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Human Development, Social Development Factor and Economic Growth in Nigeria

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ABSTRACT

The interaction between social development issues and human development outcomes are recently been advanced as ultimate objective towards improvement of developing economies. Premised on this, the study investigated the interrelationship between human development, social development factor and economic growth in Nigeria using annual time series data spanning between 1981 and 2019. The data were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin, United Nation Development Programme (UNDP) and World Bank, World Development Indicator (2019) edition database. The study employs Autoregressive Distributed Lag (ARDL) bounds test approach to co-integration and VAR Granger causality model as estimation techniques. Of the variables considered, the prominent role of life expectancy (LEXR) at lag two-period, literacy rate, poverty rate, and employment rate (EMPR) at lag two-period were clearly brought to fore in the short and long runs and as well conformed to each other except that of population growth rate and per capita income at lag one period that were not in concordance but statistically pronounced. The result of ECM(-1) of 165% implies that the errors are being corrected within the same period to ensure convergence at the long-run. VAR Granger causality result indicates that bi-directional causal relationship exists between GDP and LEXR; and as well between GDP and EMPR in the country. This implies that increase in economic growth is necessary for enhancing life expectancy and employment rate just as enhanced life expectancy and appreciable level of employment are needed to improve economic growth in the country. While a uni-directional relationship running from LITR to GDP without a feedback. Given the above findings, it is therefore recommended that government and policymakers should devise a policy measure to strengthen the Nigerians capabilities which in turn will increase life expectancy as a result of good health, employment level and educational standard of the citizens. Efforts should also be made by the government to reduce impoverished citizen to enable them achieve their full potential and afterwards sustainable economic growth can be enhanced in Nigeria.

KEYWORDS: Human development, Social development, GDP, ARDL, VAR Granger causality

I. INTRODUCTION

The interaction between social development issues and human development outcomes are recently been advanced as ultimate objective towards improvement of developing economies (UNDP 1990). To this end, economic growth through GDP growth rate identifies the growth attained through individual's right to live a long and healthy life, better education and as well enjoy a decent standard of living which cannot be realized without addressing social development issues (OECD, 2014). However, their intellectual antecedents can be traced to earlier basic needs approaches of the International Labour Organisation (ILO), World Bank as well as Sen's concept of capabilities (Sen, 1984). Similarly, human and social development are primarily concerned about improving the well-being of every individual in the society and as well expanding the quality of human life by focusing on people which can greatly contributes to economic growth and development in the country (Organisation of Eastern Caribbean States (OECS), 2008). Hence, their significant contributions cannot be over emphasized as earlier purports by Gustav, Frances and Alejandro (2000) that positive growth trajectories are running from both human development and social development to economic growth.Further, as rightly noticed by 2005 World Economic Summit (WES) that sustainability of African economies require an inclusive growth much importantly from human development and social development participants which in turn will improve economic growth in developing countries (Nigeria inclusive) (UNDP, 2016). Again, literature has also made us to realized that sustainable economic growth and development in any countries cannot be witnessed without some prominent dimensions of inclusive growth such as human development (e.g. healthy life expectancy, education / literacy rate, labour force to mention but few)

and; social development factors like poverty rate, employment rate, rural-urban population in the country amongst others (Marijan, Miroslaw, Kristina, (2017). However, in developing countries most especially in Nigeria, human and social development are issues of debate prior of their essentialities to life and humanity which in turn if effectively managed can spur the growth of the economy. Therefore, the existence of human and social development cannot be undermined in creating enabling environments for achieving economic growth if it is well handled (UNDP, 2019). Todd (2020) also emphasized that human and social development integrates an individual, interpersonal and community approaches to the promotion of healthy development and well-being which the services produced as a result of an adequate integration will be transformed to an increase in aggregate output. Extant literature in developing countries most especially in Nigeria on the interrelationship between human development, social development factor and economic growth are few. Most of these studies are either on relationship between economic growth and human development alone nor correlation between economic growth and social development. Besides that, some prominent indicators (e.g. educational attainment/ literacy, healthy life expectancy, population growth and inequality rates, per capita income and as well as labour force) factoring the dimensions of human development outcomes and social development factor are missing in the literature, which the present study considered and included in the modification model of Barro and Sala-i-Martin, 1992; in the work of Gustav *et al.,* (2004). Nonetheless, anecdotal and empirical evidences have pinpointed the influence of human development outcomes and social development factor as a major drag on Africa's inclusive growth process. Many Africa countries have witnessed different episodes of social development issues (e.g. child abuse, nepotism, poverty, employment discrimination and institutional challenges) and human development outcomes (malnutrition, rural populated area and health challenges) affecting the growth of the economy. Alluding to the foregoing scenarios and lacuna, this study is out to investigate the interrelationship between human development, social development factor and economic growth towards transformative steps that will shift the Nigerian economy into a sustainable and resilient path which typifies African countries. To achieve this objective, this study employs Autoregressive Distributed Lag (ARDL) approach in contrast to other related earlier studies such as Gustav *et al.,* 2004; Maria-Ana & Emilia, 2019; Mervyn, 1969; and Abimbola, Oladele, Olatunji & Omotayo, 2016) who employed estimation techniques like cross-section regression, pearson correlation, regression analysis, principal component analysis and cluster analysis method, to either study the relationship between economic growth and human development nor the correlation between economic growth and social development. Most of these studies had not critically investigated the interrelationship between human development, social development factor and economic growth using ARDL approach. However, the remaining part of this study is organized as follows, section two concentrates on review of literature. Section three presents methodology which includes theoretical framework, model specification and estimation technique for the study. Section four analyzes and discusses empirical results while the concluding remarks and policy recommendations are presented in section five.

II. LITERATURE REVIEW

In this section, some relevant concepts are discussed, while related theories and empirical literature are presented.

