

Effect of Macroeconomic Variables on Human Capital Development in Nigeria Using Health Care as Proxy 1986-2018

¹Ujuju Ejieh Lucky and ² Prof. Vincent N. Ezeabasili (Ph.D)

¹Department of Banking and Finance, Delta State Polytechnic, P.M.B. 5, Ozoro, Delta State, Nigeria | Tel: 08023261780 | Email: ujjulucky2004@yahoo.com

²Department of Banking and Finance, Chukwuemeka Odumegwu Ojukwu University, Igbariam Campus, Anambra State, Nigeria | Tel. 08034238705

Abstract: *The inconsistencies in the application and implementation of macroeconomic variable in developing economies have constituted critical constant in human capital development. The complicating findings in studies of the nexus between macroeconomic variables and human capital development could result in misapplication and faulty implementation of macroeconomic policy instruments consequently the main objection of the study is to examine the effect of macroeconomics on human capital development in Nigeria proxy by proxy health care (life expectancy). Other specific objectives are to determine the effect of money supply on health care in Nigeria and to assess the effect of inflation rate on health care in Nigeria. The data used for the study was sourced from Central Bank of Nigeria (CBN) statistical bulletin and World Bank Development Indicator 2018. The data were analyzed with econometric techniques involving descriptive statistics, Augmented Dickey-Fuller and Philip Perron tests for unit root. The autoregressive distributive log (ARDL) was used to determine the effect of relationship between macroeconomic variables and health care. The result obtained indicated that macroeconomic variables have a significant long run and short run effect on public health proxy by life expectancy in Nigeria. The study made some of the following recommendations that relevant policy instruments be put in place to enhance life expectancy through the creation of favourable socio-economic environment, government should increase the education budget to accommodate the poor children in the street whose parents cannot afford school fees and private sector investment should be encouraged by the government at all level to create employment opportunities so as to improve the quality life and living standard of Nigeria people.*

Keywords: *Macroeconomic variables, Healthcare, Life Expectancy, Monetary Policies*

INTRODUCTION

Macroeconomic variables are indicators or main signposts signaling the current trends in the economy. These macroeconomics affect the aggregate performance, structure, behavior and decision-making of an economy as a whole (Osullivan and Sheffrin, 2003). Like all expects, the government, in order to manage the economic aggregates, must do analysis and understand the major variables that determine the current behavior of macro economy (Berharden, 2009). The major macroeconomic indicators used for the study are money supply, interest rate, inflation rate, government expenditure and exchange rate. In today's world, we interpret macroeconomic variables quite differently within the parameters of the global crisis and other external economic shares as they occur.

Human are the most valuable assets in every economy (Ogunliye, Owolabi, Sanyaolu and Lawal, 2017). To achieve development, it therefore between imperative for these assists

to be managed properly and effectively. One way this can be done is by ensuring adequate investment is made in human capital. Human capital refers to the abilities and skills of human resources and human capital development refers to the process of acquiring and increasing the number of persons who have the skills, education and experience which are critical for the economic development of the country (Adekunle, 2011). The government efforts contribute to human capital development (Ragan and Lipsey, 2005).

Statement of the Problem

Over the past decades, macroeconomic variables and human capital development have attracted significant attention from finance and development experts and have been debated extensively. Several studies carried out on macroeconomic variables and human capital developments are with mixed findings. For instance, Temitope and Bola (2013), and Ewurum, Mgbemena, Nwogwugwu and Kalu (2015) found that human capital variable like health expenditure impacts positively on macroeconomic like economic growth in Nigeria; whereas Fabiyi, Adeyi and Isiaka (2018) revealed unemployment as negatively related to GDP, capital formation and export. Also, public health expenditures and growth engenders good health outcomes like reduced mortality rate Okeke 2015; Oluwatoyin, Adegboye and Fagbeminiyi (2018), growth of the economy Onisanwa (2014), but no effect on education (Okeke, 2015).

More so, empirical studies in Nigeria are few that employed time series and focused on the effect of macroeconomic variables on human capital development. In addition. Most of the studies did not consider the short run shocks on human capital development. Also, a good number of the extant studies used panel and cross-section data and as well lack consensus on their findings on macroeconomics variables and human capital development nexus. One of the reasons for this is the fact that these countries have different levels of macroeconomic variables and human capital development and their measurements. The current study, therefore, complements the existing empirical studies by using annual data for most current year 2018, and Autogressive Distributive Lag model that is capable of reporting both long run effect and short run shocks of macroeconomic variables on human capital dynamics proxy by healthcare (life expectancy) in Nigeria.

Objectives of the Study

The main objective of this study is to investigate the effect of macroeconomic variables on human capital development in Nigeria. However, other specific objectives include:

- (i) Evaluate the effect of interest rate on healthcare (life expectancy) in Nigeria proxy for human capital development;
- (ii) Analyze the effect of inflation rate on healthcare (life expectancy) in Nigeria proxy for human capital development;
- (iii) Determine the effect of government expenditure healthcare (life expectancy) in Nigeria proxy for human capital development;
- (iv) Ascertain the effect of money supply on healthcare (life expectancy) in Nigeria proxy for human capital development; and
- (v) Examine the effect of exchange rate healthcare (life expectancy) in Nigeria proxy for human capital development.

