

**IMPACT OF HEALTH ON HUMAN CAPITAL DEVELOPMENT AND
ITS EFFECT ON ECONOMIC GROWTH IN NIGERIA 1980-2020**

BY

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**BEING A PROJECT SUBMITTED TO THE
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DECEMBER, 2022

CERTIFICATION

This is to certify that this work titled Impact of Health on Human Capital Development and its Effect on Economic Growth in Nigeria 1980-2020 was carried out by me Christiana APINOKO for the award of Bachelor of Science (B.sc) Degree in the Department of Economics, Faculty of Social Sciences University of Benin, Benin City, under the supervision of the following persons;

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Date

DEDICATION

This project is dedicated to God Almighty for his infinite Mercy, favour, grace, strength, knowledge and protection upon me.

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To the Almighty God, I sincerely give my gratitude for his gift of life, knowledge, guidance, favour and good health without which this project would not have been completed. I express my sincere appreciation to my amiable supervisor, Dr. I.P. Sede for his fatherly advice, assistance and support towards me in ensuring the progress, completion and success of this project.

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ABSTRACT

This study empirically examined the impact of health on human capital development and its effect on economic growth in Nigeria for the sample period of 1980-2020. The Augmented Dickey Fuller unit root test was employed to test for the order of integration of the series, further the autoregressive distributed lag model was employed to estimate the long run relationship between the variables.

Results showed that contrary to a priori expectation, human capital index and life expectancy had negative relationship with economic growth. The study therefore recommends that proper and effectively managed health policies should be put in place so that human capital would be healthy enough to assimilate skills and know how and this would translate to more economic growth for Nigeria.

CHAPTER ONE

INTRODUCTION

Human capital development as have been empirically proven is the anchor of any modern economy. The most valuable asset in both developed and developing economy according to Hader & Lahrech (2015) are humans. To achieve development, it therefore becomes imperative for these assets to be developed, managed and effectively utilized. One way of ensuring this is by pursuing optimum health status for the populace. Health is a basic component of human capital development because without good health, there would be no humans to develop.

Human capital in itself is “the knowledge, skills and health that people accumulate throughout their lives, enabling them to realize their potential as productive members of society. Investing in the populace through nutrition, health care, quality education, jobs and skills helps develop human capital and this is crucial to ending extreme poverty and creating more inclusive societies” (world bank,2020). Human capital development has been defined as an end or objective of economic growth. It is a medium of fulfilling the potentials of people by increasing their capabilities and this necessarily implies empowerment of people, allowing them to participate actively in their own development. Human capital development enhances the skills, knowledge, productivity, creativity and inventiveness of people. Essentially it is the empowerment of people to identify

their own priorities and implement programmes and projects of direct benefit to them. This in turn leads to active participation of people in the development process of the Country. All these cannot be possible without good health, what then is health? Health is defined as a state of complete physical, social and mental well-being and not merely the absence of disease or infirmity (WHO, 1996). Indeed, the world health organisation (WHO) posits that improvement in health such as increases in life expectancy at birth, has a great potential to raise economic growth in regions such as Sub-Saharan Africa (WHO,2001). In this respect, empirical evidence on the indicators of health capital have also been found to explain about 22-30 percent of growth in aggregate output (bloom & canning, 2003; Bloom, Canning and Sevilla,2004; Gyrimah-Brempong & Wilson 2004).

Gains in human capital development and the economy resulting from health investment are achieved through a number of related pathways:

- I) Healthier children have higher Performing cognition and school attendance as well as better employment opportunities in adulthood. The health benefits of childhood nutritional interventions are then passed on to beneficiaries' own children as well as the obvious benefit in education and labour force participation
- II) Improving adult health through for example free HIV/AIDS treatment and iron supplementation result in greater productivity and income. As health

improves, childhood mortality declines and the utilization of family planning increases, women have fewer children and the country reaps the reward of the demographic dividend resulting in economic growth.

III) As health improves and life expectancy increases, people are compelled to save more for later life and this boost investment and capital formation. Successful control of infectious disease through health investment attracts foreign investment, which strengthens the economy and creates jobs (Jamison, Yamey and Wadge, 2016)

Although, interpretations of the causal connection between health and economic growth are controversial, evidence is accumulating in a variety of disciplines and sub field of economics and a number of hypothesis merits more conceptual refinement and empirical testing, where specific pathways may be in the future identified and quantified.

The third of the sustainable development goals is to ensure healthy living and promote well-being for all by 2030. This paper, is situated in goal 3 of the sustainable development goals (SDGs) which is to ensure healthy living and promote well-being for all at all ages by 2030. In line with this goal. I) There would be reduction in the global maternity mortality rate to less than 70 per 100,000 live birth ii) There will be an end to preventable death of new born children and children under-5 years of age, a reduction of under-5 mortality rate at 25 per 1000 and iii) To substantially reduce the number of death and illnesses

form hazardous chemicals and air, water and soil pollution and contamination. Unfortunately, Nigeria still has a long way to go in the achievement of these goals as there is still prevalence of under 5 mortality (estimated at 70 per 1000) and a maternal mortality rate of (120 per 100,000 live birth) (United Nations 2016).

1.1 Background of the Study

It is no news that human capital is the only form of capital that has the capacity to control other capital therefore it is the only capital of value to the economy. In view of this, the federal government of Nigeria in pursuance of global best practice incorporated human capital development into the economic recovery and growth plan (ERGP), a medium-term plan for 2017-2020 advanced to restore sustained economic growth while leveraging on the ingenuity and resilience of the Nigeria people-The nation's most priceless accent. Quite antithetical to expectations, investment in human capital development witnessed no substantial improvement. For instance, budgetary allocation to the health sector is comparatively inconsequential to other African countries. The total health expenditure (THE) as proportion of the gross domestic product (GDP) from 1998 to 2000 was less than 5 percent, lagging behind in the THE/GDP ratio in other developing countries such as Kenya (5.8%), Zambia(6.2%), Tanzania(6.3%), Malawi(7.2%) and South Africa(7.5%) (Gideon, G.Goshit and Rosemary, A.Anga, 2014). This is a far cry from the WHO recommended minimum bench mark of at least 15% allocation to health. So long as investment

in human development through health remains unsatisfactory, sustainable economic development will remain an illusion in Nigeria.

Nigeria has been struggling over the decade to fix its weak health system with quite a number of policies and plans. The inability of government and policy makers to deliberately address the short comings of the health system has affected adversely the country and its people. There is a consensus among health system experts that weak health systems hinder the achievement of health systems goals and global health initiatives (GHIs). Thus, health system strengthening is critical to making substantial progress towards improving health outcome and by extension economic growth. In spite of health system development efforts and health care reforms, health outcomes remain poor. Furthermore, Nigeria has made limited progress of health care reforms during the period of 1960-2018. Poor implementation of policies has been a major factor militating against health system strengthening. The Nigerian health system has over the years favoured curative services rather than preventive services and this is of inimical detriment to the development of human capital and productivity because there is more output from a person who prevented himself from getting sick (in terms of man hour) than a person who got sick and was cured. Man-hour and productivity is lost to the amount of time the individual was sick for. Decentralization and fragmentation of the health sector has also been a major problem. Poor coordination of donor funds has led to the creation of a parallel system. The NHIS

has provided coverage to less than 5% of the Nigeria populace. Evidently, the Nigeria health system has not effectively addressed the numerous challenges confronting it. This study has therefore been put forward to expose the relationship between health and economic growth in Nigeria and emphasize the need to strengthen and develop its health system in order to fully maximize its populace because without humans, all other forms of capital are left dormant and underutilized.

1.2 Statement of the Problem

Nigeria had made significant economic growth culminating in her status as a lower middle-income country though a lot of work is needed to sustain this achievement. Real per capita GDP grew from \$568 in 1990 to \$2028 in 2018. At the same time, health status has improved, for instance, life expectancy at birth rose from 47.19 years in 1990 to 55.84 years in 2018 following the significant reduction in infant and under-5 mortality rate (world bank, 2014)

Irrespective of these apparent improvement in economic conditions, however, health care has continued to dwindle in Nigeria, owing to the fact that that health-care is being relegated to the background. The health sector is characterized by incessant shocks and inefficiencies. A large percentage of Nigerian population estimated to be 182.2 million according to world bank, (2016) remain at rather low levels of literacy and often with insufficient access to education and health care. Various studies while exploring human capital

development and economic growth in Nigeria have often resulted in various findings with no consensus. This may be attributable to various measures used to measure human capital development as education, health, productivity, youth empowerment with no universal agreement on the measures. However life expectancy as an important health indicator whose importance as a component of human capital development continues to rise has seldom been used even though it remains at alarmingly low levels in a number of Sub-Saharan African countries of which Nigeria is one. This is the research gap which this study intends to fill.

