MACROECONOMIC POLICIES AND HEALTH STATUS IN NIGERIA

Abstract

This study investigates macroeconomic policies and health status in Nigeria. With the objective of ascertaining the most viable macroeconomic policy variables on health status of Nigerians, the study utilized secondary annual time series data spanning the period of 37years from 1981 and 2017. To test the existence of unit root in the series, the ADF stationarity test was carried and the result shows that all series were I(0) and I(1). The Johansen Co-integration results from the trace test and maximum eigen value indicate the presence of at least three co-integrating equations in the model, implying that a long run relationship exists between health status and macroeconomic variables. The bound test also corroborates the existence of long run association among the variables. Empirically, the estimates ultimately confirmed that public capital expenditure, domestic debt and financial deepening have long run significant impact on health status in Nigeria. Inflation is the only macroeconomic variable that does affect health status significantly. On the basis of the empirical findings, the study thus recommends that for health outcomes in Nigeria to improve, appropriate macroeconomic policy mix should be focused on capital expenditure, domestic debt and financial inclusion (making funds available to the poor and vulnerable in the society).

INTRODUCTION

The major macroeconomic goal of any nation is the maximization of welfare of the citizens. The government does this through the formulation and implementation of macroeconomic policies which could be fiscal or monetary in approach.

The welfare programmes of the government by means of social services in education and healthcare has proved important in national development in the developed world with lower poverty level and higher income.

Though there has been a remarkable improvement in macroeconomic performance in many Developing Countries in the 1970s and 2000s due to oil windfalls, its impacts on health conditions and poverty reduction are yet to be seen (Dzator and Hopkins, 2012). This is the typical situation in Nigeria.

The Nigerian health system has suffered low growth rate apparently due to macroeconomic policy inconsistency. One of the ways of looking at this is inadequate government spending and a continued reduction in the contribution of the health sector to the national economy. This has led to over dependency on Out-Of-Pocket expenditure for quality healthcare demand (Sambo, Ejebi, Adamu and Aliyu, 2011).

The attention of government in health sector which could be depicted by the annual public investment in the sector suggests that macroeconomic policies have tilted away from health sector. Following Abuja declaration (2001), the governments of less developed countries should spend a minimum of 15% of annual total government expenditure and 5% of GDP on public health in order to provide basic healthcare service to the citizens.

Statistical evidence (CBN, 2017) show that the proportion of the health sector to GDP stood at b1.6% in 2000, grew to 4.1% in 2005, but declined to 3.5% and less than 2% in 2010 and 2016 respectively. In the same vein, life expectancy at birth stood at 46 years in 2000, improved marginally to 48 years in 2005, and declined to 47 years in 2016 (WDI, 2018).

Infant mortality is a key indicator of health status in many developing nations. In Nigeria, infant mortality has been on the decline from 258.5 in 1970, 217.3, 213.2, 187.9 and 133.9 in 1980, 1990 and 2000 respectively, reaching 108.8 in 2015 (NBS, 2016). Though this decline in infant mortality trend is commendable, but the absolute figure is high when compared to the developed countries and other emerging nations. Again, some scholars have attributed the observed downward trend to better public policies in favour of the health sector by means of improved public healthcare spending.

In this regard, public health expenditure stood at #1.27 billion in 2008, increased to #257 billion and #304.33 billion in 2016 and 2017 respectively (NBS, 2017). Though these values appear large in absolute term, it is relatively low when compared with lower-resource nation with similar structural characteristics.

In Africa for instance, the allocation to health sector in Nigeria stands least amongst nations like Burkina Faso, Zambia, Malawi and Niger Republic. In 2012, Nigeria allocated 6% of her budget to the health sector, while 15.8%, 16.4%, 17.1% and 17.8% respectively was appropriated by the aforementioned countries.

2. LITERATURE REVIEEW

2.0 Conceptual Clarification

Macroeconomic Policy as a Concept

Essentially, monetary and fiscal policies constitute the two major macroeconomic policies used by the government to regulate, allocate and stabilize the economy.

Following Bakare(2003), monetary policy is a deliberate action undertaken to achieve the government stated objectives using monetary instruments such as money supply and interest rate. Similarly, monetary policy is further seen to mean a deliberate action employed by monetary authorities to control the quantity of money in an economy in order to direct it towards desired direction.