Conceptual Review

Economic growth represents the expansion of a country's GDP or national output. That is, an increase in the goods and services produced by an economy, typically a nation over a long period of time. According to Todaro, 2000, economic growth refers to an increase in a country's national output of goods and services or increase in the volume of output of goods and services within a specified period. To Lewis, it means an increase of output per head of population since the ultimate aim of economic growth is to raise standard of living of the people. However, economic growth is measured as percentage increase in real gross domestic product GDP which is gross domestic product GDP adjusted for inflation. There are three main types of economic growth theories over time; which includes the classical, neo classical and the modern day theories of economic growth, as briefly explain thus:The classical theory of economic growth states that every economy has a steady state GDP and any deviation of that steady state is temporary and will eventually return. This is based on the concept that when there is a growth of GDP, population increases but contrary population will decrease and thus lower demand on the resources. Neo classical theory to economic growth (an extension to the 1946 Harrod-Domar model) is also known as Slow-Swan growth model of 1956. The theory focuses on three factors that impact economic growth such as labour as a factor of production, capital-output ratios that are not fixed and technological progress, or more specifically, technologically advancement. The theory showed that there will be a point at which labour and capital can be set to reach equilibrium so that more output growth can be enhanced.

Social development refers to the complexity of social dynamics that projected growth inclusiveness for a country. That is, the interplay of social structures, processes and relationships which may have great impact on economic growth and development of a country (Jan, 2005). Besides, it also focused on but not limited to social concerns of the people as objectives of development and people-centered, participatory approaches to development. Again,

social development is about inclusiveness, social justice and the common good. Indicators of social development provide comparative information about areas such as income, environment poverty, employment, security, education, health, crime and civic participation. The major purpose of economic growth and development is to improve social and material well-being of all individuals and social institutions with the goal of achieving the highest possible level of human development. Socioeconomic development, therefore, requires an integration of economic and social development. The United Nations (UN), in the 1950s, promoted approaches to social welfare that emphasized child and family welfare services. By the beginning of the 1960s, the emphasis was on economic growth in addition to concerns about families and children and the UN used the British label of "social development" for this combined interest.

Human development, according to UNDP in 2010, is the broad based progress that raises standard and expands people's choices in all countries and communities in all key dimensions of human development, from health and education and livelihoods to the personal freedom to control and improve one's own life' (HDR, 2013). As describe by Todaro (1997), economic growth and development are associated with progress in all aspect of an economy such as social, political, cultural and economic. It includes increase in productivity, development of human capital, proper utilization of resources, reduction in poverty rate, environmental sustainability, social inclusion, health safety, literacy, low malnutrition and other initiatives (Dang, 2013). Human Development in such terms is clearly not simply about economic growth, and neither is it merely health and education service delivery. Instead it places people at the centre of development, and seeks to enlarge people's choices by building their capabilities, allowing them to expand the range of things that they can do or be (Sen, 1992).
The most widely used indicator of human development is the human development index (HDI) which further suggests how economic growth can be enhanced most especially in developing nations (Nigeria inclusive) and also asserted by 2010 global Human Development Report. The HDI is an indicator made up of three components that provide a simple measure of income, health and education levels in a country. The calculation of the HDI changed in 2010 geometric mean of Gross National Income (GNI) per capita, life expectancy index, and a new education index, compared to what it has been up till 2009 as an arithmetic mean of three indices; GDP per capita, a life expectancy index, and an education index (based on school gross enrolment ratios and adult literacy), Global Human Development Index , 2010.

Theoretical Underpinning: In a bid to properly link this present study to related theory in the literature, two different theories are analyzed which include Solow Growth Model (SGM) proposed by Mankiw (1992) and Capability theory by Sen (1992).

Solow Growth Model (SGM)-Economic Growth Theory : First strand of theory used in this study is an augmented Solow Growth Model (SGM) proposed by Mankiw (1992), where human capital development, physical capital labour, health capital as well as technology contributes to economic growth and also determine factors of output. What happened is that togetherness of human capital development, physical capital and labour could explain economic growth disparity across countries far better than physical capital and labour alone. As an indicator of human capital development, Mankiw used education which can as well represent level of literacy in the country. Thus, the higher the level of education / literacy, the higher the human capital development which the impact can be felt on economic growth. However, Mankiw used the fraction of the working population between ages 15 and 19 enrolled in school as the indicator of human capital, demonstrating that human capital is highly correlated with output, and thereafter noticed that the entire regression fit better after its inclusion. The augmented model is an extended form of the original Solow growth model which gave output (Y_t) as a Cobb-Douglas function of physical capital (K_t), labour (L_t), and technology (A_t) (Solow, 1952). The original Solow growth model looks as follows:

$$Y_{(t)} = K_{(t)}{}^{\alpha}(A_{(t)}L_{(t)})^{1-\alpha-\beta} \qquad (2.1)$$

As mentioned before, Mankiw added human capital to equation (2.1) to account for the contribution of human capital (H(t) represented by education attainment/level of literacy (social development) to economic growth:

$$Y_{(t)} = K_{(t)}{}^{\alpha} H_{(t)}{}^{\beta}(A_{(t)}L_{(t)})^{1-\alpha-\beta} \qquad (2.2)$$

Yoo and Yang (2004); and Heshmatti, 2005; added health capital P(t) to (2.2) as one of the indicators of human development factoring life expectancy, and showed that their model gave a better fit than when health capital was not included. Thus, the augmented Solow model now becomes:

$$Y_{(t)} = K_{(t)}{}^{\alpha} H_{(t)}{}^{\beta} P_{(t)}{}^{\gamma}(A_{(t)}L_{(t)})^{1-\alpha-\beta} \qquad (2.3)$$

Capability Approach of Sen (1992) : Another strands of theoretical base of this study is the ‘‘Capability Approach’’ put forth by Nobel Laureate Amartya Sen (1992),where he describes welfare in terms of capability to function. The theory asserts that whether a person or community is poor or non-poor depends on his capability of function in the community. In a related development, we could also re-collect that human development report in 1990 made an attempt to re-transmit this theory of ‘‘Capabilities Approach’’ into a tractable ranking of nations. The aim of this is to capture the complexity of human life" through provision of a quantitative approach using socio-economic indicators as a measure of human development (UNDP, 1990). On the other hand, Sen further asserts that the deficiency of traditional economics linked to capability approach hereby concentrates on the national product, aggregate income and total supply of goods, rather than the entitlements of the people and the capabilities generated from this towards improvement of economic growth in the country. Among the indicators of this capabilities approach includes but not limited to human, physical, intellectual and social endowment. Thus, it also includes a variety of needs which need to be fulfilled in order to enhance a person's capabilities and abilities such as good health, nutritious food, functional (purposive) education, convenient housing, clean environment and among others (Hassan & Fuadah, 2014).