1.3 Research Questions

The questions put forward by this study includes:

- I) To what extent do health and human capital development influence economic growth?
- II) Is there any relationship among health, human capital and economic growth?
- III) Is there a causal relationship between human capital development and economic growth?

1.4 Statement of Hypothesis

Ho: Health has no effect on economic growth

H1: There is no relationship between health and human capital

H2: There is no causal relationship between health, human capital and economic growth.

1.5 Purpose of the Study

This study has been put forth to expose the apparent relationship between health and economic growth which would be useful to policy makers in evaluating the relative cost and benefit of health improvement policy for the country. Also, this study was put forth to contribute to the body of knowledge on health economics.

1.6 Significance of the Study

Some studies has been put forth previously to investigate the factors influencing Nigeria economic growth (see for instance Akinsokeji Rogers Adebayo, Akinlo taiwo; Ogunleye, O.A sanyaolu, Lawal O.O ; Attahir Babaji Abubakar, Ahmed sani Bala, Abdullahi Aliyu Musa) However, very few of these studies have captured the effect of health on economic growth. Therefore, this study is significant in that it examines the effect of improved health on economic growth in Nigeria given that most studies assessing the effects of human capital on growth mostly focus on education and skill acquisitions.

1.7 Scope of the Study

The impact of health on human capital and its effect on economic growth in Nigeria is done in University of Benin, Benin city, Edo state in Nigeria covering the period 1980 -2020 because this marked the emergence of organized health care services. The fourth national development plan (1981-1985) addressed the issue of preventive health services for the first time. On the last day of 1983, a

new military government came into power and one of the reasons it gave for the military intervention was the state of health services, declaring “our teaching hospitals have been reduced to mere consulting clinics”. In more recent Nigeria, the capacities of the facilities that emerged from previous efforts have been stretched and infrastructure broken beyond repair. Primary care services now only exist in name. The affluent have perfected medical tourism to India, Singapore, South Africa and even Ghana. This stems from the obvious fact that health care is being relegated to the background in Nigeria.

1.8 Limitations of the Study

The possible limitations of this study include the unavailability of data to capture health as a variable, this problem was over come by instrumental data (life expectancy and infant mortality rate) but they are not without their own shortcomings Which essentially entails the specification of a bad instrument that is an instrument correlated with the omitted variables. Especially worrisome is the possibility that an association between the instrumental variables and omitted variables can lead to a bias in the resulting estimates that is much greater than the bias in ordinary least squares estimates.

There are also problems associated with time series data. existence of unit root can cause spurious regression and also errant behaviour may be exhibited for example, the t-ratios may not follow a t-distribution but this shall be overcome by utilizing the Augmented Dickey-Fuller (ADF) test.

CHAPTER TWO

CONCEPT OF THE STUDY

2.1 The Nigerian Health Sector

The Nigerian health sector has suffered several pitfalls. Despite Nigeria's strategic position in Africa, the country is terribly underserved when it comes to quality health care. While various strategies have been put forward by the Nigerian government to address the wide ranging issues in the health care system, they are yet to be implemented at the state and local government area levels. According to the 2009 communiqué of the Nigerian national health conference, health care system keeps on deteriorating as evidenced by lack of coordination, fragmentation of services, dearth of resources including drug and supplies, inadequate and decaying infrastructure, inequality in resource distribution and access to care and very disgraceful quality of care. Although health has the potential to attract political attention, the amount of attention it actually receives varies from place to place. In August 1987, the federal government launched its primary health care plan (PHC) which president Ibrahim Babangida announced as the cornerstone of health policy. Intended to affect the entire population, its main stated objectives included accelerated health care personnel development, improved collection and monitoring of health data, ensured availability of essential drugs in all areas of the country, implementation of an expanded programme on immunization (EPI), improved nutrition throughout the country,

promotion of health awareness, development of a national family health programme and widespread promotion of oral rehydration therapy for treatment of diarrheal diseases in infants and children.

Implementation of these programmes was intended to take place mainly through collaboration between the ministry of health and participating local government councils, which received direct grants from the federal government. Of these objectives, the EPI was the most concrete and probably made the greatest progress initially. The immunization programme focused on four major childhood diseases; pertussis, diphtheria, measles and polio and tetanus and tuberculosis. Its aim was to increase dramatically the proportion of immunized children younger than 2 from about 20 percent to 50 percent initially and to 90 percent by the end of 1990. Launched in march 1988, the programme by August 1989 was said to have established in more than 300 of the 449 local government areas. Although the program was said to have made much progress, its goal of 90 percent coverage was probably excessively ambitious, especially due to the economic strains of structural adjustment that permeated the Nigerian economy throughout the late 1980s.

Fast forward to present day Nigeria, the statistics depicts a grim picture. An average of 20,000 Nigerian travel to India each year for medical assistance due to the inadequacies plaguing the health care system at home. Nigeria is responsible for an alarming amount of under-five deaths. UNICEF said in a

recent report that “preventable or treatable infectious diseases such as malaria, pneumonia, diarrhea, measles and HIV/AIDS account for more than 70 percent of the estimated one million under-five deaths in Nigeria “. Another report by the WHO says that nearly 10 percent of new born deaths in the world last year occurred in Nigeria. While studies like the global burden of disease show steady improvements in child survival rates, the persistent rate of avoidable deaths in Nigeria is very disturbing.

There is a toxic mix of problems accounting for the reason why Nigerian health sector is in such a precarious state; poor health infrastructure, incessant strikes and industrial action by health service workers, insufficient health personnel and insufficient financial investment. Government’s performance in the health sector has been abysmal, investment in infrastructure has been poor and merger remuneration for health workers have created a massive brain drain to the US and Europe. The annual budget of the government for the health sector lies around 4.17 percent of the total national budget which means each Nigerian is only getting \$5 per person per year! These values are very alarming especially owing to the fact that the human capital of any economy is the main stay of that economy. A health investment of less than \$5 per person a year is not even an investment to start with. This is the reason why this study have been put forward to expose the relationship between human capital through health and its connection to economic growth. With a view of urging the Nigerian government

to invest more into the health sector as this would culminate to faster economic growth for the country.

2.2 Theoretical Literature

The standard theoretical framework for empirically analyzing the sources of economic growth emanate from the neoclassical growth theory pioneered by Solow (1956).

Professor RM Solow built his model of economic growth as an alternative to the Harrod-Domer line of thought without its critical assumption of fixed proportion in production. Some assumptions of the model are as follows;

1. One composite commodity is produced.
2. There is neutral technical progress
3. The savings ratio is constant.
4. Prices and wages are flexible.
5. Output is regarded as net output after making allowance for the depreciation of capital
6. The production function is homogenous to the first degree.
7. The two factors of production, labour and capital are paid according to their marginal productivities.

Given these assumptions, Solow shows in his model that with variable technical coefficient there would be a tendency for capital-labour ratio to adjust itself through time in the direction of equilibrium ratio. If the initial ratio of

capital to labour is more, capital and output would grow more slowly than labour force and vice versa. Solow's analysis is convergent to equilibrium path (steady state) to start with any capital-labour ratio.

The Solow model concerns itself with long-run economic growth. A key component of economic growth is savings and investment. An increase in savings raises the capital stock and thus raises the full employment national income and product. Solow analyses how higher savings and investment affects long run economic growth. In the short run, higher savings and investment does not increase the rate of growth of national income and product in the short run.

Solow set up a mathematical model of long run economic growth. He assumes full employment of capital and labour. Given these assumptions about population growth, saving, technology, he works out what happens as time passes.