Fiscal policy becomes prominent following the Keynesian postulation of the general theory of trade, income and employment during the great depression in 1930s as a remedy.

Fiscal policy is a powerful stabilization instrument of government policy, which is used to decide the pattern of government expenditures and influence economic activities. Furthermore, it is an equilibrium restoration tool in the existence of inflationary and deflationary gaps and also for the correction of unemployment.

Bakare(2003) conceptualizes fiscal policy as changes in taxes and expenditures which aim at short-run goals of full employment and price stability. In review of this definition, it focuses on short-run analysis leaving effectiveness of fiscal policy in long-run. To overcome the limitation inherent in this definition, Jhingan(2016) defined fiscal policy as that part of government's overall economic policy which aims to achieve the state's economic objectives through the use of taxation, public spending and budget surplus or deficit. The definition of Powel is adequate for adoption by this study.

The overall objectives of macroeconomic policy (Monetary and Fiscal policy) are to attain the following:

i) Full-employment

In economic literature, full employment does not connote the absence of unemployment. It rather implies full capacity utilization of both human and non-health resources. In buttressing the point further, Bakare(2003) opines that the full employment government usually aims at is one with the smallest percentage of unemployment.

ii) Price stability

Inflation is a major macroeconomic problem in the world over, though it is more prevalent in Developing Countries. Frequency fluctuation in the aggregate price level is an indicator of a sick economy. Following this assertion, the fiscal policy that is aimed at stabilizing the general price level in the economy, that to curb wide gyration of prices, which upset the economy leading to either inflationary gaps.

iii) Economic growth and development

The actualization of economic growth and development has remained an integral objective of macroeconomic policy makers in developing and developed countries. While the problem of growth could be peculiar to the advanced world, issues of development are attributable to the developing nations to which Nigeria belongs. To this end, the attainment of a higher standard of living, coupled with improvement in social economic wellbeing of the people make the development. In analyzing the social economic welfare of the citizens, the concepts of good health and quality of education are sacrosanct. These can be attained through macroeconomic policies in terms of public provision and private public partnership. Other macroeconomic policy objectives include: attainment of favourable balance of payment, and exchange rate stability.

2.1 The Concept of Health Status

The concept of health status can best be understood by decomposing it into various indicators. Relevant indicators of health status in a developing country like Nigeria are Maternal Mortality, Child Mortality and Life Expectancy.

Maternal Health, Child Mortality and Life Expectancy

Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. While motherhood is often a positive and fulfilling experience, for too many women it is associated with suffering, ill-health and even death. The major direct causes of maternal morbidity and mortality include hemorrhage, infection, high blood pressure, unsafe abortion, and obstructed labour (Sambo et al., 2004).

According to the United Nations MDGs, the target for any nation, is to reduce by two –thirds between 1990 and 2015 the under –five-mortality rate and reduce by three quarters, between 1990 and 2015, the maternal mortality ratio. However, nearly 11 million children under the age of five die in the world every year or well over 1,200 every hour, most from easily preventable or treatable causes. Again, 500,000 women die in pregnancy or childbirth each year, or one every minute. Over her lifetime, a woman in sub-Saharan Africa faces a 1-in-16 chance of dying in childbirth compared with 1-in-160 in other regions of the world.

In Nigeria, statistics show that while the maternal mortality rate in the early 1990s was between 1400 and 1500, it dropped to 1000 per 100,000 live births in the late 1990s to 2001 in 1999, although the national maternal mortality rate was 704 per 100,000 live births, there was considerable regional variation. While the South West and South East recorded 165 per 100,000 and 286 per 100,000 the rates were much higher in the North West and North East, which had 1,025 per 100,000 and 1,549 per 100,000 respectively. The proportion of births attended by skilled medical personnel dropped from 45 percent in the early 1900s to 31 percent in 1998 but rose again to 42 percent in 2000. Again, only about 63 percent of the mothers received antenatal care from medically qualified personnel with 2.5 percent being attended to be traditional birth attendants (TBAs) during the five years before 2003 (Ogundipe and Adeniyi, 2011).

2.2 Theories of Health Production

Healthcare is like any other commodity, whose production requires factor inputs. In delivery healthcare services to the citizens, healthcare receivers would usually consider the cost and quality of the healthcare supplier. Essentially, to determine the optimal healthcare services to be supplied and demanded, expositions of theoretical frameworks are required. In line with this assertion, the works of Gossman (1972) and Deaton (2003) were reviewed.

