t + \beta_7 RGDPpc^2{}_t + + \beta_8 TOP_t + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.3$$

$$HCDt = \lambda_0 + \lambda_1 HCD_{t-1} + \lambda_2 Ineqt + \lambda_3 \, GEEt + \lambda_4 \, GEHt + \lambda_5 \, UNMPt + \lambda_6 \, POPGrt + \lambda_7 \, INFt + \varepsilon t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.4$$

Where:

$Ineq_t$ is Income inequality and it is proxied by Gini index which is between 0 and 1 showing the level of income distribution of people in Nigeria. The choice of Gini measure of income inequality was determined by convenience given the data problem in Nigeria since other measures can as well be chosen, although each measure may contain information not contained in the other.

$ineq_{t-1}$= one-year lag of income inequality

HCD_t = Human capital development measured by the human development index (HDI). The HDI provides a summary of the welfare human capital of a country by measuring three dimensions of the country; longevity (health status), access to knowledge (educational status) good standard of living.

HCD_{t-1} = one-year lag of human capital development index

GEE= government's expenditure in educational sector as a proxy for public investment

GEH= government's expenditure in health sector as a proxy for public investment. Government expenditure in the provision of basic educational and health facilities for the people is expected to reduce inequality in income and increase the development of human capital (Benabou 2000; Baah-Bonteng, 2013).

UNMP = unemployment rate. Theoretically, unemployment is positively related to the inequality level in the distribution of income and negatively to the development of human capital. In the face of unemployment, the individual will not be able to meet up to earn income thereby the gap between the haves and have not will increase. Also, in the face of unemployment there is low amount of money in the hands of some members of the society to be able to send their children to school as well as acquire good health thereby reducing the development of human capital.

Inf = inflation.

$RGDPpc^2$= per capita income which comes into the model in its square form. This is following the Kuznets inverted-U curve on the relationship between the level of income (economic growth) and the distribution of income (Kuznets 1955, in Lee and Lee, 2018).

TOP is trade openness measured by the exports-imports ratio to GDP. International trade is expected to impact negatively or positively on the level of income inequality depending on the strata of skills of the labour force and the nature of trade as shown by theoretical and empirical studies. In line with the Heckscher–Ohlin trade model, a country with open trade policy and has abundant of low-skilled

labour as obtainable in Nigeria, will have an expanded relative wage of unskilled workers, which will reduce inequality in wage. However, if trade results in the transfer of skill-biased technological variation to developing countries, a boost in trade openness will result in higher inequality in wage. As the demand for labour will be shifted to more of skilled labour, there will increase in the wage of skilled labour which will increase the wage inequality and increase the income inequality gap (Bourguignon, Ferreira, and Lustig 2004; Lee and Wie 2015).

Inf= inflation. This is expected to increase inequality. Inflation gravitates to reduction of real wage as well as redistributing income to profit takers from wage earners. It also dwindles the bottom quintile's share of income through the reduction in their real minimum wage, thereby boosting the inequality in income. According to Albanesi (2007) inflation is a tax on cash balances, thus, immensely hurting the poor households, who often hold their wealth in ready money and currency.

POPgr = population growth rate. A very high growth rate of population can hinder the effective human capital development given the large number of people that government will provide social facilities given the available fund.

A Priori, $\beta_1, \beta_5, \beta_6, > 0$ β_2, β_3 β_4, β_4 $\beta_7 < 0, \beta_8 <> 0; \lambda_1, \lambda_3, \lambda_4, > 0, \lambda_2, \lambda_5, \lambda_6 < 0$

3.2. Method of estimation and Data

The variables for the study were subjected to pre-estimation tests. The ARDL bound was used in testing for the existence of long run relationship when the variables when they were found stationary at order one and zero. Equation 3 was estimated using the non-linear autoregressive distributed lag mode (NARDL) while equation 4 was estimated using the ARDL. Secondary data spanning from 1991 to 2021 was used. Data for GINI, HCD, GDpc, TOP, POPgr and UNMPR were collected from the World Bank (2023) world development indicator and National Bureau of Statistics. The data for government expenditure in education and health sector and inflation were gotten from Central Bank of Nigeria Statistical Bulletin, (2022). The E-views 10 econometric package was used for the analysis.