The Solow model is consistent with the stylized facts of economic growth;

The labour force L (the population) grows at a constant rate n :

$$\frac{1}{L} \frac{dL}{dt} = n$$

Net investment I is the change in capital

$$I = \frac{dk}{dt}$$

Saving is a constant fraction s of national income y

$$S = sY$$

Net national product Y is a function of capital k and labour L

$$Y = f(k, L)$$

Consumption C is national income less savings: equivalently consumption is national product less investment:

$$Y = Y - S = Y - I$$

The neoclassical growth theory assumes that output is determined by the amount of capital, labour and the existing level of technical knowledge in the economy. Thus, changes in output overtime are mainly caused by changes in inputs: capital and labour. In the Solow model, the assumption of constant or decreasing return to scale is imposed on the aggregate production function such that doubling the inputs doubles the quantity produced or less than doubles output respectively. Further, aside capital, labour and technical knowledge all other inputs such as natural resources are considered relatively unimportant in the neoclassical growth theory. Meanwhile, technical knowledge (technology), savings rate and population are exogenously determined in the Solow model (see Mankiw, G; Romer, D. and Weil, D. 1992; Romer 1996) in effect, capital accumulation is the main determinant of output growth with the neoclassical framework. However, the difficulty in explaining US economy growth led economists to recognize and attribute the missing factor in growth to factors other than physical capital and consequently, human capital theory evolved. In this respect, Mankiw et al (1992), for example, in their contribution to growth theory, extended the Solow growth model to account for the rising trends in human

capital accumulation. The model, generally known as Augmented Solow model (ASM) assumes human capital to be an important input in a neoclassical production function. Along this line, human capital, health and education can be seen as separate input or labour augmenting in the production process (see for instance Mankiw et al, 1992; Knowles and Owen, 1997 and Bloom, D.E, D. Canning, and J. Sevilla, 2004). Thus, growth in output is due to improvement in capital accumulation (both physical and human) given the level of technology in the economy. Hence, the importance of human capital in the development of nations is well underscored in the neoclassical ideology. From the foregoing it can be inferred quantitatively that

$$EG = f(k)$$

Where k = a composite variable of capital such that $k = Pk + hk$

Pk = physical capital such as lands, buildings, machines etc

Hk = human capital.

Thus the Solow growth model can be specified as:

$$EG = f(Pk + hk)$$

Linearly this can be specified as an econometric model in the form below:

$$EG = \alpha_0 + \alpha_1 Pk + \alpha_2 hk + u$$

Where: EG = economic growth

Pk = physical capital

hk = human capital

α_0 = the intercept value

α_1 and α_2 = impact of the parameters of physical capital and human capital on economic growth.

2.3 Empirical Model

Following Solow (1956) as expressed above, the empirical model for this study is given as follows

$$\text{GDP} = f(\text{PR}, \text{LE}, \text{HDI}, \text{MR})$$

Where:

GDP: gross domestic product

PR: poverty rate

LE: life expectancy

HDI: human development indicators

MR: mortality rate

2.4 Empirical Review

Most of the conclusions from empirical studies on the effect of human capital on growth are positive. Thus human capital is a major contributor to economic growth. Most of these studies, however, narrowly defined human capital to be improvement in education and/or experience (see for example Barro, 1991,1999; Makiw et al,1992) in the last few decades, health as a separate input in the production function or augmenting other inputs such as labour has attracted Attention. This stems from the simple fact that unhealthy people cannot produce.

Many studies have shown that health in human capital investment is a huge boost to national economic growth (Barro, 1996; Sachs and Warner, 1997; Bloom and Williamson and Beheshti and Sojoudi, 2008).

Dihai (2012) found that economic growth is related to the growth rate of health investment and is related to the stock of health human capital in a model comprising the Arrow-Romer production function and the Grossman (1972) utility function. Accordingly, Dihai suggested that health investment can always promote economic growth if the health investment is excluded from the squeeze effect of physical capital. Likewise, Idowu Onisanwa (2014) using the cointegration and Granger causality techniques in analyzing quarterly time series data of Nigeria for the period of 1995-2009 found that GDP is positively influenced by health indicators in the long run and health indicators cause the rise of per capita GDP. Also Maame et al (2014) found that joint private and government health investment can maximise economic growth. In like manner Kulkari (2016) used the panel data regression with fixed effects model to examine the differences in the health care system of Brazil, China, Russian federation and South Africa, the emerging economies of BRICS. The result show a positive relation between health outcome and GDP per capita. Similarly, Jacob Novignon, Solomon A Olakojo and Justi Nonvignon (2012) studied the effect of public and private health care expenditure on health status in Sub-Saharan Africa and found that health care expenditure significantly influences health status through

improving life expectancy at birth, reducing death and infant mortality rates. Both public and private health care spending showed strong positive association with health status even though public health care spending had relatively higher impact. The findings implied that health care spending remains a crucial component of health status improvement in Sub-Saharan African countries, increasing health care expenditure will be a significant step in achieving millennium development goals. Balana and Robu (2014) analysed the relationship between the dynamics of the inputs and outputs of health care systems and found that there is a significant relationship between health expenditures and life expectancy. Novignon and Lawanson (2016) sought to understand the relationship between child health outcomes and health spending while investigating lagged effects. The result show a positive and significant relationship between health expenditure and child health outcomes. Public health expenditure was found to be more significant than private expenditure. Edeme, Emecheta and Omeje (2017) investigated the effects of public health expenditure on health outcomes in Nigeria and found that an increase in public health expenditure improves life expectancy and reduces infant mortality rates. Odo et al (2016) examined that the effect of expenditure on education and health has significant effect on economic growth in Nigeria. Using co integration techniques, the results revealed that, from the VECM, 1% increase in the government expenditure on education (TEDU), on average led to 23.8% increase in GDP while 1% increase in the government expenditure on health

(THEA) caused 37.6% decrease in GDP. Therefore, effort should be made by government to address the agitations by health workers and reduce the frequency of industrial action.

Some studies have relied on micro level data which focus on household and household members. Some of such studies include Alderman, Harold, John Hoddinott and Billkinsey (2006) examined the long run effects of childhood nutrition using a variety of natural and man-made experiments that provide exogenous variation in nutrition and found that better nutrition led to improvement in school completion, intelligent quotient (IQ), height and wages of the sampled households. Similarly, Thomas, S and S. Canagarajah (2004) found positive effects of adult nutrition on labour input and wages. However, literature on the relationship between income/growth and health at the macro level is generally inconclusive (Gupta and mitra,2003; world bank, 2004) in a study of 15 states from India for the period of 1973/74, 1977/78, 1983, 1987/88, 1999/2000, Gupta and mitra (2003) show that per capita public health expenditure positively influence health status, that poverty declines with better health and that growth and health have a positive two way relationship. Also, in a study of india, the world bank (2004) examines the impact of per capita GDP, per capita health expenditure and female literacy on infant mortality using state level data over the period 1980-1999. The study observes that both per capita public spending on health and per capita GDP have a negative relationship with infant mortality rate.

Using the Adult survival rate as an indicator of health status, Shargava et al (2001) finds positive relationship between adult survival rates and economic growth. The results remained similar when adult survival rates was replaced by life expectancy.

Adeyemi and Ogunsola (2019) in their study analysed the effects of human capital development on the economic growth of the Nigerian economy by utilizing time series data spanning 1980-2013. The study used the ARDL model to assess the relationship between the variables investigated. The findings of the study showed the absence of a significant impact on economic growth by human capital. Also Oluwadamilola, Akinyemi and Adediran (2018) investigated the relationship between human capital and sustainable economic growth of Nigeria. Utilizing series covering the period 1981-2015, the study employed the VECM model for analysis. Results obtained from the estimations carried out showed human capital as being instrumental in achieving sustainable growth and development. Further, Oguniyi (2017) examines the effect of human capital development on Nigeria's economic growth by employing the ARDL model to series from 1981 to 2014. The findings of the study revealed that in the long run, while education expenditure hurts economic growth, government expenditure on health was found to produce a positive effect on the economic growth of Nigeria.

Similarly Miyanda and Venkatesh (2017) analysed the effects of human capital on the zambian economy by employing the VECM model for analysis.

The result of the study showed that the human capital variable of education and health care influence a significant positive impact on economic growth. Further, it was discovered that the impact of health was higher than that of education. Schneider and Winkler (2016) show that a life saving technology enhances economic growth as long as the absorption of additional labour into the health sector does not lead to reduced spill overs in the production sector.