2.2.1 Grossman's Theory of Healthcare Production (1972)

The study by Grossman (1972) depicts the pioneering effort to discuss to the evolution of Health Economics as an independent discipline. In his analysis, Grossman (1972) posits that an individual's Health Outcome is determined by two major factors: the initial health endowment at birth, and the level of healthcare demands. In furtherance to this analysis, Grossman (1972b) considered educational attainment as a key factor that determines individuals' health status. The position of Grossman was validated by Lleras-Muney (2002) who recognized education as a key input in the production of health outcomes. In review of this theory, health status does not in reality depends only on education, initial health endowment and healthcare demand but also on the quality the environment, nutrition and maternal life style.

2.2.2 Mckeown-Fogel Nutrition Theory of Health Outcomes

In a separate analysis, Mckeown (1976) and Fogel (2004) identified the impact of nutrition on health status. In their opinion, not only does healthcare demand determine health status, but the quality of food intake by the individual. Individuals with low level of income tend to consume a less balanced diet as against the rich who consume balanced diet. In line with this, those that consume balanced diet tend to be healthier that the poor who consume either of carbohydrates with the consequence of kwashiorkor. The strength of this theory lies in it recognition of income inequality amongst households which translates to the nutritional value of the family.

2.3 Methodological Review

Assessing the effects of public health expenditure on life expectancy and infant mortality in Nigeria with the aim of establishing the relationship between public health expenditure and health outcomes in Nigeria, Edeme, Dickson and Onabe (2017) employed the Ordinary Least Square technique

on data series from 1981 to 2014. The variables used are total public health expenditure, life expectancy, infant mortality, HIV/AIDS prevalence and population growth. Eneji, Dickson and Onabe (2013) employed a descriptive analysis and the multiple regression Ordinary Least Square methods to examine the causal relationship between health expenditure, health status and productivity in Nigeria, The variables used in the models include Real GDP a proxy for productivity, Recurrent and Capital Health expenditure, expenditures on workers health, child health and maternal health. Other control variables employed are unemployment and poverty incidence to obtain a well behaved model. In 2011, another study which is aimed at examining the relationship between health care expenditures and economic growth in Nigeria adopts the ordinary least square multiple regression analytical method (Bakare and Olubokun, 2011). The variables employed for the study include real GDP and Total Health Expenditure. Akhanolu et al. (2014) evaluate the impact of government spending on economic growth based on secondary data from 1970 to 2012. The study employ the instrumental variables two-stage least squares regression. Bakare (2012) employs the Ordinary Least Square multiple regression methodology for the analysis of data and submitted that the increase in government expenditure does not contribute to sustainable growth in Nigeria. The OLS which remains the handiest instrument of the econometrician is limited by several factors. It is produces a spurious result when applied to a small sample size data series. Again, the OLS does not perform efficiently when utilized to estimate data series that are not stationary at levels. This deficiency in the methodology adopted by these studies could have been responsible for the mixed results recorded in literature. Had the studies employed the VAR, VECM, or ARDL approach, the result obtained would have been more robust.

Studying the differences in the healthcare systems of the BRICS countries, Kulkarni (2016) based on fixed effect panel data analysis used variables such as Infant mortality rate, GDP per capita, insurance, public health expenditure, out-of-pocket expenditure, Carbon-dioxide emission, female workforce and dependency ratio. Fayissa(2008) estimate health production function for Sub–Saharan Africa based on Grossman framework using a fixed effect panel data analysis. These methodologies are similar. The major advantage of this method is that it free from the problems of autocorrelation. However, it is usually bedeviled by the problem of heteroscedasticity.

These studies also adopted the panel data analysis. Anyanwu et al, (2007) using an econometrical fixed effect panel data evidence linking African countries' per capita income and government health expenditures and per capita income to two health outcomes: infant mortality and under-five mortality. This relationship is examined, using data from 47 African countries between 1999 and 2004. Health expenditures have a statistically significant effect on infant mortality and under-five mortality. Haque and Kim (2003) examine the impacts of public investment on economic growth of 15 developing countries using dynamic panel data techniques and Devarajan, Swaroop and Zou(1996) examine the effects of different expenditure component on growth. The study covered 43 countries for periods of 1970 to 1990 and employed a fixed panel data analysis methodology.