Nexus Between Human Development and Sen's Capabilities Approach : Human development finds its theoretical underpinnings in Sen's capabilities approach which holds ‘‘a person's capability to have various functioning vectors and to enjoy the corresponding well-being achievements" to be the best indicator of welfare (Sen, 1985). This perspective shifts the analysis of development to the vector of not only attributes (as is the more traditional utilitarian or even the original basic needs for human welfare such as income, education, health and amongst others (Streeten, 1979).

Empirical Evidences : Extant literature on the interrelationship between human development, social development factor and economic growth are rare / few both in developed and developing countries simultaneously. Except studies conducted on either relationship between economic growth and human development nor the correlation between economic growth and social development. However, some of these studies (e.g. Gustav, Frances & Alejandro, 2000; Gustav, Frances & Alejandro (2004); Maria-Ana & Emilia, 2019; Mervyn, 1969; and Abimbola, Oladele, Olatunji & Omotayo, 2016) are presented to guide and provide foundation for the model of this study. They are: Gustav *et al.,* (2004) examined the two-way relationship between economic growth and human development in Britain. The study used cross-country regressions that showed a significant relationship among the variables. The study builds on existing growth theory (endogenous growth model and threshold effect model) in the literature by explored empirical determinants of positive growth trajectories running from human development to economic growth. Result showed that human development plays an important role in explaining growth trajectories. The study concludes that where choice is necessary human development should be given sequenced priority towards improvement of economic growth.

Maria-Ana and Emilia (2019) investigated the interrelationships between productive employment, inclusive growth and sustainable development in European Union countries between 2007 and 2016. Data for the study were sourced from Eurostat Database 2018, United Nations Development Program (UNDP) Report, 2016, and World Economic Forum (WEF) reports. The study employed Pearson correlation, regression analysis, principal component analysis (PCA) and cluster analysis (CA) as estimation techniques. Result of the study showed that high level of inclusive growth and sustainable development can be achieved through high labour productivity, an efficient sectoral structure of employment and a low level of vulnerable and precarious employment in European Union countries. In addition, the principal component analysis and cluster analysis showed that transformation of unproductive employment into productive employment needs specific actions to be taken, so that productive employment can be a driving force to improve economic growth and development in southern European countries.
Mervyn (1969) examined the correlation between economic growth and social development: a statistical investigation. The study compared seventeen different social indicators for 20 countries between 1951 and 1969. Principal components analysis was used as estimation technique to analyze the data. Result of the study showed that a negative correlation exits between economic growth and social development contrary to theoretical expectation of the study. The study concludes that the results are not in any sense represent the preferred test of the form of the relationship between economic growth and social welfare.
Abimbola, Oladele, Olatunji and Omotayo (2016) analyzed the socio-economic development in Nigeria, focusing on the roles and challenges of small and medium enterprises development agency of Nigeria (SMEDAN): a descriptive perspective. The reviewed of the study showed that SMEDAN is faced with a lot of challenges ranging from inadequate fund, tribalism, nepotism, lack of infrastructure and institutional amongst others. Study further showed that SMEDAN failed to carried out its roles to a large extent to help alleviate challenges faced by small and medium enterprises in Nigeria. The study recommends that more awareness about the existence of the agency

and it roles should be revisited. This will enable small and medium enterprises have positive impact on the growth of socio-economic development in Nigeria.

III. METHODOLOGY

Theoretical Framework : The model for this present study erects its foundation on augmented Solow Growth Model (SGM) proposed by Mankiw (1992) and ''Capability Approach'' put forth by Nobel Laureate Amartya Sen (1992), where human capital, physical capital labour, health capital as well as technology contributes to economic growth and also determine factors of output. The augmented model is an extended form of the original Solow growth model which gave output (Y_t) as a Cobb-Douglas function of physical capital (K_t), labour (L_t), and technology (A_t) (Solow, 1952). The original Solow growth model looks as follows:

$$Y_{(t)} = K_{(t)}{}^{\alpha}(A_{(t)}L_{(t)})^{1-\alpha-\beta} \quad (3.1)$$

Thus, the augmented Solow model after inclusion of human capital (H(t) and health capital P(t), the model becomes:

$$Y_{(t)} = K_{(t)}{}^{\alpha} H_{(t)}{}^{\beta} P_{(t)}{}^{\gamma}(A_{(t)}L_{(t)})^{1-\alpha-\beta} \quad (3.2)$$

Model Specification

To investigate the interrelationship between human development, social development factor and economic growth in Nigeria. The study therefore, adopted the model of Barro and Sala-i-Martin, 1992; in the work of Gustav *et al.*, (2004) with modification of intervening variables.

Thus, the original model of Gustav *et al.*, (2004) presented thus:

$$g_{it} = y_{it}(1-e^{-\lambda})[\log(y_i*) - \log(y_{i,t-1})] + e^{-\lambda}x_i + (1+e^{-\lambda})x_i t + \text{э}_{it} \quad (3.3)$$

where x_i represents the once-and-for-all difference in technology across countries, $\hat{}y_i$ is the country specific steady-state level of output per effective worker, $yi_{,t-1}$ is the lagged level of output per worker, λ represents the speed of convergence to the steady state.