Research Questions

The following research questions are raised in the course of this study:

- i) How does interest rate affect healthcare (life expectancy) in Nigeria proxy for human capital development?
- ii) What are the effects of inflation rate on healthcare (life expectancy) in Nigeria proxy for human capital development?
- iii) How does money supply affect healthcare (life expectancy) in Nigeria proxy for human capital development?
- iv) What are the effects of exchange rate healthcare (life expectancy) in Nigeria proxy for human capital development?

Research Hypotheses

The following are the research hypotheses for the study stated in their null form.

Ho₁: Interest rate has no significant effect on healthcare (life expectancy) in Nigeria

Ho₂: Inflation rate has no significant effect on healthcare (life expectancy) in Nigeria

Ho₃: Government expenditure has no significant effect on healthcare (life expectancy) in Nigeria.

Ho₄: Money supply has no significant effect on healthcare (life expectancy) in Nigeria

Ho₅: Exchange rate has no significant effect on healthcare (life expectancy) in Nigeria

Significance of the Study

Findings from the study will be of immense benefits in a number of ways and to different groups of persons.

Public: The understanding of the study will enhance the ability of the public to see reasons while unemployment remains abated despite government various grant policies and programmes towards reducing unemployment.

Government: It would also be of paramount significance to the government for policy formulation purpose in the quest for sustainable investment growth and reducing unemployment in Nigeria.. Government will definitely find this research work useful as it tends to proffer solutions or recommendation that is capable of helping her in nation building.

Academics/Future Research: Both academic and other future researchers in this subject matter will find it useful source of research material.

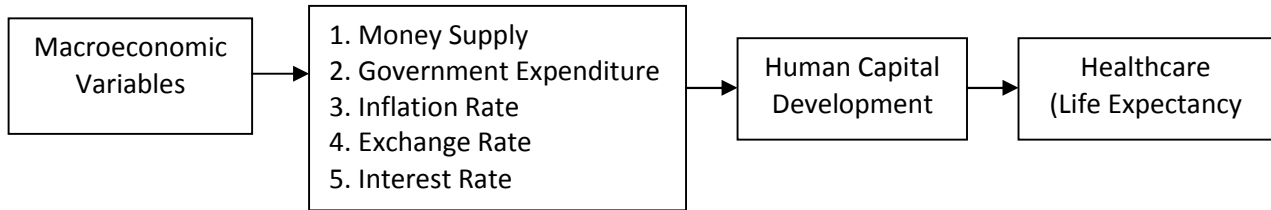
LITERATURE REVIEW

Conceptual Framework

Macroeconomic Variables

According to Oliver (2000) Macroeconomic factors are such factors that are pertinent to broad economy at the regional or national level and affect a large population rather than a few select

individuals. The following Macroeconomic factors such as inflation, money supply, government expenditure, exchange rate and interest rates are employed and deeply explain in this study.



The relationship between macroeconomic variables and human capital development

Human Capital Development

Human capital development is a worldwide wonder which involves guaranteeing ideal performance of individuals by empowering a feeling of proprietorship and responsibility among specialists (Chidi, 2012). The earth under which organizations work today is normally portrayed as unpredictable, dubious, dynamic, or complex because of broad changes and changes. In the present, very focused work showcase working with others profitably drives individual and organizational adequacy; employees work in groups framed to handle ventures, virtual groups and customers or in specially appointed mixes. Regardless of the groups' incredible esteem, numerous organizations still support practices that undermine collaboration or participation (Wukan, 2014).

Instruction that reflects satisfactory pragmatic and mechanical training parts holds the way to Nigeria winding up innovatively applicable and universally aggressive. It is likewise the best methods for engaging the citizenry to animate a supported national development, upgrade work enhance the nature of lives, diminish destitution, restrain the frequency of social indecencies due to joblessness and advance a culture of peace, opportunity and serenity. Targets of occupation creation must be accomplished through suitable training which engages results of the instruction framework with aptitudes and capabilities to end up independently employed. Without change in the nature of human capital, no advance is conceivable in an immature nation. The monetary nature of Nigerian populace still stays low since the existing economic situations don't support fast proficient progression of subjects. Mass migration of experts from Nigeria is only an indication of presence of surplus work which is to a significant degree because of deficiency of basic aptitudes. With every one of these issues and insufficiencies, individuals who frantically long for proficient progression would dependably be enticed to join the movement prepare.

Healthcare

Health is of vital importance in the development of an economy of any particular nation and its importance to economic growth and development of a nation cannot be overemphasized. Health is a crucially important economic asset for many poor people and their livelihoods depend upon it. Health is recognized as an essential component of human development. This has created several opportunities for improving the health of people, enhancing quality of life and ensuring a better future. Professor Eytayo Lambo, former Minister of Health made it known at the January

2013 edition of the Nigerian-South Africa Chamber of Commerce meeting sponsored by Total Health Trust. Modern theory of economic growth argues that human capital, especially health and education has the principal role in achieving economic growth and development (Gyimah-Brempong and Wilson, 2015). Health affects national economic output because people who are ill are likely to be less productive at work, to lose their job, or to retire prematurely, thereby decreasing household earnings and increasing the risk of poverty.

Life expectancy increased in early 19th century but till there is same countries while it stay low in the retest of the world. It shows that health standard is not same across the globe. In 20 century this global inequality is decreased and similarly today the life expectancy is approaching up to 70 to 75 years and similarly no country of the world today having low life expectancy than the countries of high life expectancy in 1800 (Roser, 2016).