Coming down to Nigeria, most of the studies have related growth to poverty while omitting the human capital (health and education) dimension of the analysis. Some of such studies include Aigbokhan (2000), Ali (2000), Amaghionye Odiwe and Osinubi (2004) and Addison and wodon (2007). While there is no doubt that a positive relationship between health and economic growth could exist, a fundamental reason why it is difficult to reach a definitive conclusion regarding the link is the web of interrelationships that is involved in the determination of a nation's income. Good health is imperative to an economy, so also is capital formation, balance of payments, investment, trade etc. In summary, there is no consensus of the relationship between growth and health in Nigeria. Consequently, the focus of this study is to establish the relationship between health and economic growth in the case of Nigeria, the channels in the relationship as well as the direction of causation.

CHAPTER THREE

METHODOLOGY

3.1 Theoretical Framework

The Solow endogenous growth model, which forms the foundation of this study's theoretical framework, stipulates that continued economic progress must be accompanied by an increase in human capital (see Lucas, 1988; Romer, 1990; and Romer, 1994). Endogenous growth models' proponents asserted that the rate of output increase is governed internally by the financial climate. These theories suggest that human capital is the engine that propels an economy's expansion. The generalization of human capital production technology as growth-determinants and the accessible channels of human capital investment in developing nations, where associated consensus is still debatable in literature, forms the theoretical foundation of this work.

Based on the preceding, we consider an economy in which final output is determined by two distinct factors of production, labour and physical capital.

$EG = f(pk + hk)$. Economic growth is a function of physical capital and human capital

3.2 Data and data collection

The main focus of this research is to examine whether health is a reflection of human capital accumulation and how it would affect economic growth in Nigeria. The study uses time series secondary data for the analysis of

the impact of health on economic growth of Nigeria for the period of 1980-2020. Data on relevant variables including gross domestic product (GDP), life expectancy (LE), poverty rate (PV), human development index (HDI) and mortality rate (MR) are sourced from the world bank development indicators collected from its statistical yearbooks.

3.3 Model Specification

Sen (1998) argued that although life expectancy (LE) and mortality rate (MR) as proxy variables for health care are criticised as crude by Knowles and Owen (1995), they have been strongly defended in the macroeconomic context of developing countries. Therefore, both variables were utilized as surrogates for health capital. Like other economic papers analysing the relationship between health, human capital development and Economic growth, we have also employed the following variables in the growth equation: poverty rate, human development index, infant and life expectancy at birth.

3.4 Unit Root Test for Stationarity of Series

The process involves examining the stationarity status of all variables under consideration. This determines the order of integration of a stochastic process order whether stationary or non-stationary. The test is adjudged to conform to stationarity premised on the condition that the F-stat exceeds the critical value at 10%, 5% or 1% significance level respectively. It is tested at levels or first difference. Stationarity at levels is known as integration of order 1 or I(1).

Stationarity at first difference is known as integration of order 2 known as I(2). The need for the variables to be checked for stationarity either at first difference or levels order is germane to avoid a spurious regression. The universally acceptable methodology for verifying unit root is Augmented Dickey-Fuller (ADF) test pioneered by the works of Dickey and Fuller (1979, 1981), and the Phillip-Perron test (PPT) attributable to Phillips (1987) and Phillips and Perron (1988). ADF adjust higher order serial correlation by incorporating lagged difference term on the right-hand side rejecting a null hypothesis of unit root (the series are non-stationary) in juxtaposition for the alternative hypotheses of stationarity. The tests are also amenable to experimentation with and without a deterministic trend (t) for each of the series.

3.5 The Autoregressive Distributed Lag Model (ARDL)

This study utilized the ARDL model due to the following benefits over other co-integration model, first, the autoregressive Distributed lag model is superior in consideration regardless of sample size which can either be small or finite and consist of 30 to 80 observations. Ghatak and Siddiki (2001). Second, this approach is more suitable when variables integrate in a different order as when some variables are I(0) and when some variables are I(1). Third, modelling ARDL with the appropriate lags is to correct for both serial correlation and indigeneity problems. Pesaran (2001). Fourth, the ARDL model, simultaneously can estimate long run and short run co-integration relations and provide unbiased

estimation for the study. Pesaran(2001). A simplified ARDL model for these variables X, Y and Z can be expressed as:

$$\Delta Y_t = \alpha_0 + \pi_1 Y_{t-1} + \pi_2 X_{t-1} + \pi_3 Z_{t-1} + \varphi_1 \sum_{j=1}^n \Delta Y_{t-j} + \varphi_2 \sum_{j=1}^n \Delta X_{t-j} + \varphi_3 \sum_{j=1}^n \Delta Z_{t-j} + u_t$$

Where π_1 , π_2 and π_3 are long run coefficients whose sum is equivalent to the error correction term in VECM model and φ_1 , φ_2 and φ_3 are short run coefficients. The generalized ARDL model for accessing the effect of health on economic growth in Nigeria is as follows:

$$\Delta \ln GDP_t = \sum_{i=0}^p \Phi_1 \Delta \ln PR_{t-i} + \sum_{i=0}^p \Phi_2 \Delta \ln HDI_{t-i} + \sum_{i=0}^p \Phi_3 \Delta \ln MR_{t-i} + \sum_{i=0}^p \Phi_4 \Delta \ln LE_{t-i} + \beta_1 \ln PR_{t-1} + \beta_2 \ln HDI_{t-1} + \beta_3 \ln MR_{t-1} + \beta_4 \ln LE_{t-1} + u_t$$

Δ indicates differencing of variables, while u_t is the error term (white noise) and subscript (t-1) is for the lagged period, φ_1 to φ_4 is the short run coefficient. For decision making criteria about (H_0 or H_1), Pesaran et al (2001) proposes the following procedure:

- 1) If $F_s >$ upper bound of critical value, confirm the existence of co-integration.
- 2) If $F_s <$ lower bound of critical value, confirm variables are not co-integrated.
- 3) If F_s less than or equal to the upper bound and greater than or equal to the lower bound of critical value then the conclusive decision may not reach about variables co-integration.

Once the long run association is established, the next two steps need to be executed to estimate long run and short run coefficients of the proposed ARDL models. The long run ARDL equilibrium model is as follows:

Therefore, the ARDL model specifications of equation 2 is expressed as unrestricted error correction model (VECM) to test for co-integration between the variables under study:

$$\Delta \ln \text{GDP}_t = \sum_{i=0}^p \phi_1 \Delta \ln \text{PR}_{t-1} + \sum_{i=0}^p \phi_2 \Delta \ln \text{HDI}_{t-1} + \sum_{i=0}^p \phi_3 \Delta \ln \text{MR}_{t-1} + \sum_{i=0}^p \phi_4 \Delta \ln \text{LE}_{t-1} + \beta_1 \ln \text{PR}_{t-1} + \beta_2 \ln \text{HDI}_{t-1} + \beta_3 \ln \text{MR}_{t-1} + \beta_4 \ln \text{LE}_{t-1} + u_t$$

Once co-integration is established, the long run relationship is estimated using the conditional ARDL model specified as:

$$\ln \text{GDP}_t = \varphi_0 + \beta_1 \ln \text{PR}_{t-1} + \beta_2 \ln \text{HDI}_{t-1} + \beta_3 \ln \text{MR}_{t-1} + \beta_4 \ln \text{LE}_{t-1} + u_t$$

On the a priori we expect; $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 < 0$, $\beta_4 > 0$.

The lags length of the ARDL model are to be estimated using the akaike information criterion (AIC)

$$\Delta \ln \text{GDP}_t = \sum_{i=0}^p \phi_1 \Delta \ln \text{PR}_{t-1} + \sum_{i=0}^p \phi_2 \Delta \ln \text{HDI}_{t-1} + \sum_{i=0}^p \phi_3 \Delta \ln \text{MR}_{t-1} + \sum_{i=0}^p \phi_4 \Delta \ln \text{LE}_{t-1} + \sum_{i=0}^p \Omega \text{ecm}_{t-1} + u_t$$

Where: GDP= gross domestic product

HDI= human development index

LE = life expectancy rate

PR = poverty rate

MR = mortality rate

φ = constant term

u_t = white noise

$\varphi_1 - \varphi_4$ = short run elasticities (coefficients of the first differenced explanatory variables)

$\beta_1 - \beta_4$ = long run elasticities (coefficients of the explanatory variables)

On the a priori we expect $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 < 0$, $\beta_4 > 0$. This implies that the human development index and life expectancy should have a positive relationship with the gross domestic product while mortality rate should have a negative relationship. This means that an increase in the variables of life expectancy and human development index should increase the level of income in the economy. For mortality rate, an inverse relationship exists between it and the GDP indicating that a fall in infant mortality should increase the level of income

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Empirical Analysis

The data analysis is presented in this chapter. The first section is subdivided into introduction, descriptive statistics of the data, the unit root test and post estimation test such as stability and normality tests. The study also carried out a cointegration test which is a precondition for estimating the error correction model. The Autoregressive Distributed Lagged model was the econometric technique employed for estimation. The data on the study range from 1980 to 2020. The data were sourced from the CBN statistical Bulletin and the World Bank Development Indicators, 2019 version.