Analysing the relationship between macroeconomic policy and health status at the state level in Nigeria is Bassey and Akpan (2012). The study employs the multivariate analytical technique to describe the relationship that exists between health care financing, health facility utilization and health outcome in Cross River State, Nigeria. The centre piece of the study was on women who are of child bearing age and who had given birth to at least one child within the past five years. The study stratified the state into two rural Local Government Areas and one Urban Local Government Area.

The defect in the previous methodologies reviewed has prompted the adopting of a more scientific methods. In this regard, Chete and Adeoye (2002) examine the empirical mechanics through which macroeconomic variables of human capital (education and healthcare) influences economic growth in Nigeria. To achieve this, the study used vector Auto regression analysis. Corroborating Chete and Adeoye (2002) methodologically is Usman, Mobolaji, Abdulkareem and Muhammed(2011) studied the relationship between public expenditure and growth in Nigeria. The study proxied public expenditure by public capital investment in human capital, infrastructure and administration and adopted the Vector Autoregression analysis.

Odubunmi, Saka and Oke(2012) employ the Vector Error Correction Method on data series from 1970- 2009 to analyse the long-run relationship between health care spending and economic growth in Nigeria. The study corroborates that of Filmer and Pritchett (1999) which investigate the causal direction and long run relationship between government health expenditure, poverty and health status, in Nigeria and adopted a similar methodology of Granger causality test and Vector Error Correction Model (VECM). Ayuba (2014) while investigating the causal relationship between public social expenditure (education and health) and economic growth in Nigeria for the period of 1990 to 2009 employed the Vector Error Correction Model (VEC) Model Based Causality test.

In Nigeria, Onisanwa (2014) assesses the impacts of health on Economic growth in using the Co-integration, and Granger Causality techniques in analysing Quarterly time series data for the period of 1995-2009. While Boussalem, Boussalem and Taiba (2014) studied the causality and co-integration relationships between public spending on health and economic growth from 1974-2014 using annual time series data for Algeria. The study adopts the Co-integration and Error Correction Model (ECM).

A phenomenal methodological exposition, adoption and incorporation were carried out by Kurt (2015) with the aims of testing the direct and indirect effects of health expenditures on economic growth in Turkey. The study employed The Feder–Ram model applied to aggregate and manufacturing industrial production as total output, total government health expenditures, general government cure and pharmaceutical products health expenditures, general government medicine and health expenditures series between the month of January, 2006 and November, 2013.

2.4 Empirical Review on health outcomes and macroeconomic policies

Freeland and Schendler (1983) examine health expenditures and economic growth between 1971 and 1981. During this period, health expenditures rose threefold from $83 million to $287 million according to their report. Expenditure growth in the health sector has increased faster than and outpaced the contribution of health to the gross national product. In addition, Strauss and Thomas (1998) stated that health and income mutually affect each other. They concluded that problems affecting health cause negative shocks in growth. Ayuba (2014) investigated the effects of health on economic growth for ten industrialized countries. By increasing the growth rate, changes in health have led to continuous growth leaps.
In addition, Adeniyi and Abiodun (2011) analysed the effects of health expenditure on the Nigerian economic growth, using data on life expectancy at birth, fertility rate, capital and

recurrent expenditures between 1985 and 2009 argues that if funds are judiciously expended in the health sector, the effects of this expenditure on the economic growth will be direct and substantial. Thus the need to improve the quality and type of health provided.

Onisanwa (2014) assesses the impacts of health on Economic growth in Nigeria using the Co-integration, and Granger Causality techniques in analysing Quarterly time series data of Nigeria for the period of 1995-2009. It was found that growth is positively amplified 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. This finding contradicts Ayuba (2014) that reports a growth to health causality as against health to growth for Nigeria.

Akhanolu, Babajide and Okafor(2014) evaluate the impact of government spending on economic growth based on secondary data from 1970 to 2012. The study reports that both capital expenditure and lagged-two capital expenditure positively and significantly impacts growth. Furthermore, internal debt stimulates economic growth and the overall thesis of the study is that more budgetary allocations be provided for capital projects, and the encouragement of Private Partnership model for capital projects in order to minimize corruption.