Life expectancy is a measure of the length of life expected to be lived by an individual at birth. Improvement of life expectancy to as least 70 years by 2020 is one of Nigeria's health policy targets. Life expectancy is frequently utilized and analyzed in the composition of demographic data for the countries of the world, for the attainment of mortality experiences and for more reliable international comparisons (Julien, 2009). Lie, Zhang and Less 92017 noted that life expectancy has important implications for the individuals and aggregate human behavior. They noted that it has crucial effects on fertility behavior, economic growth, human capital investment, intergeneration transfers and incentives for pension benefits. Granstein and Kanganovich (2016), noted from the social planner's perspective that life expectancy has implication for public finance.

Interest Rate

Interest rate is the charge a borrower pays for the money lend to him for business or other transaction motives. Investors borrow money from banks and other financial institutions. The response of investment expenses changes keenly with interest rate which is at the mind of money-making analysis Acha &Acha, (2011). Interest rates are the other strong factors that affect financial policies as well as weaker financial payments in guiding principles of investors. It facilitates investment if the high interest rate is applicable on savings. The negative influence of higher investment rate inhibits the macroeconomic effect of interest rate policy. In New York, borrow and cash offers money as a guarantee to the lender of collateral. This is the most common form of investment in business performance. This program takes the type of customized term loan of a portfolio of securities. Because the transaction is customized, it is difficult to make general statement regarding its use. That said borrowers may negotiate an annual free for rights to borrow securities from beneficial owners entire portfolio. The net result is a government spending on GNP which has been the remains to single significant source of difference in excess of stabilization interest rate policy. The purpose of interest rate is in response to money investment to look forward in narrowing the divergence concerning the effects of cost and interest rates in the commercial banks. The reactions of interest rates depend on the fundamental substitutability of capital for other factors in investment to take place.

Inflation

It is the persistent increase in the general price level within the economy which affects the value of the domestic currency (Fatukasi, 2012). It is not once and for all upward price movement but has to be sustained over time and affect all goods and services within the economy. Several

factors are responsible for inflation in Nigeria. The inflation which results from excess aggregate demand is called the demand pull inflation, the cost push inflation results from upward movement in the cost of production while the structure inflation arises from some constraints such as inefficient production, marketing and distribution systems in the productive sectors of the economy. Other forms of inflation in developing country could be imported, open and seasonal inflation. The imported inflation comes as a result of transmission of inflation through internationally traded goods and services. This is when the economy imports goods from countries already, experiencing inflation.

The open inflation comes as a result of uninterrupted market mechanisms and seasonal inflation is associated off season in production when supply constraints permeates the economy as a result of fall in production especially farming produce. In Nigeria, other factors can be attributed to inflation such as the nature of the economy, its history, and fiscal and monetary policy direction. Inflation is defined as a generalized increase in the level of price sustained over a long period in an economy (Lipse and Chrystal, 2015), that is, a persistent rise in the price levels of commodities and services, leading to a fall in the currency's purchasing power. Although inflation is a household word in many market-oriented economies, and there exist a compendium of empirical studies on the over-arching problem of inflation, yet only selected few seem to know about the determinants, mechanics, and the real impact of inflation on national economic growth.

Government Expenditure

Government expenditure is the total in cash terms of the federal, state and the local government spending including transfers to the parastatals and the three levels of government (Anyato, 2016). In as much as public expenditure is highly desirable it however talks from of allocation stabilization of resources (Musgrave and Musgrave 1989). The allocation function becomes necessary so as to provide both private and public goods in particular social goods in appropriate mix with available resources. The provision of social and physical infrastructure through public investment and expenditure on some goods and services theoretical can directly improve productivity in the private sector through more efficient allocation of resources due to the special characteristics of social goods (Kellick 2009). It is the responsibility of the state through expenditure to provide the desirable services which the price mechanism cannot provide or produce at all or would only do so at high cost and with smaller social benefit. The recurrent expenditure is government expenditure made regularly from year to year. Some examples includes personnel cost overhead cost utility services telephones, furniture and equipment.

On the other hand capital expenditures are spend on new construction, land and building acquisitions. This divides total expenditure into transfer and non- transfer expenditure. Generally, there is certain expenditure which does not result in corresponding of the transfer of real resources to the government. The payment of debt, unemployment benefit are examples of this expenditure. Here the governments usually transfer additional financial resources to some sections of the society. On the other hand non transfer payment may include the actual expenditure incurred by the government for the use of goods and services. To a large extent, the use of resources received in returns for non- transfer payment may also be for consumption or investment purpose. To this effect, one can say expenditure on defense, education energy, road, and infrastructure,are usually referred to as real expenditure, with respect to public expenditure categorization on component. It is because capital and recurrent expenditure result from different

period of benefit that financing differences exists, because capital expenditure confers benefits over several years, it is expected that the cost should be spread over the years of that benefit. Therefore if a health center is built and paid for the current, it would seem harsh expecting the total cost to be financed by current year's tax payers money.

Money Supply

Money is a collection of liquid assets that is generally accepted as a medium of exchange and for repayment of debt. In that role, it serves to economize on the use of scarce resources devoted to exchange, expands resources for production, facilitates trade, promotes specialization, and contributes to a society's welfare (Singh et al, 2011). The supply of money at any moment is the total amount of money in the economy at a point in time (Jhingan, 2006). In Nigeria, the narrow money supply (M1) is defined as currency outside bank plus demand deposits of commercial banks plus domestic deposits with the central banks less Federal Government deposits at commercial banks.