4.2 Descriptive Statistics

Table 4.1: Descriptive Statistics for the Variable

	GDP	HDI	LE	MR	PR
Mean	1336.405	0.264098	48.39024	104.5122	40.60732
Median	955.0000	0.450000	46.30000	110.0000	38.70000
Maximum	3099.000	0.540000	55.00000	126.0000	51.90000
Minimum	270.0000	0.000000	45.30000	72.00000	35.10000
Std. Dev.	865.6326	0.249597	3.163606	19.52194	4.975359
Skewness	0.428059	-0.119884	0.844504	-0.310474	1.009282
Kurtosis	1.737776	1.049850	2.182395	1.433854	3.161829
Jarque-Bera	4.070759	6.595143	6.015429	4.848920	7.005512
Probability	0.130631	0.036973	0.049404	0.088526	0.030114
Sum	56129.00	10.82800	1984.000	4285.000	1664.900
Sum Sq. Dev.	30722114	2.491952	400.3361	15244.24	990.1678
Observations	41	41	41	41	41

Source: *Authors Computation*

Descriptive statistics comprises the variables, observations, mean, standard deviation, skewness and kurtosis of the data on variables employed in

the research within the study period as presented in Table 1 and analyzed. Table 1 shows the results of the data used; using 41 observations for each of the variable to estimate the impact of health and human capital on economic growth in Nigeria from 1980 to 2020 for the descriptive statistics. The mean describes the average value in the series and the standard deviation measures the volatility of the data or the amount of deviation of the data from the average. The skewness measures whether the distribution of the data is symmetrical or asymmetrical. A positive skewness value indicates that the distribution of the data has a long right tail, while a negative skewness value shows that the distribution of the data has a long left tail.

From the table it shows that GDP had a maximum growth of 3099.000 for the period while the Minimum was 270.000 thus showing high disparity in the values for GDP for the sample period. This can be adduced to a number of factors such as instability of oil prices in the international market, low productive capacity and low new and viable investments. The average growth for the period was 1336.405. The maximum for HDI for the period was 0.540000 and the minimum was 0.0000, this is to be expected as much of the populace of Nigeria are not provided with the adequate tools needed to function as productive members of society. Judging by the average value for HDI of 0.264, Nigeria still has a long way to go in the provision of human development opportunities for her citizens. The maximum for value LIFE EXPECTANCY (LE) is 55.000, while the

minimum value is 45.3, showing that the Nigerian populace has a very low life expectancy ratio when compared to other industrialized nations of the world. This may be due to a number of factors, the health care system being one of the most important. The average value for life expectancy was 48.390, meaning that the average Nigerian dies at the age of 48. This has several implications on the economy of the country, the most important being that productivity is terribly affected. the maximum value for MORTALITY RATE is 126.00 and the minimum value is 72.0000 while the mean and median is 104.5122 and 110.0000 respectively. Also poverty rate has a maximum value of 51.900 while it minimum value is 35.1000. While the mean and median is 40.60732 and 38.7000. The table shows that all the means and the medians of the variables lie within their minimum and the maximum. Meeting this criterion implies the data are good enough to be adopted for estimation and for projections.

The skewness for GDP, LIFE EXPECTANCY and POVERTY RATE is positive which indicates that the tail moves to the left. While that of HDI and MORTALITY RATE has a negative skewness which indicates that the tail moves to the right.

4.3 Correlation Results

Table 2 presents the result of correlation coefficient of the variables used for the estimation. The correlation test is used to determine the direction of a linear relationship between two variables. This is shown below:

Table 4.2: Correlation Result for the Variables

	GDP	HDI	LE	MTR	PR
GDP	1				
HDI	0.6699458774	1			
LE	0.8232710558	0.800445259	1		
MTR	-0.8089905466	-0.921967858	-0.9549488994	1	
PR	-0.6925156081	-0.267813751	-0.6190044906	0.4838032692	1

Source: *Authors Computation*

From the table above it can be seen that GDP has a positive relationship with HDI and LIFE EXPECTANCY this means that human development index and life expectancy move in the same direction as GDP for the sample period. This comes as no surprise because when HDI is high, people are more economically productive and hence gross domestic product will increase. Likewise if life expectancy is high people don't die prematurely and thus has a higher opportunity to contribute to the gross domestic product. A negative relationship is seen between GDP and MORTALITY RATE and POVERTY RATE. When infant mortality is high, there is a reduced number of active and working youths and this has the potential of affecting the GDP negatively. Also, a high poverty rate is going to affect productivity, aggregate demand, investment levels etc in a negative way and these have the ability to negatively affect GDP. The covariance between HDI and LIFE EXPECTANCY is approximately 0.800, which indicates that there is a high positive relationship between these two variables, while the correlation between HDI and MORTALITY RATE is approximately -0.92 which is indicative of the fact that without an active and

healthy populace, human development can simply not be achieved. The covariance between POVERTY RATE and LIFE EXPECTANCY is approximately -0.62 which shows strong negative relationship. The higher the poverty rate, the more likely it is for the populace to die untimely because poor people cannot afford proper health care and in a country like Nigeria where the state of the public hospitals are nothing to write home about, this situation is not too far fetched. Also, poverty exposes people to a host of health dwindling habits like stress, improper diet, lack of exercise etc and this cumulates to lower life expectancy at the end of the day.

4.4 The Results of Augmented Dickey-Fuller (ADF)

Table 4.3: Results of Augmented Dickey-Fuller Test

Variable	level	1 st difference	2 nd difference	remark
GDP	-3.960760	-7.357762	-4.6432406	i ₀
HDI	-2.121391	-6.469385	-7.223917	i ₁
MTR	-4.771996	-1.227689	-11.371225	I ₀
LE	-0.279322	-3.785896	-8.024192	I ₁
PR	-2.056628	-7.005715	-6.406368	I ₁

The stationarity test on Human development indices, life expectancy and poverty rate have shown to be stationary at first difference. On the other hand, the unit root test on the mortality rate has shown to be stationary at level. This means that the stationary level of the variables of the study are a mixture of stationary at levels and first difference. None of the variables adopted in this study is stationary at second difference as this has a high tendency of leading to a spurious result.

They are stationary because the ADF calculated statistics are lesser in comparison to the critical values of the ADF at 5% levels of significance.

4.5 Test for Cointegration

Null hypothesis: no levels relationship

Table 4.4: F Bounds Test

F bounds test				
Test statistic	Value	Signif.	I ₀	I ₁
Asymptotic: n=1000				
F-statistic	6.4566454	5%	2.56	3.49

Source: Author Computation

The value of the F-statistic (6.457) is greater than the critical values at the 5% level of significance. Thus, the null hypothesis of no co-integration is rejected, implying long run co-integration relations among the variables as expected apriori.