However, the model was implicitly modified as presented in (3.4) and (3.5):

$$Growth*of*Economy = f(Human*develpment, Social*development) \quad (3.4)$$

$$Y_{i_t} = GDP = f(LEXR, LITR, POPgr, PCI, POVR, EMPR) \quad (3.5)$$

Based on equation (5), the operational form of the study model can be expressed as:

$$GDP_t = \Psi_0 + \Psi_1 LEXR_t + \Psi_2 LITR_t + \Psi_3 POPgr_t + \Psi_4 PCI_t + \Psi_5 POVR_t + \Psi_6 EMPR_t + \Omega_t \quad (3.6)$$

Where GDP_t *represent* Economic growth in the country at time t; LEXR = Life expectancy at birth; LEDU = Level of education (education attainment by the citizen). Thus, a country with higher level of education is expected to produce better economy more efficiently which in turn leads to more sustainable development for her country; POPgr = Population growth rate in the country (increase of people living in both urban and rural areas); PCI = Per capita income that measure the amount of money earned per person in a nation or geographic region; POVR = Poverty rate that measure the ratio of the number of people (in a given age group) whose income falls below the poverty line; and EMPR = Employment rate measure the extent to which available labour resources (people available to work) are being used and as well calculated as the ratio of the employed to the working age population. Thus, taking the natural log of equation (3.6) like GDP and PCI, so that all the variables will be on the same rate or unit, the model now becomes:

$$LGDP_t = \Psi_0 + \Psi_1 LEXR_t + \Psi_2 LITR_t + \Psi_3 POPgr_t + \Psi_4 LPCI_t + \Psi_5 POVR_t + \Psi_6 EMPR_t + \Omega_t \quad (3.7)$$

a-priori, it is expected that: $\Psi_1 \ldots \Psi_4 > 0; \Psi_5 < 0; \Psi_6 > 0$

Where: t = 1…n; $\Psi_1 \ldots\ldots \Psi_6$ are vectors coefficient of independent variables influencing health outcomes, and Ω_0 represents constant intercept, while Ω_t is the stochastic error term which is assumed to be normally distributed with zero mean and constant variance.

Estimation Techniques

Unit Root and Co-integration Tests : The use of unit root and cointegration tests became imperative in a bid to circumvent any inherent limitations from traditional modelling used in empirical analysis (Amin & Audu, 2007).

In view of this, the study employs Augmented Dickey- Fuller (ADF) model to test the stationary property of the data set employed. Thus, test model equations are expressed as:

$$\Delta\Pi_t = \vartheta_0 + \vartheta_1 \Pi_{t-1} + \sum_{i=t}^{m} \lambda_i \Delta\Pi_{t-1} + \partial_t \quad (3.8a)$$

$$\Delta\Pi_t = \vartheta_0 + \vartheta_1 \Pi_{t-1} + \vartheta_1 t + \sum_{i=t}^{m} \lambda_i \Delta\Pi_{t-1} + \partial_t \quad (3.8b)$$

Where: time series variable is represented by Π_t and ∂_t as time and residual respectively. If a series is stationary without any differencing it is designated as I (0), or integrated of order zero (0). On the other hand, a series that has stationary first differences is also designated I (1), or integrated of order one (1).

Further, the study moved on to test for cointegration among the variables to ascertain whether there exist long run relationships among the variables. In this study, the ARDL bound test approach to cointegration test was employed because it offers several desirable statistical features that overcome the limitations of other cointegration techniques (Pesaran *et al*., 2001); and has become increasingly popular among researchers in recent years (Jayaraman & Choong, 2009).

Auto-Regressive Distributed Lag (ARDL) Testing Procedure : To empirically investigate the dynamic relationships among human development, social development factor and economic growth in this study, we employed the Autoregressive Distributed Lag (ARDL) co-integration method introduced by Pesaran, Shin and Smith (1996, 1999 and 2001). However, the use of ARDL bounds test approach to cointegration has been applied for the estimation of F-statistic, that determines whether a long run relationship exists among the data series (Pesaran *et al.*, 2001), as also apply to this study. The condition for the existence of cointegration is that the ARDL bounds test F-statistic value must be greater than the upper critical bound value at 5% significance level. If the calculated F-statistics is less than the lower bound, then there is no cointegration among the variables but if the calculated F-statistic remains between the lower and upper critical bounds then the decision is inconclusive. Operationally, the study estimated the short-run and long-run impact of the explanatory variables on inflation in Nigeria. The coefficient of the cointegration equation CointEq(-1) of the short-run result conventionally known as the error correction term (ECT) which is (human development and social development factor variables) expected to be positive and significant measures the speed of adjustment of the model back to long run equilibrium after disequilibrium which occurs in response to shocks (Ahmad, 2011). Specifically, it shows the rate at which economic growth adjusts to changes in the explanatory variable indicators. Hence, the greater the coefficient of the ECT, the higher the speed of adjustment of the model from short run to long run and vice versa. Lastly, the study conducted several diagnostic tests of model adequacy such as Breusch-Godfrey serial correlation LM test, Breusch-Pagan-Godfrey heteroskedasticity test, Jarque-Bera histogram normality test, and as well the cusum and cusum of squares tests of stability. The condition for no serial correlation and existence of homoscedasticity is that the probability Chi-square values of the Observed R-squared and F-statistic values must be more than 5% respectively. Whereas the condition for the existence of normality is that the probability value of the Jarque-Bera coefficient must be greater than 5%; that of stability is that both the cusum and the cusum of squares lines must appear in-between the two critical lines of the graph. In line with Pesaran *et al.*, (2001) and Bahmani and Nasir (2004) modeling approach, the ARDL dynamic (ECM-ARDL) model for this study (from our equation 3.7) is given as:

$$\Delta LGDP_t = \beta_0 + \sum_{j=1}^{k} \beta_1 \Delta LGDP_{t-j} + \sum_{j=1}^{k} \beta_2 \Delta LEXR_{t-j} + \sum_{j=1}^{k} \beta_3 \Delta LITR_{t-j} + \sum_{j=1}^{k} \beta_4 \Delta POPgr_{t-j}$$
$$+ \sum_{j=1}^{k} \beta_5 \Delta LPCI_{t-j} + \sum_{j=1}^{k} \beta_6 \Delta POVR_{t-j} + \sum_{j=1}^{k} \beta_7 \Delta EMPR_{t-j} + \upsilon_1 LGDP_{t-1} + \upsilon_2 LEXR_{t-1}$$
$$+ \upsilon_3 LITR_{t-1} + \upsilon_4 POPgr_{t-1} + \upsilon_5 LPCI_{t-1} + \upsilon_6 POVR_{t-1} + \upsilon_7 EMPR_{t-1} + \partial_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.9a)$$

Where: Δ = First differencing operator, L= natural logarithm, t = time, t-1 = lag one (previous year), β_0 = constant and ∂_t = error term. The term summation signs (Σ) represent the short run dynamics with assumed mixed orders of integration of variables. However, the second part of the equation represents the long run dynamics, where the integration property is assumed to be I(1); β_1 to β_7; and also υ_1 to υ_7 are the coefficients to their respective variables.