4. Observational system

4.1. Descriptive Statistics

Table 4.1. Descriptive Statistics

Statistics	HCD	INEQ	GEE	GEH	UNMP	INF	TOP	RGDPpc^2	POPGr
Mean	0.31500	43.5022	207.802	126.597	14.4217	18.5245	35.1938	53484.7	2.57625
Median	0.47500	43.0000	128.067	72.0815	13.5500	12.9418	36.5402	32191.3	2.58000
Maximum	0.54000	69.0000	646.748	423.329	33.3000	72.8355	53.2779	192068	2.68000
Minimum	0.00000	35.1000	0.29129	0.15016	3.60000	5.38801	0.00000	584.249	2.48000
Std. Dev.	0.24902	6.56835	209.439	135.693	7.84402	16.2621	11.3392	57129.2	0.06676
Skewness	-0.48890	1.76904	0.78407	0.86391	0.95822	2.13452	-0.88863	0.94596	0.08085
Kurtosis	1.27551	8.41540	2.28882	2.43559	3.76705	6.54456	4.25056	2.72089	1.56475
Jarque-Bera	5.23995	55.7928	3.95315	4.40518	5.68147	41.0515	6.29673	4.87631	2.78146
Probability	0.07281	0.00000	0.13854	0.11052	0.05838	0.00000	0.04292	0.08732	0.24889
Observations	32	32	32	32	32	32	32	32	32

Source: Extracted from E-views Print-out

The measure of central tendency of each series in table 4.1 above shown a high level of stability as depicted with their values falling in between the Maximum and Minimum values. Almost all the variables had level spreads and quite distributed evenly given their low values of standard deviation. With the exception of trade openness and human capital development, all data exhibit positive skewness. They were also normally distributed at 5% substantial level according to Jarque Bera and their accompanying probabilities, with the exception of government expenditure on health, real GDP per capita, and population growth.

4.2. Test of stationarity

Table 4.2. Stationarity Test Result

Variables	ADF statistics At Level	ADF statistics At 1^{sf} Diff.	Critical value	Order of integration
HCD	-1.115318	-5.430187	-2.963972	1(1)
INEQ	-3.788242	-	-2.960411	1(0)
GEE	0.423018	-4.025524	-2.963972	1(1)
GEH	0.133724	-5.692395	-2.963972	1(0)
UNMP	-0.732978	-7.227481	-2.963972	1(1)
INF	-2.078814	-5.357102	-2.963972	1(1)
TOP	-1.648794	-6.539676	-2.963972	1(1)
$RGDPpc^2$	3.029973	-	-2.991878	1(0)
POPGr	-1.322899	-5.060581	-2.963972	1(1)

Source: Compiled from E-views 10; Significance at 0.05 levels

As reveled from Table 4.2, the ADF statistics was stationary at levels for (INEQ, GEH and $RGDPpc^2$). However, HCD, GEE, UNEMP, INF, TOP and POPGr, were found stationary at first difference. Thus, the variables are integrated of mixed order, level 1(0) and order one I(1). This shown just cause for the ARDL Bounds Test.

4.3. Model valuation

4.3.1. Valuation of the income inequality Equation

4.3.1.1. Result of Long-Run ARDL formation

First in resolving the reliability of the results, the R^2 of 0.809942 showed that the model is well fitted with independent variables explaining about 80% of the deviation in the contingent variable. DW result revealed that there is no presence of autocorrelation in the result given a statistic of 1.927147 which is lower than 2 rules of thumb.

Analyzing the estimates, Table 4.3 of the long-run estimate showed that while first year lag of income inequality showed a positive relationship and insignificant impact on current level of income inequality in agreement with the dynastic rule of income inequality, the second-year lag showed a negative significant impact on current level of income inequality at 10% level of significance. Both current and lag of levels of the development of human capital has a positive relationship with the level of income inequality with only the previous level having a significant impact at 5% level of significance. Thus, 1% increase in current and previous levels of the

8

development of human capital leads to 6% and 33% increase in the level of Nigeria's income inequality for the time under review. This is contrary to our exception and to the study of Suhendra, et al., (2020) and Adan, et al., (2023) who found a negative influence of the level of human capital development on income inequality. This positive and substantial association between the level of development of human capital and income inequality can be attributed to the low level of Nigeria human capital development index (low health status, standard of living and educational status). For instance, Word Health Statistics showed that Nigeria's life expectancy rate at birth of 54.4 is about the 190th positions, while maternal mortality of 1047 is second to the highest out of 203 countries that were assessed (World Health Organization, 2022). Thus, much need to be done on the development of human capital in Nigeria to effectively reduce income inequality.

The result further showed that the present value of government expenditure on education had negative insignificant impact on income inequality while the first lag with a positive coefficient (6.036019) is statistically substantial at 5 %, indicating that percentage increase in GEE increases the level of income inequality by 6.03 % contrary to the study of Ali (2022) but in support with the Adan, et al. (2023) that found a negative and non-substantial impact of expenditure in education on inequality in income. Lee and Lee (2018) however, found that equal distribution as well as expansion in education significantly reduces income inequality. This also strengthens the outcome of the level of human capital development on inequality in income. The negative sign of government expenditure on health (GEH) with (-12.18237) and non-substantial at 5%, revealed that a 1% decrease in GEH reduces Nigeria's inequality level by 12% which agrees to the studies of (Ali, 2022) but in variance with Adan, et al. (2023). These portrays the low impact of public sector investment and conforms to the fact that the level of development of human capital has not been a priority in Nigeria.