Exchange Rate

Conceptually, an exchange rate implies the price of one currency in terms of another. Exchange rate is the ratio between a unit of one currency and the amount of another currency for which that unit can be exchanged at a particular time (Ngerebo- and Ibe, 2013). In other words, exchange rate is the price of one currency vis-à-vis another and is the number of units of a currency required to buy another currency (Mordi, 2006). Exchange rate of currency is the link between domestic and foreign prices of goods and services. Also, exchange rate can either appreciate or depreciate. Appreciation in the exchange rate occurs if less unit of domestic currency exchanges for a unit of foreign currency while depreciation in exchange rate occurs if more unit of domestic currency exchanges for a unit of foreign currency.

Theoretical Framework

The theoretical framework of the study is anchored on the monetarist model because the theory is associated with economic growth, investment and productivity by human capital.

The Monetarist Theory

The monetarist are the twentieth century economist who criticize the model and lay emphasis on the importance of monetary policy especially money supply in stabilizing the economy. The monetarist led by Professor Milton-Friedman also regarded as the chief priest of the monetarist propounded in their discussions of the working of monetary policy, used a less-formal approach that allowed with to include multiple interest and wealth (or permanent income) no key variable in their discussions. They believed that there is a strong short run correlation between money, supply, GDP and price level. They also posit that long-run economic growth is independent of monetary change, being determined by basic growth factors such as expanding productive capacity, population growth, advancing technology and natural resources.

In the long-run, it is opined that monetary change affects only the price level. Thus, stabilization policy should seek a growth rate of money that closely approximate the long-run rate of growth of real productive capacity. It is a known phenomenon that less developing countries have abundant supply of labour and lack sufficient physical capital stock or saving that hold back their economic growth and development.

Macroeconomic variable therefore become an important tools to use by the government

to influence level of saving, national, improvement in the welfare and wealth of it's citizens and development of human capital.

Empirical Studies

Macroeconomic Variables and Life expectancy

Momodu (2014) examines public health activities and macroeconomic variables in Nigeria within a period of forty years (1970-2010). A test of causal relationships between government expenditure (GE) and other explanatory variables- GDP, unemployment (UER), inflation (IFR) Balance of payment (BOP) was examined using the following statistical tools -Augmented Dicky Fuller (ADF) stationarity test, Johanson's co-integration test, OLS, multiple regression analysis and Granger causality test. The time series data were found to be stationary in the short- run and a number of co-integrating equations were found to establish long-run relationships among the variables of study. The results include: 1. Public health was more effective though marginally in stimulating economic growth (measured by GDP) in the period of regulation and more effective in reducing unemployment and enhancing BOP in the period of regulation.2. With respect to maintaining price stability, the public sector was significantly more effective in the period of deregulation. Granger causality test shows causal flow from government expenditure (GE) to BOP no causal flows to GDP, inflation rate (IFR) and unemployment (UER). The studied therefore recommend appropriate policy mix improvement in quality of government expenditure, infrastructural development value-added export, regulated flow of FDI to retail sector, emphasis on import of capital good, and focus on the agricultural sector among others.

Bourne, Mills, Campbell-Smith, Sharpe-Pryce, Francis, Ikhalfani and Davis, (2014) examined the influence of macroeconomic variables on health indices, murder and mortality: a case of Jamaica studied how selected macroeconomic variables influence murder, mortality and ill health. The variables were on Health Indices, Murder and Mortality, interest rate, inflation rate, money supply, and government expenditure. Ordinary least square regression analyses were used to establish the model for 1) mortality, 2) murder and 3) ill-health. There was a strong correlation between murder and health insurance coverage (rs0.960; P0.0001), inflation (rs-0.861 P=0.0001), exchange rate (rs=0.950; P0.0001); a moderate relationship between mortality and health care utilization (rs0.654; P=0.001) and no bivariate relationship existed between murder and illness (rs-0.41 1, P=0.090).The reality is government should have a coherent policy in place to address these events, as every life lost through murder is important and represents a reduction in potential contribution to economic growth and development.

Temitope and Bola (2013) investigated the effect of health investment on economic growth in Nigeria, from 1977 to 2010. Using the vector error correction model, the study finds that there is a long run relationship between health expenditure and economic growth. The variables were health investment, private investment, per capita income, and degree of openness. The results from the study also reveal a positive relationship between health expenditure and economic growth in Nigeria. However, the results from the vector error correction model showed that in the short run, the impact of health expenditure on the economic growth did not converge to the long run growth. Investment in health could boost economic growth, if government invests more in this aspect of human capital.

Ewurum, Mgbemena, Nwogwu and Kalu, (2015) investigated the impact of health sector reforms on Nigeria's economic growth from 1990 -2013. The method of analysis is the Bound F-Test approach. The variables were on gross domestic product per capita, secondary school

enrolment and life expectancy at birth and HIV. Mortality Rate and ADIS. The result shows that there is a long-run co-integrating relationship existing among the variables of GDP per capita, improved sanitation facilities (LISF), mortality rate under 5 years (LMTU 5) and Out-of-pocket expenditure (ELOPE). It also shows that 58% of the total variation in GDP per capita is accounted for by the changes in LHIV/AIDS, LISF, LMTUS and LOPE. We therefore, recommend a universal policy of healthcare system that will guarantee the populaces' access to healthcare services. Similarly, there is need to reduce the out-of-pocket expenses, healthcare beneficiaries incur in Nigeria.