Specifically, the long run ARDL model for this study is:

$$LGDP_t = \upsilon_0 + \upsilon_1 LGDP_{t-1} + \upsilon_2 LEXR_{t-1} + \upsilon_3 LITR_{t-1} + \upsilon_4 POPgr_{t-1}$$
$$+ \upsilon_5 LPCI_{t-1} + \upsilon_6 POVR_{t-1} + \upsilon_7 EMPR_{t-1} + \mu_t \quad \text{.....(3.9}b\text{)}$$

After ascertaining the long run relationship, we used the following equation to estimate the short run coefficients:

$$\Delta LGDP_t = \beta_0 + \sum_{j=1}^{k} \beta_1 \Delta LGDP_{t-j} + \sum_{j=1}^{k} \beta_2 \Delta LEXR_{t-j} + \sum_{j=1}^{k} \beta_3 \Delta LITR_{t-j} + \sum_{j=1}^{k} \beta_4 \Delta POPgr_{t-j}$$
$$+ \sum_{j=1}^{k} \beta_5 \Delta LPCI_{t-j} + \sum_{j=1}^{k} \beta_6 \Delta POVR_{t-j} + \sum_{j=1}^{k} \beta_7 \Delta EMPR_{t-j} + \varpi EC_{t-j} \quad \text{.....(3.9}c\text{)}$$

Where: ϖEC_{t-j} is the error correction term, indicating the speed of adjustment reverse to long run in the model. EC is the residuals that are obtained from the estimated ARDL co-integration model.

VAR Granger Causality Procedure

As proposed by Sims (1976), the use of Granger causality became imperative in this study in a bid to examine the short run causality relationship among the data series. In addition, Granger causality test will further determine if the historical values of one variable can forecast or predict the relationship among other variables. For instance, if variable LEXR Granger cause another variable like GDP, then the past value of LEXR should contain information that are useful in predicting GDP, over and above the information contain in the past value of GDP alone. Here, is the mathematics approach to test for VAR Granger causality relationship among the variables as given in (4.0) below:

$$\begin{bmatrix} GDP_t \\ LEXR_t \\ LITR_t \\ POPgr_t \\ PCI_t \\ POVR_t \\ EMPR_t \end{bmatrix} = \begin{bmatrix} \vartheta_1 \\ \vartheta_2 \\ \vartheta_3 \\ \vartheta_4 \\ \vartheta_5 \\ \vartheta_6 \\ \vartheta_7 \end{bmatrix} + \begin{bmatrix} \beta_{11i}\beta_{12i}\beta_{13i}\beta_{14i}\beta_{15i}\beta_{16i}\beta_{17i} \\ \beta_{21i}\beta_{22i}\beta_{23i}\beta_{24i}\beta_{25i}\beta_{26i}\beta_{27i} \\ \beta_{31i}\beta_{32i}\beta_{33i}\beta_{34i}\beta_{35i}\beta_{36i}\beta_{37i} \\ \beta_{41i}\beta_{42i}\beta_{43i}\beta_{44i}\beta_{45i}\beta_{46i}\beta_{47i} \\ \beta_{51i}\beta_{52i}\beta_{53i}\beta_{54i}\beta_{55i}\beta_{56i}\beta_{57i} \\ \beta_{61i}\beta_{62i}\beta_{63i}\beta_{64i}\beta_{65i}\beta_{66i}\beta_{67i} \\ \beta_{71i}\beta_{72i}\beta_{73i}\beta_{74i}\beta_{75i}\beta_{76i}\beta_{77i} \end{bmatrix} \begin{bmatrix} GDP_{t-1} \\ LEXR_{t-1} \\ LITR_{t-1} \\ POPgr_{t-1} \\ PCI_{t-1} \\ POVR_{t-1} \\ EMPR_{t-1} \end{bmatrix} + \ldots + \begin{bmatrix} \beta_{11k}\beta_{12k}\beta_{13k}\beta_{14k}\beta_{15k}\beta_{16k}\beta_{17k} \\ \beta_{21k}\beta_{22k}\beta_{23k}\beta_{24k}\beta_{25k}\beta_{26k}\beta_{27k} \\ \beta_{31k}\beta_{32k}\beta_{33k}\beta_{34k}\beta_{35k}\beta_{36k}\beta_{37k} \\ \beta_{41k}\beta_{42k}\beta_{43k}\beta_{44k}\beta_{45k}\beta_{46k}\beta_{47k} \\ \beta_{51k}\beta_{52k}\beta_{53k}\beta_{54k}\beta_{55k}\beta_{56k}\beta_{57k} \\ \beta_{61k}\beta_{62k}\beta_{63k}\beta_{64k}\beta_{65k}\beta_{66k}\beta_{67k} \\ \beta_{71k}\beta_{72k}\beta_{73k}\beta_{74k}\beta_{75k}\beta_{76k}\beta_{77k} \end{bmatrix} \begin{bmatrix} GDP_{t-k} \\ LEXR_{t-k} \\ LITR_{t-k} \\ POPgr_{t-k} \\ PCI_{t-k} \\ POVR_{t-k} \\ EMPR_{t-k} \end{bmatrix} + \begin{bmatrix} \lambda_{1t} \\ \lambda_{2t} \\ \lambda_{3t} \\ \lambda_{4t} \\ \lambda_{5t} \\ \lambda_{6t} \\ \lambda_{7t} \end{bmatrix}$$

Where $\vartheta_1 \ldots \vartheta_7$ are vectors of constant; $\lambda_{1t} \ldots . \lambda_{7t}$ are the vectors of error terms of VAR model while $\beta_{11i} \ldots .$ β_{77i} are the coefficients of VAR Granger causality for the model. Also, i = 1,…,k

Sources of Data : The study made use of sourced secondary data from various organizations and agencies which includes Central Bank of Nigeria (CBN) Statistical Bulletin, United Nation Development Programme (UNDP) and World Bank, World Development Indicator (2019) database edition.