Analyzing the Kuzent's law in Nigeria, the outcome of the analysis revealed the obedience of the law as the square of real gross domestic product per capita revealed a positive connectivity with income inequality in the second lag and at the fist lag showed a negative significant relationship. Showing that income inequality increases with a rise in growth and then falls as growth increase. This was supported by the study of Adan, et. al (2023) but in a variance with the study of Batuo, et. al (2022). In conformity to theory, unemployment showed a positive relationship and insignificant impact on income inequality while previous level of inflation in conformity to the study of Suhendra, et. al (2020) showed a positive significant impact on income inequality. Trade openness exhibited a positive significant impact on the levels of inequality in income distribution indicating that international trade in Nigeria is based on skill-based technology which is resulting in higher wage inequality and hence, increasing the income inequality gap in Nigeria (Lee and Wie 2015).

Table 4.3. Long-run Estimate for income inequality equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INEQ(-1)	0.082442	0.250481	0.329133	0.7482
INEQ(-2)	-0.390692	0.208177	-1.876731	0.0873
HCD	6.373913	15.05914	0.423259	0.6803
HCD(-1)	33.35065	15.69513	2.124905	0.0571
LGEE	-0.821229	8.736767	-0.093997	0.9268

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGEE(-1)	-0.384011	1.837817	-0.208949	0.8383
LGEE(-2)	6.036019	2.384637	2.531211	0.0279
LGEH	-12.18237	8.472483	-1.437875	0.1783
UNMP	0.176668	0.225089	0.784879	0.4491
INF	-0.094936	0.137374	-0.691077	0.5038
INF(-1)	0.303691	0.142061	2.137741	0.0558
INF(-2)	-0.278416	0.125225	-2.223321	0.0481
LRGDPPC	2.228201	1.882225	1.183812	0.2614
LRGDPPC(-1)	-26.14990	10.15645	-2.574708	0.0258
LRGDPPC(-2)	26.42343	8.265319	3.196903	0.0085
TOP	0.578775	0.193547	2.990363	0.0123
TOP(-1)	0.065093	0.168065	0.387305	0.7059
TOP(-2)	0.150677	0.145732	1.033931	0.3234
C	26.62475	29.39947	0.905620	0.3845

R-squared =   0.809942
Adjusted R-squared =   0.749894
F-statistic=   2.80428
Durbin-Watson stat=   1.927147
Prob(F-statistic)=   0.044329

Computed by the Author using Eviews 10

4.3.1.2. Result of Short-Run ARDL formation

Given the different orders of integration of the variables at 5% significance level, an ARDL Bounds Test analysis of the PSS method of co-integration test was carried out to determine the existence of co-integration among the variables

Table 4.4. ARDL PSS Bond Test for Model 1

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	4.926858	7
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.92	2.89
5%	2.17	3.21
2.5%	2.43	3.51
1%	2.73	3.9

Source: Extracted from E-view result

The result as shown in Table 4.4 establishes the existence of co-integration among the variables. Hence, we conclude that we fail not to reject the null hypothesis and thus in accordance with the presumption of the ARDL-ECM and in this case a NLARDL-ECM.

The estimation of the NLARDL-ECM of the income inequality equation presented in table 4.5, showed that human capital development (HCD) had positive but insignificant impact on Nigeria's level of income inequality. This suggests that

increasing the level of development of human capital has the possibility of increasing Nigeria's level of income inequality but with unsubstantial impact. It was also noticed from this study that inflation (INF) in the first lag, RGDP per capital (RGDPpc[2]) and Trade openness (TOP) had positive and substantial impacts on income inequality. Statistically, a 1% surge in inflation, RGDP per capita and Trade openness is likely to increase rate of inequality in income by 0.27%, 2.22% and 0.57 % in the short-run. In line with the findings of Nwosa (2019), the substantial impact of GEE on inequality in income can be ascribed to the low yearly budgetary to the sector which have not shown result on the poor relating to the provision of the basic education and health requirements needed in making the poor employable, improving their standard of living and closing the wide income inequality gaps.

The outcome of this study further revealed that openness had an adverse insignificant impact on the level of inequality in income in the first lag, implying that a 1% increase in trade openness will hopefully reduce the inequality in income distribution by 0.15 %. This is in contrary to Nwosa (2019) who found that trade openness had significant impact. Given the Structural Adjustment Programme of the mid-80s that liberalized Nigeria economy resulting in increase in to international trade, they may have been a short run fall in the inequality in income distribution. However, in the long run with the expansion of trading activities, the low skill workers were discarded for higher skilled worker and as such leading to a surge in income gap in the long run as revealed in the result of the long run estimation (Table 4.3).