Boachie (2015) assessed the growth effect of health in Ghana is examined for the period 1982 to 2012. We use life expectancy at birth as a proxy for health, and real per capita GDP as a proxy for economic growth. After employing ARDL bounds test approach to co integration, and controlling for the effects of education, international trade, FDI, inflation, and accumulation of physical capital, we find that economic growth is significantly driven by health, both in the short and long run. However, the favorable growth effect of health in the short run is found to be lower. The implication is that improvement in health status of the population raises output in the economy. In this regard, policy should aim at raising health sector investment and strengthen the healthcare system to improve health status.

Employing annual time series data on Ghana from 1970-2006 and an error correction model that captures both short-run and long-run relationships; the analysis clearly captures the demand-size factors that motivates decision to allocate financial resources to the health sector. The main finding highlights the dominants of per capita income (Per capita GDP) and other macroeconomic factors such as health status of the population and age structure of the population in influencing the decision to invest in healthcare.

Onisanwa (2014) examined the impacts of health on Economic growth in Nigeria. The Co-integration, and Granger Causality techniques were used in analyzing Quarterly time series data of Nigeria for the period of 1995-2009. The study finds that GDP is positively influenced by health indicators in the long run and health indicators cause the per capita GDP. It reveals that health indicators have a long run impact on economic growth. Thus, the impact of health is a long run phenomenon.

Riman and Akpan (2010) investigate the causal direction and long run relationship between government health expenditure, poverty and health status, in Nigeria for the period 1970-2009. They employed the Granger causality test and Vector Error Correction Model (VECM) in establishing a strong causal bi-directional relationship running between life expectancy and poverty in Nigeria. Their study also reports the existence of a long-run relationship between poverty and health status. However, they found a non-significant longrun relationship between health status and government health expenditure. They conclude that policies that would improve health status should be such as would promote adult literacy level, reduce the poverty and income disparity since, increasing budgetary allocation to funding health sector alone without reducing poverty level, would not be sufficient to improve the health status of the country.

Lucian, Straciuc, Maghiarand Ciprian, (2010) examined the relationship between economic growth and health by using the results of some previous works and applying them on the recent data, in order to find out if the economic growth rate in the current European Union member countries is connected to the growth rates of various diseases, Based on the existing economic theories, they examine if the results found in literatures apply when regressing

different types of variables in the. EU member states for the period of 1995-2007. Their results show a positive relationship between the health of population and the GDP, with the causality in the relation between the real GDP and the economic growth directed from the economic growth to the diseases growth rates.

RESEARCH METHODOLOGY

Research Design and Sources of Data

The study use the ex-post facto research design to examine macroeconomic variables dynamic and unemployment rates in Nigeria. The data for the study was generated from the official publications of financial institutions such as CBN Statistical Bulletin, CBN Annual Report and Accounts. The data were extracted from the soft copies of the named sources as made available by the authorities on their websites. The time frame is expected to cover thirty seven (32) years from 1986 to 2018.

Model Specification

Model for Macroeconomic variables and health (life expectancy). The model for the study was adapted from the work of (Momodu, 2014) who studied public health and macroeconomic variable in Nigeria and its variable are:

$$PH = f(GOVT, UNE, NFL, BOP)$$

Where;

PH	=	Public Health
GOVT	=	Government Expenditure
UNE	=	Unemployment Rate
1NFL	=	Inflation Rate
BOP	=	Balance of Payment

This present study modified the model as

$$LIEX f(MS, JNF, EXCH, GOV, NT), \text{ Equation (1)}$$

Where:

LIEX	=	Life Expectancy
MS	=	Money Supply
INF	=	Inflation Rate
EXCH	=	Exchange Rate
GOV	=	Government Expenditure
INT	=	Interest Rate

The relationship can be explicitly formulated into a model thus:

$$LIEX = \alpha_0 + \alpha_1 MS + \alpha_2 EXR + \alpha_3 INFL + \alpha_4 GOV + \alpha_5 INT + p \quad - \quad \text{Equ 2}$$

Where α_0 is a constant or intercept, $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ and α_5 are the coefficients of the explanatory variables, p is stochastic error term.

DATA PRESENTATION AND ANALYSIS

Data Presentation

The logged data for this study was presented in the appendix. The data was logged to present the data in the same base before it was use for the analysis. Another reason is to achieve normality.

Analysis of Data

Table 1: Descriptive Statistics

Macroeconomic Variables and Life Expectancy						
Mean	48.25500	6.547237	68.07474	90.09474	11.67463	17.61579
Median	46.00000	6.611111	70.18000	97.40000	11.81725	17.68500
Maximum	54.49000	10.12982	8566000	360.5000	14.53615	29.80000
Minimum	45.00000	2.672078	3797000	0.610000	8.431766	7.750000
Sid. Dev.	2.971298	2.555846	1261960	91.21405	2.287401	4.626646
Observations	32	32	32	32	32	32

The summary statistics show that the average mean of life expectancy is about 48.2, money supply is 6.54, while average mean of inflation rate, exchange rate, government expenditure and interest rate were 6.547237, 68.07474, 90.09474, 11.67463 and 17.61579 respectively. The standard deviations of macroeconomic variables such as money supply, inflation rate, exchange rate, government expenditure and interest rate are 2.971298, 2.555846, 12.61960, 91.21505, 2.287401 and 4.626646. The value of the standard deviations indicate that there is wide spread in the life expectancy in Nigeria. This is also evident in the wide gap between the maximum and minimum values. For example, the maximum value of life expectancy is 54,49000 while the minimum is 45.000 with difference of 9.49. Similarly, the maximum of money supply is 10.12982 while the minimum is 2.672078. These performance variations are rather on the high side. Even in the case of inflation rate, the maximum is 85.66 and the minimum is 37/97. It is equally observed that exchange rate varied widely over time. For instance, exchange rate is 360.5 while its minimum value is 0.61. The wide variation over time indicates high level of fluctuation of macroeconomic variables which affects life expectancy.