IV. ANALYSIS AND DISCUSSION OF RESULTS

The unit root test results are presented in tables 4.1. However, Augmented Dickey-Fuller (ADF) test was used in the study to ascertain the stationarity of the variables at possible different levels. The result showed that variables of interest were integrated of different orders, I(0) and I(1).

Table 4.1: Unit Root Test

Variables	**ADF Test** **H_o: Variable is not Stationary**	**Order of Integration**
GDP	-2.945842***	I(0)
Δ(LEXR)	-2.867506*	I(1)
LITR	-6.240964***	I(0)
Δ(POPgr)	-5.185806***	I(1)
PCI	-3.015070**	I(0)
Δ(POVR)	-5.020724***	I(1)
EMPR	-3.511670**	I(0)
Asymptotic Critical Values		

1%	-3.621023	
5%	-2.943427	
10%	-2.615817	

*****, **, * implies significant @ 1%, 5% and 10% levels respectively,**
Δ represents first difference
Source: Extracted from Regression Output

From the unit root test result on Table 4.1, it showed that all the variables of interest were integrated of different orders I(0) /and I(1), (e.g. GDP, LITR, PCI and EMPR were stationary at level while other variables including LEXR, POPgr and POVR maintain their stationarity at first difference). However, none of these variables are stationary at I(2). Premised on this, Auto-regressive Distributed Lag (ARDL) model became imperative in the study to confirm the long run relationship among the variables of interest.

Table 4.2: Lag Length Selection Test : Before the analysis of ARDL procedure, we carried out an ARDL lag order selection process. By iteratively reducing the lag length from lag 4 to where there seems to be no improvement in the choice of lag length, the result in Table 4.2 was generated.

Table 4.2: Lag Length Selection Criteria

Lag	LogL	FPE	AIC	SC	HQ
0	-404.166	NA	1893.332	27.411	27.738
1	-163.335	353.219	0.0058	14.622	17.238
2	-76.531	86.804*	0.000848*	12.102*	17.006*
* indicates lag order selected by the criterion(each test at 5% level) FPE: Final prediction error; AIC: Akaike information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion					

Source: Extracted from Regression Output

The result from table 4.2 showed that all the lag length selection criteria suggests maximum of two lags for the ARDL model. That is, the majority of the criterion stood at lag 2, so that the errors in the equation can be serially independent and as well to avoid multicolliarity in the model before carrying out ARDL Wald bounds test as shown in table 4.3.

Wald Test

Decision Rules: The decision rule for accepting or rejecting the null hypothesis of the calculated F-statistic value is based on the tabulated critical lower and upper bounds values specified by Narayan (2005). Thus, the table is presented below:

Table 4.3: ARDL Wald Bounds Test
Null Hypothesis: No Long-run Relationship Exist

Test Statistic	Value	K
F-statistic	7.997516	6
Critical Value Bounds (@)		
Significance	I(0) Bound	I(1) Bound
10%	2.12	3.23***
5%	2.46	3.61**
2.5%	2.75	4.99
1%	3.15	4.43*

Source: Extracted from Regression Output

Note: (i) k is the number of regressors in the ARDL model.
(ii) *, **, *** indicates significance at 1%, 5% and 10% levels respectively, based on Pesaran (2001).

Table 4.3 indicates that the calculated Wald test (F-statistic) of 7.9975 is higher than the upper bound critical value of 3.61 at 5% significance level. We concludes that there is an evidence of long-run relationships among variables in the model. Hence, the null hypothesis of no co-integration is therefore rejected at 5% level of significance.

Table 4.4: Long Run Coefficients from ARDL Estimates

Dependent Variable: D(LGDP$_t$)			
Regressor	**Coefficient**	**t-Value**	**P-Value**
C	70.360210	4.270047	0.0011*
LEXR	2.558699	-1.926457	0.0781**
LITR	-0.031402	-3.345092	0.0058*
POPGR	-136.644557	-2.552910	0.0253**
LPCI	0.234091	0.685710	0.0059*
POVR	-3.212273	-3.079456	0.0095*
EMPR	1.047187	-0.382086	0.0091*

Notes: *, (**),*** indicates statistically significant level at 1%, 5% and 10%
Source: Extracted from Regression Output

Result from long run estimates in table 4.4 indicates that the coefficients of LEXR, LPCI, POVR and EMPR conform with theoretical hypothesized signs for the model, with exception of LITR and POPgr that proofed contrary. From the result, it can be deduced that coefficients of LEXR (2.559), LPCI (0.234) and EMPR (1.047) are directly signed and statistically significant at their conventional levels while POVR(-3.212) is inversely and correctly signed at 1% level. The estimates indicates that in the long run economic growth in Nigeria is influenced by life expectancy, per capita income and appreciable level of employment with estimates of 2.558, 0.234 and 1.047 respectively, indicating that growth of the economy will increase by 0.026%, 0.0023% and 0.0105% respectively in response to a 1% change in economic growth in the country. Estimates of poverty rate of (-0.032%) will decrease GDP by 1% change, except measures are put in place by the government to reduce impoverished citizen which in turn may likely improve economic growth at the instance of increase in employment rate. However, the coefficient estimates of LITR (-0.0314) and POPgr (-136.644) suggests that in the long run economic growth will reduce by 0.0003% and 1.36% respectively. This implies that a unit increase in LITR and POPgr will leads to reduction in GDP .

Table 4.5: Error Correction Representation for Estimated ARDL Model

Dependent Variable: Δ(LGDP)			
Regressor	**Coefficient**	**t-Value**	**P-Value**
C	204.0225	3.036947	0.0103**
(D(GDP(-1))	1.077967	3.674426	0.0032*
D(LEXR(-1))	40.561269	2.018900	0.0664***
D(LITR)	-0.045261	-2.844894	0.0148**
D(POPGR)	140.474294	0.613617	0.5509
D(PCI(-1))	-0.896930	-2.189510	0.0491**
D(POVR)	-3.102691	-1.428206	0.1787
D(EMPR(-1))	27.608415	2.615186	0.0226**
ECM(-1)	-1.648404	-6.001368	0.0001*
R-squared = 0.80 **Adj. R-squared** = 0.50 **Durbin-Watson stat.** = 2.873516			

Prob. (F-statistic) = 0.004223 ARDL(2, 2, 2, 1, 2, 1, 2) selected on the basis of AIC

Note: *, **, *** indicates significance at 1%, 5% and 10% levels, respectively.