Muysken,Yetkiner and Ziesemer(2003) examine the effect of health investment on productivity as an important variable associated with human capital accumulation. The study also concentrates on the possible existence of endogeneity by using instrumental variables estimation. The results portray an evidence of the positive impact of health expenditure on income growth. Furthermore, the authors looked at the bounded gains of health status and divided the sample according to the median of total health expenditure and found that the countries with lower levels of health spending obtain larger benefits when the other determinants of growth are held constant.

Olaniyi and Adams (2000) examine the adequacy of the levels and composition of public expenditures and document that education and health expenditures have faced lesser cuts than external debt services and defence, but allocations to education and health sectors are inadequate when related to the benchmark and the performance of other countries.

Furthermore, Chete and Adeoye (2002), examine the empirical mechanics through which human capital influences economic growth in Nigeria. The result calls for re-allocation of resources in favour of health and education infrastructure for sustained growth to be recorded in the country. The study however, decried that the real capital expenditure on education and health have been lesser than required.

3. THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

3.1Theoretical Framework

Following the earliest work of Grossman (1972), the foundation for the analysis of health production function was laid. In recent time, scholars have adopted and adapted this study to suit their respective perspectives in health analysis. The work of Deepak and Umakant (2018) which investigates the effect of macroeconomic policies on public health status in India serves as the analytical framework for the model specification of this work.

3.2 Model Specification

$$HS = F(TCPE, MS/GDP, DD, INF) \quad (1)$$

HS is Nigerians health status proxied by Life Expectancy at birth
TCPE depicts total public capital expenditure as a proxy for fiscal policy
MS/GDP represents financial deepening (FD), a proxy for monetary policy
DD is the domestic debt level of the country another fiscal policy instrument
INF is Inflation rate

The model transforms to:

$$LE = F(TPE, FD, DD, INF) \quad (2)$$

The mathematical model is:

$$LE = \alpha_0 + \alpha_1 TCPE + \alpha_2 FD + \alpha_3 DD + \alpha_4 INF \quad (3)$$

The econometric model is:

$$LE = \alpha_0 + \alpha_1 TCPE + \alpha_2 FD + \alpha_3 DD + \alpha_4 INF + \mu \quad (4)$$

Having proposed the ARDL technique for the analytical process, the suitable model for estimation is hereby stated.

$$LogLE_t = \alpha_0 + \alpha_1 LogLE_{t-1} + \alpha_2 LogTCPE_t + \alpha_3 FD_t + \alpha_4 LogDD_t + \alpha_5 INF_t + \mu_t \quad (5)$$

Equation 5 above shows the endogeneity of all variables as assumed by the Autoregressive distributed lag model.

From equation 5 above,

LE_t = Life Expectancy at Birth

LE_{t-1} = Life Expectancy at birth lagged by one year

$TCPE_t$ = Total Public Capital Expenditure

FD_t = Financial Deepening

DD_t = Domestic Debt

INF_t = Inflation

$\alpha_0, \alpha_1, \alpha_2, \alpha_3,$ and α_4 are the direct elasticities or parameters to be estimated

μ_t = unobserved white noise error term.

3.3 a priori expectation

$\alpha_0 > 0$, $\alpha_1 > 0$, $\alpha_2 > 0$, $\alpha_3 > 0$, and $\alpha_4 < 0$

3.4 Sources of Data

Data for the study was collected from the Central Bank of Nigeria (CBN) Statistical Bulletin and World Development Indicators for years 2016 and 2018 respectively. The data was a time series data spanning the period of 37years from 1981 and 2017 on an annual basis.

3.5 Estimation Techniques

The techniques used for this work are ordinary least square (OLS) and auto regressive distributive lag (ARDL). Ordinary Least Square is considered for this work because of its properties which has been subjected to empirical analysis which was found to be efficient and unbiased, Auto Regressive Distributive Lag (ARDL) to test for long run and short run relationship between the dependent and the independent variables.

4. DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This section contains data analysis and discussion of results. Data for the study is a time series data between 1981 and 2017.

4.2: Unit Root Test (Augmented Dicky Fuller)

Table 4.1: Result of stationarity (unit root) test.

Variable	ADF Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Order of Integration
LNHS	-3.3195	-3.6329	-2.9484	-2.6129	I(1)
LNTPCE	-6.0565	-3.6329	-2.9484	-2.6129	I(1)

LNFD	-5.3126	-3.6329	-2.9484	-2.6129	I(1)
INFL	-3.0903	-3.6268	-2.9458	-2.6115	I(0)
LNDD	-4.2153	-3.6329	-2.9484	-2.6129	I(1)

Source: Author's Computation using E-Views (June, 2018).