It was also realized from this study that income per capita showed an optimistic substantial impact on the inequality of income in Nigeria in the current year and a negative significant impact in the previous years. Lee and Lee (2018) found in their study that the higher the per capita income, the more open the economy is, and the faster the technological progress is, the higher the income and education inequality.

The short run estimation divulged that the error correction coefficient (*CointEq(-1)*) came out with anticipated sign (-1.30) with substantial impact. This thus insinuate that about 30% disequilibrium in the short-run is corrected in the long-run.

Table 4.5. NLARDL-ECM for income inequality equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INEQ(-1))	0.390692	0.126433	3.090110	0.0103
D(HCD)	6.373913	9.211621	0.691943	0.5033
D(LGEE)	-0.821229	1.141018	-0.719733	0.4867
D(LGEE(-1))	-6.036019	1.115454	-5.411268	0.0002
D(INF)	-0.094936	0.072013	-1.318314	0.2142
D(INF(-1))	0.278416	0.069483	4.006956	0.0021
D(LRGDPPC^2)	2.228201	0.947990	2.350449	0.0385
D(LRGDPPC^2(-1))	-26.42343	5.015895	-5.267938	0.0003
D(TOP)	0.578775	0.107160	5.401040	0.0002
D(TOP(-1))	-0.150677	0.085182	-1.768877	0.1046
CointEq(-1)*	-1.308250	0.149487	-8.751585	0.0000

Computed by the Author using Eviews 10

4.3.2. Valuation of the Human Capital Development Equation

4.3.2.1. Result of Long-Run ARDL formation

Table 4.6 showed that the diagnostic test is of a good standard, indicating a good fitness of the model and robustness of the result. This was revealed with R^2 output showing that 89% of the changes in the contingent variable were accounted for by explanatory variables. Also, the F-sat of 38.899 revealed that the independent variables jointly have a significant impact on the dependent variable while the Durbin-Watson stat of 2.066171 although marginally higher than 2 portrays the absence of autocorrelation in the model.

The output of the result portrays that the preceding lag of human capital development do not have substantial impact on present level. 1% increase in previous levels of human capital development leads to 0.23% increase in current level of human capital development. In line with our expectation, although marginally, current and previous lag of income inequality showed a negative significant impact on human capital development while the second and third lags showed a positive substantial effect on the level of development of human capital. 1% increase in income inequality showed a marginal fall of 0.01% in the level of development of human capital in the current year and a 0.014% drop in the very long preceding years. This reveals that closing the income inequality gap, will push up the development of human capital and hence development of the economy.

The current and preceding levels of government's expenditure on education were found to have a negative significant impact on human capital development contrary to expectation. Specifically, 1% increase in current and previous years leads to 0.01%,0.02% and 0.004% fall in the level of development of human capital in Nigeria respectively. These marginal falls in human capital development given government expenditure in educational sector could be attributed to the recent effort that is being put into the educational sector as it was expected to have a great negative impact on human capital development. For instance, government allocation increased from 4.83% of total national budget in 2010 to 5.4% in 2023 while primary gross enrolment increases from 26.7% in 2000 to 85.73% in 2019. However, current level of inflation was found to significantly reduce the level of development of human capital as predicted while the previous levels of increased rate of inflation is were found to have a positive unsubstantial impact on the development of human capital.

Further analysis of the result showed that both the present and preceding levels of government's expenditure on health, unemployment and population growth substantially and positively impacted on the development of human capital development in the long run. As suggested by the result, 1% increase in government expenditure on health, unemployment and population growth increased the development of human capital by 0.01% & 0.005%, 0.02% & 0.0049% and 3.75% & 1.796% for the variables current and previous period respectively in the long run.

The positive impact of unemployment on human capital development is contradictory to expectation as unemployment is a major challenge to Nigeria economy especially youth unemployment. This may nevertheless be accounted for by the high number of disguised unemployment in Nigeria which tend to cover the true picture of the unemployment statues. This disguised unemployment tends to affect the level of development of human capital hence total unemployment level. The results show consistency with the previous ones which were obtained by Rougoor and van-Marrewijk, (2015).