Source: Author's Computation

The coefficient of most important in table 4.7 is the ECM(-1) which is well behaved as its coefficient is negative and statistically significant at 1% level, though it exceeds 1. The value (ECM -1.65%) indicates that the speed with which GDP adjusts the regressors is about 165% in the short run. This implies that the errors are being corrected within the same period to ensure convergence at the long-run or to restore long run equilibrium in the current year. Further, the most interesting in this study is that almost result of the short run coefficient estimates such as LEXR at lag two-period, POVR, and EMPR at lag two-period are in tandem with long run result. The R-squared value of 0.80 showed that about 80% variations in GDP are jointly explained by variations in human development and social development factor indicators of the model while the remaining 20% are attributed to other variables not included in the model. The probability F-statistic value of 0.004223 showed that the overall model is significant in explaining economic growth in Nigeria. The Dubin-Watson statistic value of 2.87 suggests that the model is free of serial autocorrelation problem (error) in the model.

Post Estimation Analysis : This study examines various diagnostic tests such as Breusch-Godfrey serial correlation LM, Heteroskedasticity ARCH, Heteroskedasticity Harvey, Ramsey RESET specification, Jacque-Bera normality as well as cumulative sum of recursive residual (CUSUM) and cumulative sum of squares of recursive residual (CUSUMsq) tests, in a bid to ascertain the reliability and robustness of the estimated model. The results are presented in table 4.6, Figure 4.1.

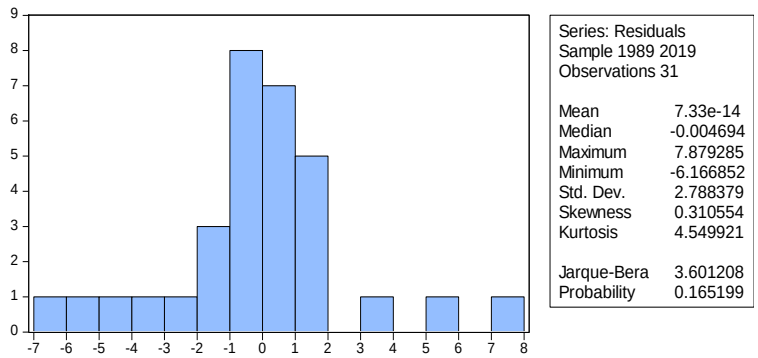
Table 4.6: Diagnostic Tests of the ARDL model

	MODEL	
Diagnostic Test	**F-statistic**	**P-Value**
➢ B-G Serial Correlation LM Test	4.27264	0.5456
➢ Heteroskedasticity Test: ARCH	0.92829	0.3436
➢ Heteroskedasticity Test: Harvey	1.59701	0.2058
➢ Heteroskedasticity Test: B-P-G	0.97104	0.4236
➢ Ramsey-RESET Test	5.1719	0.3517

Source: Author's Regression Output

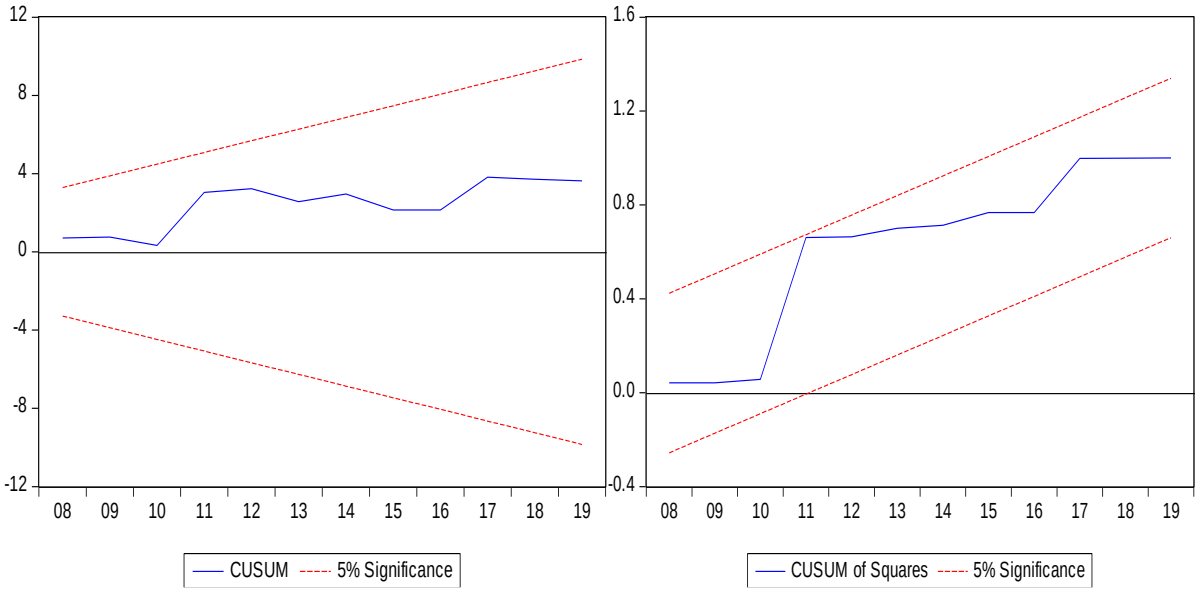
Table 4.6 of ARDL diagnostic tests showed that, the model's residuals are serially uncorrelated and has a correct functional form, normally distributed, homoskedastic and as well, the linear model is appropriate and statistically significant, implying that the null hypothesis of model misspecification can be rejected based on the following values: Breusch-Godfrey serial correlation LM test (0.5456>5% to accept null hypothesis), Heteroskedasticity Harvey (0.2058 > 5% level), Ramesy-RESET test (p-value of 0.3517 > critical value of 0.05) and ARCH LM test (0.3436 > 5%) respectively. It can therefore be deduced that the model has a satisfactory econometric properties, valid for reliable interpretation and can also be used for policy making without re-specification.