From the ADF test, health status, total public capital expenditure, financial deepening and domestic debts are integrated of order one, while inflation rate is stationary at level, that its, integrated at order zero. This shows that the condition for the utilization of the ARDL has been met.

4.3: Johansen Co-integration Test

Co-integration test is used to determine if a long run relationship exists among the variables employed in the model. This study adopts the trace test and maximum Eigen Value to ascertain if a long run equilibrium relationship exists in the model.

Table 4.2: Result of Johansen Co-integration (Trace Test)

TRACE TEST				
Hypothesized No of CE(s)	**Eigen Value**	**Trace Statistic**	**0.05 critical value**	**Prob****
None*	0.6290	86.6801	69.8189	0.0013
At most 1*	0.4250	51.9754	47.8561	0.0195
At most 2*	0.4128	32.6086	29.7971	0.1231
At most 3	0.2298	13.9726	15.4947	0.0837
At most 4*	0.1290	4.8353	3.8415	0.0279

Source: Author's Computation using E-views (2018)

Table 4.3 Result of Johansen Co-integration test (Maximum Eigen Value)

MAXIMUM EIGEN VALUE				
Hypothesized No of CE(s)	**Eigen Value**	**Maximum Eigen Statistic**	**0.05 critical Value**	**Prob****

None*	0.6290	34.7046	33.8769	0.0398
At most 1	0.4250	19.3669	27.5843	0.3867
At most 2	0.4128	118.6359	21.1316	0.1079
At most 3	0.2298	9.1374	14.2646	0.2749
At most 4*	0.1290	4.8353	3.8415	0.0279

Source: Author's Computation using E-views (2018)

Table 4.2 and 4.3 represent the Trace and Maximum Eigen statistics for the model. The null hypothesis that there is no co-integration among the variable is rejected at 5% level of significance from the standpoint of both statistics. This shows the relationship between the dependent variable and the explanatory variables in the long-run. The trace test indicates the existence of at least three co-integrating equations, while the maximum Eigenvalue test confirms that at least one co-integrating equation exists among the variables in the model. Hence, the study resorts to the ARDL technique to estimate both the long run and short run estimates.

4.4: ARDL Estimation of Result

Table 4.4: ARDL Long and Short Run Result

Dependent Variable: LNHS

Long Run Estimates				**Short Run Estimates**			
Variable	**Coefficient**	**t-stat**	**Prob**	**Variable**	**Coefficient**	**t-stat**	**Prob**
	-	-		$LnHS_{t-1}$	0.24046**	2.5634	0.0248
LNTPCE	0.066068**	4.4600	0.0008				
FD	0.012776**	5.4110	0.0002	FD	-0.0025	-3.5868	0.0037
LNDD	0.062764**	4.9096	0.0004	LNTPCE	-8.39	-0.0311	0.9757
INF	0.002022	1.8708	0.0860	LNDD	-0.01698	-2.9331	0.0125
C	3.548762	107.91	0.000	INF	-2.94	-0.0411	0.9679
				C	-0.8533*	-2.5151	0.0272
Statistical Properties of Results							

R^2	0.9990
Adj R^2	0.9970
F-statistic	726.68
Prob(F-statistic)	0.0000
Durbin-Watson Stat	2.1500
Akaike Info Criterion	-8.523
Schwarz Criterion	-7.571

Source: Author's Computation using E-views 10 (2018)

Table 4.5: Bound Test

Estimated Model:)

Optimal Lags: (3, 3, 2, 4, 4)

F- Statistics: 5.06*

Level of significance	Lower Bound	Upper Bound
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Author's Computation using E-views 10 (2018)

4.4 Discussion of Results

Table 4.5 shows that F-statistic 5.06 is greater than the 5% and 10% lower and upper bound test and we can therefore conclude that there is co-integration among the variables; hence, a long run relationship exists among the variables.