Unit Root Test

The tests employed are the Augmented Dickey Fuller (ADF) test and the Phillips-Perron test (PP) Test. The null in both the ADF and PP is the presence of unit root.

Table 2: Augmented Dickey Fuller Test (ADF)

Variables	At Level	First Difference	Order of
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	t-Statistics	Prob.	t-Statistics	Prob.	Integration
MS	-2.264016	0.1892	-2.425122	0.1437	1(2)
INT	-4.656213	0.0007			1(0)
INF	-4.323464	0.0025			1(0)
EXR	1.753328	0.9995	-4.934566	0.0004	1(1)
GOVT UNE	-2.046787	0.2665	-4.355259	0.0050	1(1)
LEXP	0.848250	0.9932	-5.318523	0.0030	1(1)

Table 3: Augmented Dickey Fuller Test (ADF)

Variables	At Level		First Difference		Order of Integration
	t-Statistics	Prob.	t-Statistics	Prob.	
MS	-2.264016	0.1892	-2.425122	0.1437	1(1)
INT	-4.656213	0.0007			1(0)
INF	-4.323464	0.0025			1(0)
EXR	1.753328	0.9995	-4.934566	0.0004	1(1)
GOVT	-2.046787	0.2665	-4.355259	0.0050	1(1)
LEXP	0.848250	0.9932	-5.318523	0.0300	1(1)

Table 4: Augmented Dickey Fuller Test (ADF)

Variables	At Level		First Difference		Order of Integration
	t-Statistics	Prob.	t-Statistics	Prob.	
MS	-2.264016	0.1892	-5.575709	0.0010	1(1)
INT	-4.774825	0.0005			1(0)
INF	-2.775847	0.0730			1(0)
EXR	1.753328	0.9995	-4.927991	0.0004	1(1)
GOVT	-1.995253	0.2873	-3.355259	0.0150	1(1)
LEXP	1.624073	0.9932	-7.307302	0.0000	1(1)

The analyses of the stationarity of the variables were performed using the ADF and PP tests. Both tests showed similar result outcomes. The ADF result are shown on Table 3 while the PP results were in Table 4. From both Tables, the results for TNT find INF were integrated at levels. This suggests that the variables are stationary at their level forms. However, MS, EXR, GOVT, and LEXP were not stationary in their levels [1(0)], but were found stationary in the first differences 1(1). It is worthy of note that MS was not stationary at 1(0) and 1(1) using the ADF but was found stationary at 1(1) using the Pp. Thus the result of the PP was taken to imply that MS is stationary at 1(1).

These results of Unit root tests (stationarity test) showed that some of the variables (INT and INF) are stationary at level 1(0) while others including MS, EXR, GOVT, UNE, and LEXP are found stationary at first difference 1(1). The stationarity found at level suggests that the variable cannot be affected by changes in time series when they are employed in regression analysis. On the other hand, the variables that are stationary at first difference showed that they

respond to changes in time series. Based on the nature of the variables having a combination of I(0) and I(1) stationaries, the most suitable tool of analyses is the Autoregressive Distributive Lag (ARDL) technique.

Estimation of the Specified Models

The Autoregressive Distributive Lag (ARDL) technique was used to investigate the effect of macroeconomic variables on human capital development in Nigeria. The two forms of regression conducted are the Bound test and ARDL Short run regression estimation.

Table 5: ARDL Bounds Test for Long Run effect of Macroeconomic Variables on Health (Life Expectancy)

Model	F-Statistics	Lower Capital Value Bound at 5% Level	Upper Critical Value Bound at 5% Level
Health	17.6293*	2.62	3.79

*Significant at 5%

Source: Extracts from Eviews 9 Output on Appendix

From the results in Table 5, the critical bound values were computed at 5% level of significance. The lower critical bound value is 2.62 while the upper critical value is 3.79. The F-statistics is 17.6293. The results showed that life expectancy has F-statistics greater than the upper (3.79) and lower (2.62) critical bound values. This model with F-statistics that fall outside the critical bound values, suggest rejection of the null hypotheses. The results are summarized as follows:

Macroeconomic variables (money supply, exchange rate, inflation rate, government expenditure and interest rate) have significant long-run effect on healthcare in Nigeria.

Analyses of ARDL Long Run Coefficients and Error Correction

The model proved to have long run relationships in a macroeconomic variables and human capital development nexus. Thus, healthcare receives long-run macroeconomic shocks within the period under study within the periods under study.

Table 6: Model of the Long-Run Relationship between Macroeconomic Variable and Healthcare in Nigeria.