Fig. 4.1/Table 4.7.: Normality Test



Source: Author's Regression Output

Fig.4.2: Plots of CUSUM Residual and CUSUMsq Tests



Source: Author's Regression Output

Figure 4.2 showed that neither CUSUM nor CUSUMsq tests provided any evidence of instability in the estimates at 5% significance level for conventional specification and the results of which do not reject the null hypothesis of stability. This implies that all the coefficients in the short run model are stable and does not deviate from equilibrium in most of the periods under study. In view of this, we concludes that all the coefficients in the short run model are stable and robust for prediction.

Table 4.8: VAR Granger Causality / Block Exogeneity Wald Tests

		GDP_t		
Excluded	**Df**	**Chi-sq.**	**Prob.**	**Decision**
GDP → LEXR	2	0.9787	0.0034*	Reject
GDP → LITR	2	0.2979	0.8616	Accept
GDP → POPgr	2	0.9256	0.6295	Accept
GDP → PCI	2	7.6719	0.0216**	Reject
GDP → POVR	2	0.7259	0.6956	Accept
GDP → EMPR	2	1.0969	0.0028*	Reject
LEXR → GDP	2	0.0736	0.0639**	Reject
LITR → GDP	2	6.2998	0.0429**	Reject
POPgr → GDP	2	1.4974	0.4730	Accept
PCI → GDP	2	0.9352	0.6265	Accept
POVR → GDP	2	2.2308	0.3278	Accept
EMPR → GDP	2	6.2529	0.0439**	Reject

Source: Extracted from regression output
Notes: * (**) indicates significant level @ 1% and 5% respectively

The short run equation as shown by VAR Granger causality test in table 4.8 indicates that the result of null hypothesis of economic growth do not granger-cause life expectancy rate (LEXR), per capita income (PCI) and employment rate (EMPR) were rejected at either 1% or 5% significance level. Conversely, the null hypothesis of literacy rate (LITR) and employment rate (EMPR) not granger-cause economic growth were also rejected at 5% significance level. All other variables including population growth rate (POPgr) and poverty rate (POVR) appeared not to granger-cause economic growth at any levels (having independent relationship). Conclusively, the study found bi-directional causal relationship between GDP and LEXR; and as well between GDP and EMPR in the country. While uni-directional relationship exits from LITR to GDP without a feedback. These results have some interesting implications on the growth of Nigerian economy. First, the fact that GDP and LEXR as well as GDP and EMPR exhibits bi-causal showed that the variables in questions jointly Granger cause or reinforce each order. However, increase in economic growth is necessary for enhancing life expectancy and employment rate just as enhanced life expectancy and appreciable level of employment are needed to improve economic growth in the country. Further, a uni-directional causality here suggests that LITR have predictive power for GDP only. Finally, POPgr and POVR having independent relationship have also no predictive content or power for GDP within the period under study.

Policy Implications of the Results : Result from long run estimates suggests that in the long run, economic growth in Nigeria is positively influenced by life expectancy, per capita income and employment rate while poverty rate, literacy rate and population growth rate exhibits negative influence on economic growth. This implies that effort towards strengthen health and economic policies that will improve healthy life expectancy and level of employment as well as per capita income of an individual should be considered basically for growth enhancement in the country. However, policy that will drag high poverty level to the barest minimum and at the same time enable citizen to achieve their full potential should be focused. VAR Granger causality result suggests that bi-directional causal relationship exists between GDP and LEXR; and as well between GDP and EMPR in the country. This implies that increase in economic growth is necessary for enhancing life expectancy and employment rate just as enhanced life expectancy and appreciable level of employment are needed to improve economic growth in the country. Policymakers should not joke with any dimensions of human development variables most especially life expectancy and employment rates for better growth trajectories process. While a uni-directional relationship running from LITR to GDP without a feedback. This implies that literacy rate have predictive power to improve growth of the economy. Policy makers should take cognisance of this variable during policy consideration.

V. CONCLUSION AND POLICY RECOMMENDATIONS

The study concludes that there is an evidence of long-run relationship among variables in the model from the ARDL Wald bounds test conducted. Meanwhile, the null hypothesis of no co-integration is therefore rejected at 5% level of significance. The study finds evidence from the long run estimates that sustainable economic growth in Nigeria is positively influenced by life expectancy, per capita income and appreciable level of employment contrary to estimates of poverty rate, literacy rate and population growth rate that showed negative influenced on economic growth. This supports the work of Gustav *et al.,*2004 who gesticulate that human development factoring (life expectancy and employment rate) plays an important role in influencing growth trajectories while that of Mervyn (1969) is in contrast that social development showed a strong negative influence to economic growth. Further, the study finds that the result of ECM (-1) which is well behaved as its coefficient value (ECM -1.65%) is negative and statistically significant at 1% level. This implies that the speed with which economic growth adjusts the regressors is about 165% in the short run. However, errors are being corrected within the same period to ensure convergence at the long-run. Further striking findings from the study is that almost result of the short run estimates such as life expectancy at lag two-period, poverty rate, and employment rate at lag two-period are in conformity with long run result. Again, the result of post estimation analysis showed that the model has a satisfactory econometric property, valid for reliable interpretation and can also be used for policy making without re-specification.

Finally, the study also finds from the VAR Granger causality result that bi-directional causal relationship exists between GDP and LEXR; and as well between GDP and EMPR in the country. This implies that increase in economic growth is necessary for enhancing life expectancy and employment rate just as enhanced life expectancy and appreciable level of employment are needed to improve economic growth in Nigeria. This is in line with Maria-Ana and Emilia (2019) who asserts that productive employment positively influence inclusive growth and sustainable development in European Union countries. However, a uni-directional relationship running from LITR to GDP without a feedback.

Given the above findings, it is therefore recommended that government and policymakers should devise a policy measure to strengthen the Nigerians capabilities which in turn will increase life expectancy as a result of good health, employment level and educational standard of the citizens. Efforts should also be made by the government to reduce impoverished citizen in the society to enable them achieve their full potential and afterwards sustainable economic growth can be enhanced in Nigeria.

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