The long run estimates result show that public capital expenditure, financial deepening, inflation, and domestic debts have significant impacts on health status of Nigerians. However, TPCE and INF did not conform to theory, but all other variables are rightly signed. The fact that TPCE has a negative effect on HS Nigeria could be attributed to the limited size of capital expenditure as a proportion of the total budget. Furthermore, the existence of high level of corruption which mars the implementation of capital budget in Nigeria provides justification for the empirical findings, though this is uncommon in literature, but it corroborates study that have incorporated public sector corruption in their models, (Yaqub et al., 2013). In addition, though inflation has a positive effect on health status, but the effect is not significant at 5% significance level. Both domestic debt and financial deepening have statistically significant impact on health status of Nigerians. Numerically, a percent rise in TPCE reduces health status of Nigerians by 6.6 percent; this effect is significant at 0.01 as confirmed by the probability value of 0.0008. It is also evident that financial deepening has a positively significant impact on health status in Nigeria. Here, a percent increase in financial deepening causes a 1.28 percent improvement in health status of Nigerians. Other macroeconomic policy variables that positively affect health status are domestic debt and inflation rate. While domestic debt has a significant impact on health status, the impact of inflation is not significant at 5% level. As found by empirical evidence, when domestic debt increases by a percent, health status improves by about 6.28 percent. This could be justified by the fact that domestic debt is non-inflationary to the economy and its re-investment into the domestic economy stimulates economic activities which results in growth, employment, income, improved medical services and better health.

The coefficient of determination (R^2) result shows that over 99 percent of the variation in dependent variable is accounted for by the changes in the explanatory variables. This shows that the model has a good fit.

The F statistic shows the overall significance of the model with a calculated value of 724.68 which is higher that the tabulated value at 0.05 level of significance. This is also obvious in the probability value (f-statistic = 0.0000).

The Durbin-Watson statistic of 2.15 suggests the absence of autocorrelation amongst the variables in the model and the error term. This shows that the result obtained are reliable for policy making.

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This study examined the impact of macroeconomic policies on health status in Nigeria. The result of the econometric analysis shows that a long run equilibrium relationship exists between health status and macroeconomic policies variables in the country. We can therefore conclude the following from our findings:

- Macroeconomic policies have significant impacts on health status in Nigeria.
- Specifically, as public capital expenditure increases, health status deteriorates. Hence, capital expenditure has not been targeted towards welfare promotion of Nigerians.
- Inflation plays no significant role in the determination of Nigerians health status.
- Domestic debt promotes health outcomes in the country.
- Financial deepening or inclusion promotes better health status of Nigerians.

5.2 Recommendations

Based on the reliability of the results of the study, the following recommendations were provided.

- Government should increase the proportion of capital expenditure to the health sector if health status would be improved over time.
- To finance health sector projects, government should look up to domestic borrowings rather than foreign borrowings. This is because; domestic debt is non-inflationary and not subjected to exchange rate pressure. Domestic debt promotes macroeconomic stability which on the aggregate significantly impact on health status in the country.
- To promote health indices in the country, better financial inclusion by means of employment generation, loans to businesses and conditional cash transfer are strongly recommended as they have the capacity to drive the demand for quality health care services which would result in improved health outcome.

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Appendix

Output of Econometrical Analysis

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.319465	0.0215
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNHS,2)
Method: Least Squares
Date: 06/26/18 Time: 11:35
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNHS(-1))	-0.502326	0.151327	-3.319465	0.0022
C	0.002345	0.001136	2.063776	0.0470

R-squared	0.250321	Mean dependent var	-7.28E-05
Adjusted R-squared	0.227604	S.D. dependent var	0.005871
S.E. of regression	0.005159	Akaike info criterion	-7.640541
Sum squared resid	0.000878	Schwarz criterion	-7.551664
Log likelihood	135.7095	Hannan-Quinn criter.	-7.609861
F-statistic	11.01885	Durbin-Watson stat	2.260330
Prob(F-statistic)	0.002208		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.056539	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNTPCE,2)
Method: Least Squares
Date: 06/26/18 Time: 11:36
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNTPCE(-1))	-1.049551	0.173292	-6.056539	0.0000
C	0.142328	0.060126	2.367146	0.0239

R-squared	0.526418	Mean dependent var	0.005249
Adjusted R-squared	0.512067	S.D. dependent var	0.471780
S.E. of regression	0.329549	Akaike info criterion	0.673259
Sum squared resid	3.583873	Schwarz criterion	0.762136
Log likelihood	-9.782031	Hannan-Quinn criter.	0.703939
F-statistic	36.68166	Durbin-Watson stat	1.975381
Prob(F-statistic)	0.000001		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.312567	0.0001
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FD,2)
Method: Least Squares
Date: 06/26/18 Time: 11:37
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FD(-1))	-0.931118	0.175267	-5.312567	0.0000
C	0.269580	0.266143	1.012915	0.3185