Table 4.6. Long-run Estimate for Human Capital Development Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
HCD(-1)	0.232861	0.190451	1.222682	0.3087
HCD(-2)	-0.401449	0.617596	-0.650018	0.5620
INEQ	-0.010947	0.005652	-1.936982	0.1481
INEQ(-1)	-0.028902	0.007563	-3.821404	0.0315
INEQ(-2)	0.003108	0.003396	0.915247	0.4276
INEQ(-3)	0.014796	0.005731	2.581839	0.0816
GEE	-0.006013	0.002366	-2.541753	0.0845
GEE(-1)	-0.002063	0.001298	-1.589259	0.2102
GEE(-2)	-0.004463	0.001087	-4.104123	0.0262
GEH	0.010373	0.004077	2.543973	0.0844
GEH(-1)	-0.000879	0.001328	-0.662200	0.5552
GEH(-2)	0.003173	0.001653	1.919962	0.1506
GEH(-3)	0.005318	0.001609	3.304407	0.0456
UNMP	0.020882	0.006334	3.296681	0.0458
UNMP(-1)	0.011839	0.004990	2.372556	0.0983
UNMP(-2)	-0.015179	0.013519	-1.122767	0.3433
UNMP(-3)	0.049040	0.012743	3.848511	0.0310
POPGR	3.755684	2.798450	1.342059	0.2721
POPGR(-1)	-1.845386	1.007666	-1.831346	0.1644
POPGR(-2)	-0.636304	0.928874	-0.685027	0.5425
POPGR(-3)	1.796446	0.532407	3.374196	0.0433
INF	-0.002366	0.001128	-2.097452	0.1269
INF(-1)	-0.001886	0.001497	-1.259752	0.2968
INF(-2)	0.003526	0.001189	2.965998	0.0593
INF(-3)	0.001614	0.001757	0.918511	0.4261
C	-7.066471	6.416785	-1.101248	0.3512

R-squared =   0.896925
Adjusted R-squared =   0.871297
F-statistic=   38.89974
Durbin-Watson stat=   2.066171

Computed by the Author using Eviews 10

4.3.2.2. Result of Short-Run ARDL formation

The outcome of the stationarity test provided the ground upon which we carried out a Bounds Test analysis for co-integration.

Table 4.7. ARDL Bounds Test

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	13.09394	6

Critical Value Bounds

13

Significance	I0 Bound	I1 Bound
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99

Source: Extracted from E-view result

The result of the PSS method of co-integration for the HCD model (Table 4.7) revealed that there is co-integration among the variables. Hence, we conclude that there is a unique long-run relationship among the variables. From the above, ARDL-ECM was carried out on the equation.

The estimation of the ARDL-ECM of the level of development of human capital equation presented in Table 4.8, revealed that preceding level of development of human capital (HCD) had positive and significant impact on the current level of human capital development. Specifically, 1% increase in last year's level of the development of human capital will lead to 0.4% increase in the current level of human capital development. Of importance is the outcome of the relationship and impact of the income inequality on the level of development of human capital. It was revealed that both current and two years lag of the income inequality showed a negative and substantial impact on the levels of development of human capital.1% increase in income inequality significantly reduces human capital development by 0.01% and 0.14% in the current and previous periods respectively. This in line with some studies (Omojimite, 2011; Dae-Bong, 2010).

The estimate revealed that while present level of government's expenditure on education (GEE) had a negative relationship on the level of development of human capital, previous level of GEE showed a positive relationship on the level of development of human capital although both present and preceding levels had a significant impact on the level of development of human capital. This result of the impact of the current levels of government expenditure on education reveals the situation of Nigeria. Given a situation where allocation of national budget to education which is a major component of human capital development having almost the lowest share of allocation average of 3% for the past three decades which is fall below the recommendation of United Nations Educational Scientific and Cultural Organization is definitely worrisome and hence, the low performance and outcome of the human capital development.

Further analysis of the result showed that current levels of government's expenditure on health (GEH), unemployment and population growth showed a positive and substantial impact on human capital development at 5% significant level. This showed that a 1% increase in the variables above will increase the level of human capital development in Nigeria by 0.01%, 0.020%, and 3.755% respectively. While it was observed that a fall in the previous levels of government's expenditure on health will significantly increase the level of development of human capital. The positive outcome of unemployment is totally contrary to perception while the positive outcome of population growth depends on the use of population. This finding is in consensus with the study of Khayria &Feki, (2015) but however contrary to the study of Ogunleye, Owolabi, Sanyaolu, and Lawal (2017).

14

Regarding population growth, a surge in population without a matching surge in the level of income and welfare will really lead to a surge in poverty level thereby affecting the level of development of human capital as well as income inequality in the country. Ogbeide-Osaretin and Orhewere (2022) also found that population growth significantly impacts on economic development of Nigeria negatively and one of the channels of the impact is through low human capital development. On the other hand, previous levels of unemployment and population growth showed a negative and significant impact on human capital development at 5% level of significance as expected and in line with theory.