4.6 ARDL Long Run Form

Table 4.5: Auto-Regressive Distributed Lag Model

Dependent Variable: GDP				
Method: ARDL				
Date: 01/01/02 Time: 02:57				
Sample (adjusted): 1982 2020				
Included observations: 39 after adjustments				
Maximum dependent lags: 4 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (4 lags, automatic): HUMAN DEVELOPMENT INDICES, LIFE EXPECTANCY, MORTALITY RATE, POVERTY RATE				
Fixed regressors: C				
Number of models evaluated: 2500				
Selected Model: ARDL(1, 0, 0, 2, 1)				
Note: final equation sample is larger than selection sample				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	0.695838	0.070039	9.934979	0.0000
HDI	-448.4645	414.6232	-1.081619	0.2880
LE	-222.2257	60.18563	-3.692338	0.0009
MTR	0.289970	45.21505	0.006413	0.9949
MTR(-1)	-6.516198	79.47004	-0.081996	0.9352
MTR(-2)	-47.70098	51.44401	-0.927241	0.3612
PR	-4.846546	10.99810	-0.440671	0.6626
PR(-1)	-14.31150	17804.21	4374.315	0.2246
C	0.0023		4.070171	0.0003
R-squared	0.969219	Mean dependent var		1307.436
Adjusted R ²	0.961011	S.D. dependent var		876.6491
S.E. of regression	173.1008	Akaike info criterion		13.34480
Sum of squared residuals	898916.1	Schwarz criterion		13.72870
Log likelihood	-251.2236	Hannan-Quinn criterion		13.48254
F-statistic	118.0781	Durbin-Watson stat		1.957594
Prob(Fstatistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection				

Source: Author Computation

The long run test statistics reveal that mortality rate(MR), life expectancy (LI) and poverty rate (PR) are the key determinants of human capital development and economic growth in Nigeria. The finding is in line with the results of Matthew, Ogunnaike and Fasina (2008) and Sieng and Yussof (2015). From the

above, the interpretations of the result as regards the coefficients of the regressions are stated as follows. The value of the intercept, 0.023 indicates that if all variable are held constant, gross domestic product will grow by 2.3%. the result shows that HDI, LIFE EXPECTANCY and POVERTY RATE all has negative relationships with economic growth in Nigeria for the sample period of 1980-2020 While mortality rate has a positive relationship with economic growth. From the result, the HDI value was -448.46 which imply that if HDI grows by one unit, GDP will fall by 448.64 units, this is not in line with economic theory perhaps due to the low productivity status of the populace, low level of literacy, high level of crime and internet fraud which means our human capital are actually stunting our economic growth. Another reason for our result may be adduced to the high income disparity prevalent in Nigeria, what if the GNI is achieved by a small percentage of citizens, the wealthy and, therefore, ignores the poor? Also the coefficient of life expectancy was -222.2257, another value not conforming to a priori expectation. This may be because if life expectancy increases population size (meaning less people are dying because of high life expectancy and new people keep being born), then income per capita is reduced in the presence of fixed factors of production and decreasing marginal productivity. This means life expectancy is increasing but no new firms or industries are being raised to accommodate these people living longer and what does that amount to? A negative pressure on GDP of Nigeria, high crime rate, corruption and so many

societal ills. The coefficient of mortality rate was 0.289970, granted, in theory a high mortality rate will lead to reduced economic growth but in an almost over populated country like Nigeria, mortality rate shows a positive relationship with economic growth. This may be because it will reduce pressure on infrastructural amenities (that are lacking in the first place) and also reduce government expenditure in the form of transfers. Poverty rate was -4.846546 meaning a one unit increase in poverty rate will reduce GDP by 4.846546 units this is not a surprising result and conforms to theory. An increased rate of poverty will translate to low human capital productivity, high levels of crimes and corruption, low capital movement into the country, low indigenous investments and so on.

R^2 is 0.969219. this indicate that about 97% of the systematic variation in the dependent variable is explained by the variation in the group of the explanatory variables. In other words, only about 3% of the systematic variation in the gross domestic product was not explained by the model. This is a good fit. Judging by the F statistics, it shows that the model overall performance was significant.

Table 4.6: Breusch-Godfrey serial correlation LM test

Null Hypothesis: No serial correlation			
F-statistic	0.292085	Prob. F(2,15)	0.7509
Obs*R-squared	1.012092	Prob. Chi-Square(2)	0.6029

Source: Author Computation

The correlation result from figure 4.6 above shows it is statistically insignificant (0.05) at 5%, this implies we accept the null hypothesis that no correlation exists among the variables. This absence of correlation shows the data of the study are good and fit for estimation.

4.7 Test of hypotheses

Ho: Health has no effect on economic growth

H₁ Health has an effect on economic growth

Based on the above result, and judging from the t statistic test, there was no significant relationship between health and economic growth for Nigeria during the sample period of 1980-2020. Therefore we will accept the null hypothesis that health has no effect on economic growth.

This may be adduced to the terrible state of health care in Nigeria and the nonchalant attitude of our policy makers towards health and its prospects.

H₁: there is no relationship between health and human capital

Based on the above result, and judging from the t statistic test, there was a significant relationship seen between health and human capital. Therefore we will reject the null hypothesis

H2: there is no causal relationship between health, human capital and economic growth.

Based on the above result, and judging from the t statistic test, there is no significant relationship between health and human capita and economic growth. Therefore we will accept the hull hypothesis

4.8 Policy Implication of the Results

The finding of the study leads to the conclusions that the determinants of human capital development are deteriorating in Nigerian economy as supported by data. This is premised on the empirical results from the study. This therefore draws attention to the fact that human capital inadequacy has engrossed the economic prospect of the country and needs urgent action to revive them. However, these determinants are still very much significant to the human capital development process; the economy needs to reinvigorate investment in improving the level of human capital development.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Summary of the Findings

The research work examined the impact of health on human capital development and its relationship with economic growth in Nigeria from 1980 to 2020. The role of life expectancy, mortality rate, human development indicators and poverty rate on the economic growth can only take place where human capitals are healthy and skilled enough to transform raw material into finished product. This is the only way the economy can grow because human capital controls the other forms of capital.

The empirical result as well as the theoretical underpinnings shows life expectancy and poverty rate were found to be statistically significant to economic growth in Nigeria from 1980 to 2020. The variables were found to have contained unit root and were stationary after the first difference {i.e. $I(1)$ } which means that they were co integrated and ECM was added to the data. The long run equilibrium or cointegration F bounds test showed a long cointegration among the variables at the 5% level of significance. Life expectancy, HDI and poverty rate were seen to have indirect relationships with GDP, while mortality rate had a direct relationship with GDP contrary to a priori expectations.

The model was also found to have no serial correlation with the calculated Breusch-Godfrey serial correlation LM test showing statistical insignificance at 0.05 which led us to accepting the null hypothesis that no correlation exists among the variables.

5.1 Policy Implications

It is generally believed that Human capital is one major factor that is responsible for economic wellbeing of the people if properly channeled by the economic stakeholders. The importance of human capital development to economic growth has been seen as strategic to the socio-economic development of nations. These include education, health, Research and development (R&D) etc. The development of human capital through health is therefore crucial because it ensures that the nations' human resource endowment is knowledgeable, skilled, productive and healthy to enable the optimal utilization of other productive resources that can engender growth and development in Nigeria. combined impacts of the explanatory variables are sufficient enough to explain a 97% variation in health and human capital development. From the foregoing analysis carried, It is crystal clear that the recent call to scale up the budgetary allocation to minimum threshold of twenty six percent and fifteen percent for educational and health sector respectively is a step in the right direction.

Studies undertaken to examine the impact of human capital development on economic growth in Nigeria economy over the years showed that the

significant relationship between health and economic growth is positive. However; some of the components of human capital development were found to be unrelated and insignificant to the growth of the Nigerian economy.

Human development index was found to be statistically insignificant with about 448.4 percent in economic growth for a percentage rise in HDI. Most importantly and startling is that life expectancy was found to be negatively related to economic growth with about 222.2 per cent increase for a one percentage rise in life expectancy. It is significant within the period under study. The implication of the result suggests that government must put in place appropriate macroeconomics policies; especially the executive must fashion out the modalities of raising expenditure to develop the abundance of health sector in Nigeria in terms of infrastructure and training in Nigeria.

5.2 Recommendations

Based on the preceding policy implication, the following recommendations are put forth for the government to adopt to enhance economic growth in Nigeria;

1. Government should massively increase investment and public spending on health. The health system currently rely on mixture of government budget, health insurance, external funding and private sources including non-governmental arrangements and out of pocket payments. Despite the variety of financing sources, the level of health spending is relatively low. Nigeria spends less than 5% of her gross domestic product (GDP) on

health and per capita health spending is slightly lower than US\$35 per person per year. The ridiculously low per capita health spending in Nigeria indicates a negligent lack of commitment by Federal, State and Local Government to health, and the leadership continues to pay lip service to healthcare services. At a minimum, per capita health spending must increase to \$60 in order to provide a minimum range of services.