Cointegrating Form				
Variables	Coefficient	Std. Error	t-Statistics	Prob.
D(LEXP(-1))	-0.701181	0.113529	-6.176245	0.0085
D(LMS)	1.808202	0.798355	2.264909	0.1084
D(LMS(-2))	1.775394	0.656928	2.702572	0.0736
D(INF)	-0.039287	0.012490	-3.145357	0.0514
D(INF)	-0.010120	0.007587	-1.333873	0.2745
D(INF)	-0.005855	0.006464	-0.905756	0.4318
D(EXR)	0.001477	0.003060	0.482677	0.6624

D(EXR(-1))	0.005010	0.004918	1.018639	0.3834
D(EXR(-2))	0.007346	0.007258	1.012210	(1.3860
D(EXR(-3))	-0.008795	0.006212	-1.415787	9.2518
D(LGOVT)	0.645880	0.242784	2.660305	0.0763
D(LGOVT(-1))	2.420938	0.614234	3.941395	0.0291
D(LGOVT(-2))	-1.512428	0.467546	-3.234819	0.0480
D(ENT)	0.120896	0.030680	3.940548	0.0291
D(INT(-1))	-0.132958	0.031105	-4.274476	0.0235
D(INT(-2))	-0.140137	0.052271	-2.680974	9.0750
D(INT(-3))	0.040854	0.027654	1.477314	0.2361
CointEq(-1)	-0.250858	0.141613	-2.771432	0.0460
Long-Run Coefficients				
Variables	Coefficient	Std. Error	t-Statistics	Prob.
LMS	6.9854 17	3.760848	4.857405	0.0002
INF	-0.036831	0.069592	-0.529242	0.6333
EXR	-0.000997	0.023476	-0.042472	0.9688
LGOVT	2.381884	2.195660	3.084814	0.90574
INT	-2.113515	1.404145	-2.505198	0.0293
C	-14.450188	41.724640	-0.346323	0.7520

The result on Table 6 has a coefficient of error correction of -0.250858 and the corresponding probability value of 0.0460. The coefficient is rightly signed with a negative and a sign p.value that is less than 0.05 level of significance. Thus, this indicate that health an adjustment effect. This means that changes in healthcare as proxied life expectancy eventually return to the long-run equilibrium. This confirms the bound test result and thus posit that there is significant long-run relationship between macroeconomic variable and healthcare (life expectancy) in Nigeria. This generally implies that macroeconomic variables is an effective policy mechanism for controlling public health in Nigeria.

The result long-run equation showed that:

$$LEXP = 6.9854LMS - 0.0368INF - 0.0010EXR + 2.3819LGOVT - 2.1135INT - 14.4502.$$

The coefficients show that in the long-run, inflation, exchange rate and interest rate have positive relationships while money supply and government expenditure had positive relations with macroeconomic variables in Nigeria. The probability values are less than 0.05 ($p < 0.05$) for Money Supply (MS) and Interest Rate (INT) and greater than 0.05 ($p > 0.05$) for INF, EXR and GOVT. Thus, the study posit that government expenditure, inflation and exchange rates have no significant long-run relationship in the model. However, money supply (LMS) has a positive (6.985417) and significant ($p < 0.05$) effect on public health (life expectancy) in Nigeria. Also, interest rate (INT) has a negative (-2.113515) and significant ($p < 0.05$) effect on public health (life expectancy) in Nigeria.

Hypotheses Testing

HYPOTHESIS: Ho - Macroeconomic variables (money supply, interest rate, exchange rate, government expenditure, inflation rate) have no significant effect on life expectancy (public health) in Nigeria.

Table 7: Short Run Model of the Relationship between Macroeconomic Variables and Public Health in Nigeria

Dependent Variable: LEX1

Method: ARDL

Sample (adjusted): 1990 2018

Dynamic Regressors (4 lags, automatic): LMS INF EXR LGOVT INT

Variables	Coefficient	Std. Error	t-Statistics	Prob.*
LEXP(-1)	0.047961	.0153756	0.311931	0.7755
LEXP(-2)	0.701181	0.113529	6.176245	0.0085
LMS	1.808202	0.798355	2.264909	0.1084
LMS(-1)	0.972709	0.863799	1.126083	0.3421
LMS(-2)	0.746831	0.789965	0.945397	0.4142
LMS(-3)	-1.775394	0.656928	-3.702572	0.0436
INF	-0.039287	0.012490	-3.145357	0.0514
INF(-1)	0.014073	0.008444	1.666573	0.1942
INF(-2)	0.010120	0.007587	1.333873	0.2745
INF(-3)	0.005855	0.006464	0.905756	0.4318
EXR	0.001477	0.003060	0.482677	0.6624
EXR(-1)	0.001833	0.003114	0.588686	0.5975
EXR(-2)	-0.005010	0.004918	-1.018639	0.3834
EXR(-3)	-0.007346	0.007258	-1.02210	0.3860
EXR(-4)	0.008795	0.006212	1.415787	0.2518
LGOVT	0.645880	0.242784	2.660305	0.0763
LGOVT(-1)	0.179976	0.587910	0.306128	0.7795
LGOVT(-2)	-2.420938	0.614234	-3.941395	0.0291
LGOVT(-3)	-0.514860	0.489543	-1.051715	0.3702
LGOVT(-4)	1.512428	0.467546	3.234819	0.0480
INT	0.120896	0.030680	3.940548	0.0291
INT(-1)	0.177055	0.034199	5.177154	0.0140
INT(-2)	0.132958	0.031105	4.274476	0.0235
INT(-3)	0.140137	0.052271	2.680974	0.0750
INT(-4)	-0.040854	0.027654	-1.477314	0.2361
C	-3.624945	8.574446	-0.422761	0.7009
P-squared	0.999687			
F-statistics	383.7132	Durbin-Watson Stat		2.017034

Prob. (F-statistics)	0.000189
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The result of the short run effect of macroeconomic variables on public health as measured by life expectancy is shown on Table 10. From the ARDL, the coefficient of the dependent variable (LEXP) introduced as an endogenous variable in the model showed a positive value at lag 1 and lag 2 but significant effects only at lag of 2. This indicates that a unit increase in the public health of Nigerians will lead to further improved public health in the subsequent years two years. This suggests that public health is an endogenous variable in the model. This implies that previous status of the citizens' health predicts current year health in Nigeria.