In line with perception and theory, current and previous inflation rates were found to have a negative significant impact on human capital development at 5% level of significance. Table 4.8 showed the value of the short-run ARDL, *CointEq* (-1) (-1.168588) which was substantial at even 1% revealing the model adjust to equilibrium position in the long-run with about 1.2% of this disequilibrium being corrected annually.

Table 4.8. Short-Run ARDL estimation of human capital development

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(HCD(-1))	0.401449	0.061615	6.515434	0.0073
D(INEQ)	-0.010947	0.001174	-9.321709	0.0026
D(INEQ(-1))	-0.017905	0.001485	-12.05624	0.0012
D(INEQ(-2))	-0.014796	0.001354	-10.92873	0.0016
D(GEE)	-0.006013	0.000383	-15.70846	0.0006
D(GEE(-1))	0.004463	0.000283	15.78183	0.0006
D(GEH)	0.010373	0.000678	15.30503	0.0006
D(GEH(-1))	-0.008491	0.000542	-15.67069	0.0006
D(GEH(-2))	-0.005318	0.000350	-15.17469	0.0006
D(UNMP)	0.020882	0.001850	11.28643	0.0015
D(UNMP(-1))	-0.033861	0.002171	-15.59859	0.0006
D(UNMP(-2))	-0.049040	0.003318	-14.78189	0.0007
D(POPGR)	3.755684	0.316563	11.86392	0.0013
D(POPGR(-1))	-1.160142	0.235010	-4.936564	0.0159
D(POPGR(-2))	-1.796446	0.219162	-8.196872	0.0038
D(INF)	-0.002366	0.000463	-5.113843	0.0145
D(INF(-1))	-0.005140	0.000485	-10.59189	0.0018
D(INF(-2))	-0.001614	0.000426	-3.792532	0.0322
CointEq(-1)*	-1.168588	0.062538	-18.68614	0.0003

Computed by the Author using Eviews 10

5. Policy recommendation and Inference.

5.1. Strategy inferences

We explored the reality of the human capital development and the income inequality two-ways linkage as well as the role of public sector investment in the reduction of income inequality and the development of Nigeria's human capital. Annual data on human capital development index as a measure of the level of development of human capital, government's expenditure on education and health as well as income inequality measured by Gini coefficient among other variables were used. Below are the inference and recommendations made:

1. In the long-run previous income inequality showed a positive insignificant impact on the present income inequality. However, in the short run, previous levels of inequality in income showed a positive significant impact on current level of inequality in income which is in agreement with the dynastic rule of income inequality. Inequality in Income also had a substantial negative effect on the level of development of human capital. Hence, the study advocates for the serious implementation of strategies for the reduction of income inequality such as investment in higher education, provision of health services, social insurance progressive tax, inheritance taxation among others which should be both in the short term and the long term to correct the dynastic impact of income inequality.

2. As divulged from the result the level of development of human capital had a positive substantial impact on inequality in income in the long run while previous level of human capital development was found to have a positive significant impact on current levels in the short run. The inference here is that there is a serious need for the improvement in the level of development of human capital through increasing access to education and health. The study also recommends government's provision of the requirements for quality education and health such as building of schools and hospitals, books and drugs needed as well as providing the room for in services training for teachers and health officer for quality service provision. Thus, while, it is important for the increase in the level of human capital development, it is also important that the reduction in the level of income inequality to be pursed so that even with low amount of public sector investment, families can at least afford basic education and health needs thereby increasing the level of national human capital development.

3. Public sector investment (government's expenditure in education and health) was revealed by the outcome of the study as vital factors in enhancing the level of development of human capital, and hence the reduction of inequality in income. As diverged by the result, public sector's investment positively and substantially impacts on income inequality (both long-run and short-run) while they negatively and substantially impact on human capital development. We therefore advocate for an increase in government's expenditure (education and health), especially in the budget allocation and provision of infrastructures for the development of the level of human capital and as such reduce inequality in income.

4. Nigeria's government should step up initiatives and programs such as birth control measures and maximum number of children per household aimed at slowing the rate of population growth in the nation as it was found to significantly impact on the level of human capital development. To close the gap in the inequality in income, there is need for the improvement of social services. Consciously carrying out these tasks will lessen the prevalence of income inequality in the nation.

5. The Nigerian government must also moderate its trade liberalization policies since the country's economy appears to be too fragile to withstand the adverse shocks from foreign trade. Particularly as revealed by the study, openness in trade substantially brings about surge in inequality in income in the distant future and the present time. The most essential thing is to implement proper fiscal and monetary strategies to counteract the inevitable adverse impacts of opening the economy to outside pressures.

6. Rate of inflation should highly be controlled and stabilized by government price control measures. It was found to be among the contributors to the high-income inequality gap as well as low level of development of human capital especially in the

short run as evident from the result with inflation having a negative substantial impact on the level of development of human capital and inequality in income.