2. Government should ensure that capital expenditure and recurrent expenditure on health care are properly managed in a manner that will raise the nation's health services and availability
3. Expenditure in education and skill acquisition should receive increased funding, as well as ensure that the allocated resources are properly managed and used for the development of human capital so as to prevent incidences of brain drain of both the health and educational sectors.
4. Future generation academia in Nigeria look forward to seeing the present trend of poor infrastructure and lack of up to date learning facilities replaced with cutting edge equipment to be able to compete favourably with their peers elsewhere in the world. These aspirations are what the government and relevant. Stakeholders must respond to if the future development goals of the nation must be attained.
5. Since total expenditure on health appear to be lacking and way below the WHO standard within the period studied, government should encourage

savings and investments in the economy, increase expenditures on health provisions and induce the level of labour productivity.

6. This study recommends sensitization of the populace on the dangers of over population and the need for family planning
7. Our hospitals need to be upgraded, with state of the art facilities provided. This will serve to increase the quality of services provided and will also motivate public health care personnel.
8. Encouragement of public Health sector personnel through increased salaries, timely payment of salaries, vacation time and welfare packages. This will serve to prevent the itching problem of brain drain in our health sector.
9. Adequate funding for Antigraft Agencies: Government should increase its funding of antigraft or anti-corruption agencies like the Economic and Financial Crime Commission (EFCC), and the Independent Corrupt Practices Commission (ICPC) in order to arrest and penalize those who divert and embezzle public funds meant for increased health care provision.
10. Adequate Funding of the Educational Sector: The direction of a nation's priorities and commitments is measured in terms of actual resources devoted towards the education sector.

11. This leads to such difference in human capital among group of countries. This view is perspicuously supported by the volume of fund developed economies spend on education compared the to scanty amount the Nigerian government spend on education.
12. Educational Curriculum Must Reflect Industry Needs: With recent and anticipated technological and industry changes, more positions will require higher education, and there will be an ongoing need for continuing education. Raising the educational skill levels of the country is vital. However, this will not result in economic growth unless training is strategically coordinated to meet current and potential industry needs.
13. Raising Educational Level to Create a Quality and highly productive Work Force: Education is a dominant, if not decisive factor in preparing workers with the robust skills needed to adapt to changing job requirements. The transition from manufacturing to the technologically-based new economy dramatically raised the skills level needed to get a job.
14. There should be provision of hospitals and health care in the rural areas who have to basically fend for themselves. Some of these areas are not even connected to the national grid so they have no power whatsoever.
15. The funding of health should not be left in the hands of the government alone and as such there should be effective collaboration between the

government and private sector within the framework of public-private partnership.

5.3 Conclusion

Given the size of Nigerian economy and her natural and human capital resources, the country ought to be the gateway to Africa in terms of development for both domestic and foreign investment to thrive for anticipated national savings. Therefore in order to play this important leadership role, Nigeria's economy must move on the right direction of sustainability of growth and development.

In order to achieve this, the bed rock of economic growth which is laid on the development of its human capital through health must be encouraged, therefore, the key policy challenge for Nigeria is to take decisive steps to tackle problems of health care provision and human capital deficiency and take the role of the leading light in Africa in terms of strategically expending resources on training its human resources and efficient health care service delivery. The implication of all these for Nigeria is that she will then become a human capital hub in Africa with a healthy, happy and productive populace.

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APPENDIX

Bounds test

Dependent Variable: GDP

Method: Least Squares

Date: 01/01/02 Time: 02:56

Sample (adjusted): 1980 2020

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HDI	-670.0389	999.7357	-0.670216	0.5070
LIFE_EPECTANCY	-95.08782	109.8952	-0.865259	0.3926
MORTALITY_RATE	-49.56780	25.45572	-1.947217	0.0593
POVERTY_RATE	-73.17172	20.00453	-3.657757	0.0008
C	14248.17	8224.089	1.732492	0.0917
R-squared	0.777787	Mean dependent var		1318.146
Adjusted R-squared	0.753097	S.D. dependent var		868.1597
S.E. of regression	431.3832	Akaike info criterion		15.08572
Sum squared resid	6699291.	Schwarz criterion		15.29469
Log likelihood	-304.2573	Hannan-Quinn criter.		15.16182
F-statistic	31.50167	Durbin-Watson stat		0.797628
Prob(F-statistic)	0.000000			

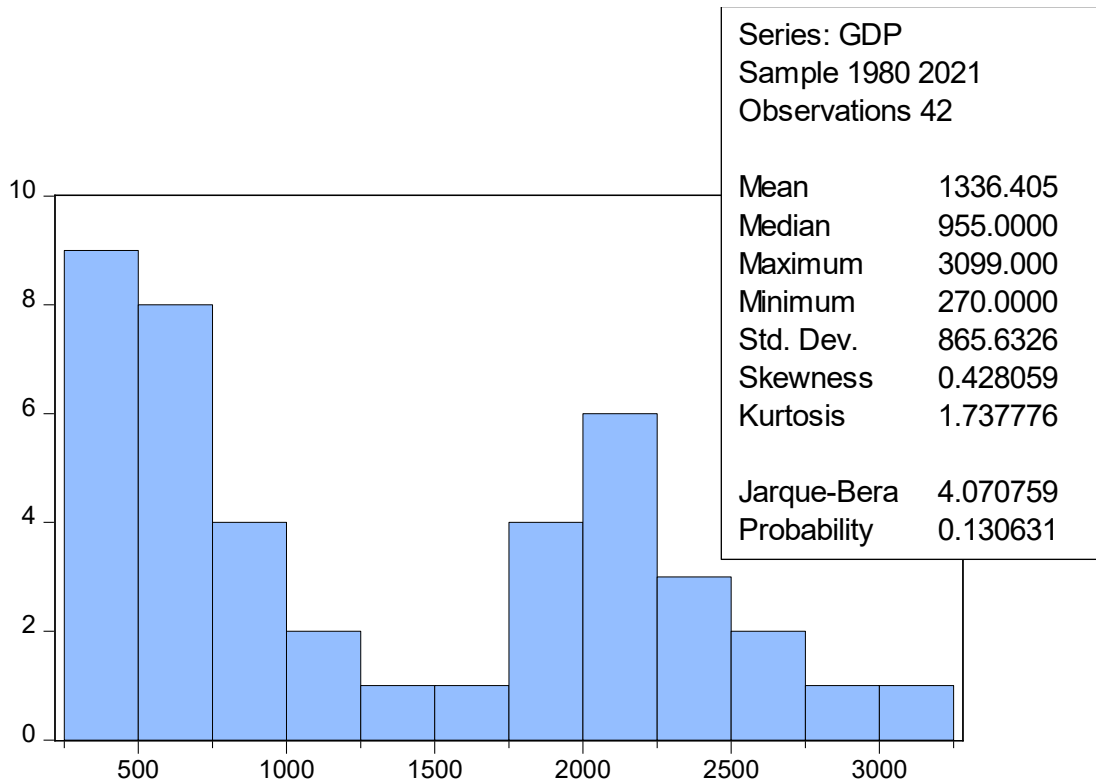
Adrf

Dependent Variable: GDP
Method: ARDL
Date: 01/01/02 Time: 03:26
Sample (adjusted): 1982 2020
Included observations: 39 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): HDI LIFE_EPECTANCY
MORTALITY_RATE POVERTY_RATE
Fixed regressors: C
Number of models evaluated: 2500
Selected Model: ARDL(1, 0, 0, 2, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	0.695838	0.070039	9.934979	0.0000
HDI	-448.4645	414.6232	-1.081619	0.2880
LIFE_EPECTANCY	-222.2257	60.18563	-3.692338	0.0009
MORTALITY_RATE	0.289970	45.21505	0.006413	0.9949
MORTALITY_RATE(-1)	-6.516198	79.47004	-0.081996	0.9352
MORTALITY_RATE(-2)	-47.70098	51.44401	-0.927241	0.3612
POVERTY_RATE	-4.846546	10.99810	-0.440671	0.6626
POVERTY_RATE(-1)	-14.31150	11.54116	-1.240040	0.2246
C	17804.21	4374.315	4.070171	0.0003
R-squared	0.969219	Mean dependent var		1307.436
Adjusted R-squared	0.961011	S.D. dependent var		876.6491
S.E. of regression	173.1008	Akaike info criterion		13.34480
Sum squared resid	898916.1	Schwarz criterion		13.72870
Log likelihood	-251.2236	Hannan-Quinn criter.		13.48254
F-statistic	118.0781	Durbin-Watson stat		1.957594
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Level