Table 10 further revealed that Money Supply (M2) has positive relationships at current period and lag 2 but negative relationship at lag 3. However, only the lag 3 short run result has significant effect. This suggests that a unit change in money supply would bring about a positive change in life expectancy (public health) in Nigeria after three years.

Moreover, Inflation rate (INFL) showed a negative relationship at current year, and positive relationship at lags 1, 2 and 3, respectively. However, the p-value indicated significant effect only in the current period. This indicates that inflation rate has a significant positive effect on public health in the current period.

Again Exchange Rate (EXR) was found to have a positive relationship with public health current year, and lag 1, but negative relationship at lag 2, 3 and 4, respectively. The p-values show that the coefficients are statistically significant in the current year, lag 2 and 3. However, EXR was not found significant at all the short term periods. This suggests that exchange rate has no significant effect on public health in Nigeria.

However, Government Expenditure (GOVT) showed positive relationship with public health at current year and lags 1 and 4, and negative relationships in their lags 2 and 3, respectively. The probability values are less than 0.05 in periods of lags 2 and 4. This indicates that government expenditure has a significant negative effect on public health in the second year and a reversed positive effect in the fourth year. This means that government expenditure has mixed effect on public health in Nigeria.

The result of the Interest Rate (INTR) revealed positive effects from the current year to lag 3 and a negative effect in lag 4. The probability values indicate significant effects from the current year to the second year lag. This means that interest rate has a continuous significant positive short run effect on public health in Nigeria.

In the overall, the coefficient of determination (R^2) revealed that about 99% of the change in public health can be explained by macroeconomic variables in Nigeria. This is confirmed by a significant p-value of 0.0000 from the F-statistics (383.7132). The Durbin-Watson statistics of 0.17034 suggests that the result is reliable.

The results have shown that macroeconomic variables have a short-run significant effect on public health in Nigeria. Specifically, money supply, inflation rate, interest rate have a significant positive effect on public health, government expenditure has negative and positive effect after 2 and 4 years, respectively while exchange rate had no significant effect on public health.

Discussion of the Findings

This research examined the effect of macroeconomic variables on human capital development

proxy by unemployment. Data were sourced from the Central Bank of Nigeria (CBN) statistical bulletin and World Bank development indicator 2018. The data generated were subjected to statistical analysis and the following output was ascertained.

Macroeconomic variables and life expectancy: The study found that macroeconomic variables have a significant positive effect on life expectancy in Nigeria. The implication of these findings is that, for life expectancy to be functional to achieve their aim and purposes, Macroeconomic variables need to satisfy the expected needs of the individual, and must be seen to be fair or equitably satisfying to the individual. This further agreed with the findings of Temitope & Bola (2013), who found increase in macroeconomic variables increase the life expectancy. The Z findings also corroborate with the findings of Onisanwa (2011) that macroeconomic variables positively influence life expectancy.

SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATION

This study examined the effect of macroeconomic variables on the human capital development in Nigeria from the periods of 1986-2018 using life expectancy as proxy. The results of the study are summarized as follows:

Macroeconomic variables including money supply, inflation rate, exchange rate, government expenditure and interest rate, have a significant long run and short run effects on public health measured by life expectancy in Nigeria. Specifically, money supply, inflation rate, interest rate have a significant positive short run effect on public health; mixed (negative and positive) significant short run effect from government expenditure; and no significant effect from exchange rate.

The study has shown that macroeconomic variables are authentic policy instruments for long run management of human capital development in Nigeria, especially in the areas of public health. A combined management of money supply, inflation rate, exchange rate, government expenditure and interest rate has sufficient as short run policy instrument in managing the standard of living and public health of a developing economy as Nigeria. Money supply is the most powerful macroeconomic indicator of human development in Nigeria.

- i. It is therefore recommended that 'relevant policy instruments be put in place to enhance life expectancy through the creation of favourable socio economic environment. This can be achieved by effective manipulation of the relevant policy instruments such as redistribution of income, employment drive, and diversification of the economy away from oil dependent. These are necessary and highly important in actualizing the 70 year Life expectancy objective of Nigeria.
- ii. Private sector investment should be encouraged by the government at all levels to create employment opportunities. Government should decrease trade restriction and this will result in an increase in openness of trade.
- iii. Government should as a matter of urgency increase the education budget to accommodate the poor children on the street whose parents can not afford school fees.
- iv. That government should ensure stable macroeconomic policies and also increase its expenditure in the area of infrastructural developments and provision of more health care facilities to improve health delivery in Nigeria.

- v. Government should be proactive in ensuring that the literacy rate and Human Capital Development is encouraged by channeling more funds to educational development and the health sector to boost the nation's industries and productivity. This will in turn facilitate economic growth.

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