7. There is also a dying need for the reduction in the unemployment. We thus advocate for the encouragement of vocational training/skill acquisition as well promoting agricultural activities. Such encouragement policies like the support for start-up capital and machines needed for mechanized agriculture is strongly recommended

8. The result supported the reality of Kuznet's hypothesis. However, the study strongly recommends for policy measures of pro-poor growth for the effective reduction in the country's inequality gap.

5.2. Conclusion

The level of development of human capital is assumed to be linked with the level of inequality in income in the society, where human capital development may impact on the level of income inequality and vice versa. However, for the effectual advancement of the level of human capital, the public sector is believed to be imminent. It is in the view of the above that this study examined the connectivity between the level of human capital advancement and inequality in income given the role of public sector investment in this connectivity.

This study divulged a substantial two-ways impact amidst human capital development and Nigeria's inequality in income. Public sector investment was found to play vital role in the linkage and was found to be a contributor to the challenge of low human capital development and the effective reduction of income inequality. Findings from the study also revealed that there is the existence of Kuznet's hypothesis in Nigeria income and inequality while unemployment, population growth and the high degree of trade openness are crucial areas to control. Hence, the study strongly advocates for policy measures of government active investment in human capital development, pro-poor growth, reduction of population growth and unemployment for the effective reduction in the country's inequality gap and the development of human capital.

References

Adan, M. A., Muriithi, D. K., Mbaabu, O. (2023). Effect of Human Capital Investment on Income Inequality in Kenya. *European Journal of Development Studies*, *3*(4), 30–40. https://doi.org/10.24018/ejdevelop.2023.3.4.288.

Aghion, P, Akcigit, U., Howitt, P. (2013): What do we learn from Schumpeterian Growth Theory. *Working paper series in economics and institute of innovation 298, Royal Institute of Technology, CESIS - Centre of Excellence for Science and Innovation Studies.*

Albanesi, S, 2007. Inflation and inequality. *Journal of Monetary Economics, Elsevier*, 54(4): 1088-1114, May. https://doi.org/10.1016/j.jmoneco.2006.02.009

Baah-Bonteng, W. B. (2013). Human Capital Development: The Case of Education as a Vehicle for Africa's economic Transformation. *Legion Journal of International Affairs and Diplomacy, 7(1): 31-55.*

Batuo M. E., Kararach, G, Malki. I (2022): The dynamics of Income Inequality in Africa: An Empirical Investigation on The Role of Macroeconomic and Institutional Forces. *World Development 157, September, 105939* https://doi.org/10.1016/j.worlddev.2022.105939

Benabou, R. (2000). Unequal Societies: Income Distribution and the Social Contract. *American Economic Review*, 90 (1): 96-129**.** DOI: 10.1257/aer.90.1.96

Binder, M. Georgiadis, G. (2011). Determinants of Human Development: Capturing the Role of Institutions. CESIFO Working Paper No. 3397, SSRN: https://ssrn.com/abstract=2031500 or http://dx.doi.org/10.2139/ssrn.2031500

Bourguignon, F., F., Ferreira, H.G., Lustig, N. (eds). (2004). The Microeconomics of Income Distribution Dynamics in East Asia and Latin America. Washington, DC: The World Bank.

Central Bank of Nigeria (2023). Quarterly Statistical Bulletin. https://www.cbn.gov.ng/documents/QuarterlyStatbulletin.asp

Dae-bong, K (2010). Human Capital and its Measurement. Being a paper presented on the 3rd OECD World Forum on "Statistics, Knowledge and Policy" Charting Progress, Building Visions, Improving Life Busan, Korea - 27-30 October 2009. https://www.oecd.org/site/progresskorea/44109779.pdf

Delbianco, F., Dabius, C., Caraballo, M.A. (2014). Income Inequality and Economic Growth: New Evidence from Latin America. *Cuadernos de Economia, 33 (63): 381-398*.

EDUCELEB (2018). Primary school enrolment rate (state by state) in Nigeria. https://educeleb.com/primary-school-enrolment-rate-in-nigeria/

Eicher, T. S., Garcia-Penalosa, C. (2001). Inequality and Growth: The Dual Role of Human Capital in Development. *Journal of Development Economics, 66(1),* 173-197. https://doi.org/10.1016/S0304-3878(01)00160-2

Globaldata (2023). Literacy Rate in Nigeria (2010-2021, %). https://www.globaldata.com/data-insights/macroeconomic/literacy-rate-in-nigeria/

Gregorio, J. D., Lee, J. (2002) Education and Income Inequality: New Evidence from Cross-Country Data. *Review of Income and Wealth, 48 (3), 395-416.* http://dx.doi.org/10.1111/1475-4991.00060