	GDP	HDI	LIFE_EPECTA NCY	MORTALITY_R ATE	POVERTY_RA TE
Mean	1336.405	0.264098	48.39024	104.5122	40.60732
Median	955.0000	0.450000	46.30000	110.0000	38.70000
Maximum	3099.000	0.540000	55.00000	126.0000	51.90000
Minimum	270.0000	0.000000	45.30000	72.00000	35.10000
Std. Dev.	865.6326	0.249597	3.163606	19.52194	4.975359
Skewness	0.428059	-0.119884	0.844504	-0.310474	1.009282
Kurtosis	1.737776	1.049850	2.182395	1.433854	3.161829
Jarque-Bera	4.070759	6.595143	6.015429	4.848920	7.005512
Probability	0.130631	0.036973	0.049404	0.088526	0.030114
Sum	56129.00	10.82800	1984.000	4285.000	1664.900
Sum Sq. Dev.	30722114	2.491952	400.3361	15244.24	990.1678

Observations 42 41 41 41 41

Dependent Variable: HDI
 Method: Least Squares
 Date: 01/01/02 Time: 01:25
 Sample (adjusted): 1980 2020
 Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.109418	0.034377	-3.182843	0.0029
@TREND	0.018676	0.001479	12.62414	0.0000
R-squared	0.803397	Mean dependent var		0.264098
Adjusted R-squared	0.798355	S.D. dependent var		0.249597
S.E. of regression	0.112081	Akaike info criterion		-1.491634
Sum squared resid	0.489926	Schwarz criterion		-1.408046
Log likelihood	32.57851	Hannan-Quinn criter.		-1.461196
F-statistic	159.3689	Durbin-Watson stat		0.415572
Prob(F-statistic)	0.000000			

hdi unit root test should include trend and constant because from the result, at 5% significant level both are statically significant

Null Hypothesis: D(HDI) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on AIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.559389	0.0000
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(HDI,2)
 Method: Least Squares
 Date: 01/01/02 Time: 01:30
 Sample (adjusted): 1982 2020
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(HDI(-1))	-1.075230	0.163922	-6.559389	0.0000

C	0.014886	0.012023	1.238079	0.2235
R-squared	0.537648	Mean dependent var	2.56E-05	
Adjusted R-squared	0.525152	S.D. dependent var	0.107012	
S.E. of regression	0.073741	Akaike info criterion	-2.326597	
Sum squared resid	0.201196	Schwarz criterion	-2.241286	
Log likelihood	47.36865	Hannan-Quinn criter.	-2.295989	
F-statistic	43.02558	Durbin-Watson stat	2.001090	
Prob(F-statistic)	0.000000			

hdi is stationary at frist difference

Null Hypothesis: D(LIFE_EPECTANCY,2) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 1 (Automatic - based on AIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.024192	0.0000
Test critical values:		
1% level	-4.226815	
5% level	-3.536601	
10% level	-3.200320	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LIFE_EPECTANCY,3)
 Method: Least Squares
 Date: 01/01/02 Time: 01:32
 Sample (adjusted): 1984 2020
 Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LIFE_EPECTANCY(-1),2)	-1.871508	0.233233	-8.024192	0.0000
D(LIFE_EPECTANCY(-1),3)	0.505779	0.148281	3.410952	0.0017
C	-0.000125	0.062818	-0.001997	0.9984
@TREND("1980")	0.000296	0.002571	0.115259	0.9089
R-squared	0.725131	Mean dependent var	0.002703	
Adjusted R-squared	0.700143	S.D. dependent var	0.304126	
S.E. of regression	0.166537	Akaike info criterion	-0.645395	
Sum squared resid	0.915239	Schwarz criterion	-0.471241	
Log likelihood	15.93980	Hannan-Quinn criter.	-0.583998	

F-statistic	29.01909	Durbin-Watson stat	2.033437
Prob(F-statistic)	0.000000		

life Expectancy is stationary at 2nd deference

Null Hypothesis: D(POVERTY_RATE) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 2 (Automatic - based on AIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.493915	0.0003
Test critical values:		
1% level	-4.226815	
5% level	-3.536601	
10% level	-3.200320	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(POVERTY_RATE,2)
 Method: Least Squares
 Date: 01/01/02 Time: 01:34
 Sample (adjusted): 1984 2020
 Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POVERTY_RATE(-1))	-1.710619	0.311366	-5.493915	0.0000
D(POVERTY_RATE(-1),2)	0.529503	0.246260	2.150175	0.0392
D(POVERTY_RATE(-2),2)	0.420028	0.160469	2.617506	0.0134
C	1.148502	1.114015	1.030958	0.3103
@TREND("1980")	-0.059357	0.046042	-1.289203	0.2066
R-squared	0.653720	Mean dependent var		0.000000
Adjusted R-squared	0.610435	S.D. dependent var		4.652180
S.E. of regression	2.903667	Akaike info criterion		5.094914
Sum squared resid	269.8009	Schwarz criterion		5.312605
Log likelihood	-89.25591	Hannan-Quinn criter.		5.171660
F-statistic	15.10266	Durbin-Watson stat		2.013560
Prob(F-statistic)	0.000000			

Poverty rate is stationary at first difference

Null Hypothesis: MORTALITY_RATE has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 2 (Automatic - based on AIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.771996	0.0024
Test critical values:		
1% level	-4.219126	
5% level	-3.533083	
10% level	-3.198312	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(MORTALITY_RATE)
 Method: Least Squares
 Date: 01/01/02 Time: 01:45
 Sample (adjusted): 1983 2020
 Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MORTALITY_RATE(-1)	-0.078408	0.016431	-4.771996	0.0000
D(MORTALITY_RATE(-1))	0.204034	0.119603	1.705925	0.0974
D(MORTALITY_RATE(-2))	0.626399	0.117211	5.344185	0.0000
C	10.88436	2.297409	4.737666	0.0000
TREND("1980")	-0.138588	0.028599	-4.845814	0.0000
R-squared	0.843326	Mean dependent var		-1.368421
Adjusted R-squared	0.824336	S.D. dependent var		1.172225
S.E. of regression	0.491307	Akaike info criterion		1.538583
Sum squared resid	7.965619	Schwarz criterion		1.754055
Log likelihood	-24.23308	Hannan-Quinn criter.		1.615247
F-statistic	44.40722	Durbin-Watson stat		2.203621
Prob(F-statistic)	0.000000			

mortality rate is stationary at first difference

DATA (1980-2020)

YEAR	HDI	GDP	LIFE EXPECTANCY	POVERTY RATE	MORTALITY RATE
1980	0	874	45.3	38.7	126
1981	0	2180	45.6	38.7	125
1982	0	1844	45.9	38.7	124
1983	0	1223	46	38.7	123
1984	0	902	46.1	38.7	123
1985	0	883	46.1	38.7	123
1986	0	639	46.1	38.7	124
1987	0	598	46	38.7	124
1988	0	549	46	38.7	125
1989	0	474	45.9	38.7	125
1990	0.398	568	45.9	38.7	125
1991	0.398	503	45.9	45	124
1992	0.398	477	45.9	45	124
1993	0.422	270	45.8	45	123
1994	0.421	321	45.8	45	123
1995	0.431	408	45.9	45	121
1996	0.434	462	45.9	51.9	120
1997	0.437	480	45.9	45	118
1998	0.443	469	46	45	115
1999	0.456	498	46.1	45	113
2000	0.439	568	46.3	51.9	110
2001	0.455	590	46.5	51.9	107
2002	0.466	742	46.8	51.9	104
2003	0.45	795	47.7	40.1	101
2004	0.46	1008	48.3	40.1	98
2005	0.465	1268	48.3	40.1	95
2006	0.473	1656	48.8	40.1	92
2007	0.478	1883	49.4	40.1	90
2008	0.484	2259	49.9	40.1	88
2009	0.49	1912	50.4	40.1	86
2010	0.482	2280	50.9	35.7	84
2011	0.492	2488	51.3	35.7	83
2012	0.5	2724	51.8	35.5	82
2013	0.519	2963	52.2	35.5	81

2014	0.523	3099	52.7	35.5	80
2015	0.526	2687	53.1	35.9	79
2016	0.526	2176	53.5	35.9	78
2017	0.531	1969	54	35.9	77
2018	0.534	2028	54.3	35.1	76
2019	0.539	2230	54.7	35.1	74
2020	0.54	2097	55	35.1	72

SOURCE: CBN STATISTICAL BULLETIN