Imandojemu, K., Ekperiware, C., M., Babatunde, J. A., (2020). The Nexus between Human Capital Development and Economic Growth in Nigeria: A VAR Methodology. *East African Scholars Journal of Economics, Business and Management. 3(10)* DOI: 10.36349/easjebm.2020.v03i10.005. = https://www.easpublisher.com/easjebm

Keji, S. A. (2021). Human Capital and Economic Growth in Nigeria. *Future Business Journal, 7(1):49* https://doi.org/10.1186/s43093-021-00095-4

Khayria, K., Feki R (2015): Gender Inequality and Economic Development, *Business and Economics Journal, 6 (4)*

Lee, J., Lee, H (2018). Human Capital and Income Inequality. *Asian Development Bank Institute* Working Paper *No. 810 February.*

Lee, J. W., Wie, D. (2015). Technological Change, Skill Demand, and Wage Inequality: Evidence from Indonesia. *World Development 67: 238–50.*

Macrotrends (2023[a]). Nigeria Infant Mortality Rate 1950-2023. https://www.macrotrends.net/countries/NGA/nigeria/infant-mortality-rate'>Nigeria Infant Mortality Rate 1950-2023. www.macrotrends.net. Retrieved 2023-02-18.

Macrotrends (2023[b]). https://www.macrotrends.net/countries/NGA/nigeria/healthcare-spending' www.macrotrends.net. Retrieved 2023-11-13.

Nwosa, P.I (2019). Income Inequality and Economic Growth in Nigeria: Implication for Economic Development, *OECONOMICA* 15 (1):107-115

Ogbeide-Osaretin, E. N**,** Orhewere, B. (2022): An Empirical Evidence of Energy Consumption and Economic Development Dynamics in Nigeria: What is the Role of Population*? Energy Economics Letters. 9(1), 27–43.* https://doi.org/10.55493/5049.v9i1.4510 www.aessweb.com

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

Olowookere, J. K, Olanipekun, D., Sokunbi, G. M., Aderemi,T. A. (2022). Human Capital Development and Sustainable Development: Evidence from Nigeria. *Studia Universitatis Babeş-Bolyai Oeconomica 67(1): 63-76.* DOI: 10.2478/subboec-2022-0005

Omojimite, B (2011). Building Human Capital for Sustainable Economic Development in Nigeria. *Journal of sustainable Development*, 4(4):183-189

Onuigbo, F. N (2021). Human capital development and economic development in Nigeria- an analysis of the role of government. *International Journal of Innovative Social Sciences & Humanities Research 9(4):181-190, Oct.-Dec.*

Rougoor, W., van-Marrewijk, C, (2015). Demography, Growth and Global Income Inequality. World Development, Elsevier, 74(C): 220-232.Handle: *RePEc:eee: wdevel:v:74:y:2015:i:c:p:220-232* DOI: 10.1016/j.worlddev.2015.05.013

Seery. E, Okanda, J., Lawson, M (2019): A Tale of Two Continents Fighting Inequality in Africa. *OXFAM Briefing paper – September*. Oxfam GB for Oxfam International

Shuaibu, M., Oladayo, P. T. (2016). determinants of human capital development in Africa: a panel data analysis. *Oeconomia Copernicana, 7(4), 523-549.* DOI: http://dx.doi.org/10.12775/OeC.2016.030)

Suhendra, I., Istikomah, N., Ginanjar, R. A. F., Anwar, C. J. (2020). Human capital, income inequality and economic variables: a panel data estimation from a region in Indonesia. *Journal of Asian Finance, Economics and Business; 7(10): 571–579.* doi:10.13106/jafeb.2020.vol7.no10.571

United Nations Educational Scientific and Cultural Organization (2019). Literacy rate, adult total (% of people age 15 and above) country ranking. Institute for Statistics. http://uis.unesco.org/

United Nations Educational Scientific and Cultural Organization (UNESCO) (2023). Data for sustainable development goals. https://uis.unesco.org/

World Bank (2022). School enrollment, tertiary (%gross). https://data.worldbank.org/indicator/SE.TER.ENRR

World Bank (2023). World Population Review. https://worldpopulationreview.com/country-rankings/best-healthcare-in-the-world

World Bank (2023). Nurses and midwives (per 1,000 people)-Nigeria. https://data.worldbank.org/indicator/SH.MED.NUMW.P3?locations=NG

World Bank (2023) Human capital index (HCI) (scale 0-1). https://data.worldbank.org/indicator/HD.HCI.OVRL

World Bank (2023a): Human development: insights. human development report. https://hdr.undp.org/data-center/country-insights#/ranks

World Health Oganisation (2022). World health statistics, 2022. https://www.who.int/news/item/20-05-2022-world-health-statistics-2022