R-squared	0.460990	Mean dependent var	-0.031006
Adjusted R-squared	0.444656	S.D. dependent var	2.064547
S.E. of regression	1.538529	Akaike info criterion	3.754975
Sum squared resid	78.11333	Schwarz criterion	3.843852
Log likelihood	-63.71207	Hannan-Quinn criter.	3.785656
F-statistic	28.22336	Durbin-Watson stat	1.982961
Prob(F-statistic)	0.000007		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.090310	0.0363
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF)
Method: Least Squares
Date: 06/26/18 Time: 11:38
Sample (adjusted): 1982 2017

Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.438602	0.141928	-3.090310	0.0040
C	8.782321	3.835612	2.289679	0.0284

R-squared	0.219289	Mean dependent var	-0.075000
Adjusted R-squared	0.196326	S.D. dependent var	17.05963
S.E. of regression	15.29359	Akaike info criterion	8.346698
Sum squared resid	7952.396	Schwarz criterion	8.434671
Log likelihood	-148.2406	Hannan-Quinn criter.	8.377403
F-statistic	9.550018	Durbin-Watson stat	1.651791
Prob(F-statistic)	0.003972		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.215268	0.0022
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNDD,2)
Method: Least Squares
Date: 06/26/18 Time: 11:39
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNDD(-1))	-0.776168	0.184132	-4.215268	0.0002
C	0.139489	0.045031	3.097610	0.0040

R-squared	0.349990	Mean dependent var	-0.013431
Adjusted R-squared	0.330293	S.D. dependent var	0.192865
S.E. of regression	0.157832	Akaike info criterion	-0.799125
Sum squared resid	0.822062	Schwarz criterion	-0.710248
Log likelihood	15.98468	Hannan-Quinn criter.	-0.768444
F-statistic	17.76848	Durbin-Watson stat	1.887874
Prob(F-statistic)	0.000182		

Co-integrating Test

Date: 06/26/18 Time: 11:42
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments
Trend assumption: Linear deterministic trend
Series: LNHS LNTPCE FD LNDD INF
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.629003	86.68006	69.81889	0.0013
At most 1 *	0.424974	51.97543	47.85613	0.0195
At most 2 *	0.412838	32.60856	29.79707	0.0231
At most 3	0.229771	13.97264	15.49471	0.0837
At most 4 *	0.129033	4.835282	3.841466	0.0279

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.629003	34.70463	33.87687	0.0398
At most 1	0.424974	19.36687	27.58434	0.3867
At most 2	0.412838	18.63592	21.13162	0.1079
At most 3	0.229771	9.137361	14.26460	0.2749
At most 4 *	0.129033	4.835282	3.841466	0.0279

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNHS	LNTPCE	FD	LNDD	INF
-12.60360	-0.927858	0.187965	0.825006	0.065953
-33.07968	1.007594	0.790794	-1.262309	-0.015287
52.14099	3.839822	-0.233649	-4.273835	0.071652
30.87198	0.008323	-0.119346	-1.040326	0.002360
31.64343	-0.407403	-0.121580	0.133103	0.018779

Unrestricted Adjustment Coefficients (alpha):

D(LNHS)	-0.002020	8.68E-05	0.001190	-0.001762	-2.21E-05
D(LNTPCE)	0.167800	-0.101227	-0.030351	-0.013831	-0.057571
D(FD)	-0.418795	-0.588752	0.244786	0.332734	-0.038968
D(LNDD)	0.002484	0.045637	0.023348	0.039735	-0.032528
D(INF)	-6.054403	0.628004	-6.241669	1.147402	-1.822294

1 Cointegrating Equation(s):		Log likelihood	-31.36969	

Normalized cointegrating coefficients (standard error in parentheses)

LNHS	LNTPCE	FD	LNDD	INF
1.000000	0.073619	-0.014914	-0.065458	-0.005233
	(0.04012)	(0.00683)	(0.04234)	(0.00098)

Adjustment coefficients (standard error in parentheses)

D(LNHS)	0.025464
	(0.01048)
D(LNTPCE)	-2.114877
	(0.62779)
D(FD)	5.278319
	(2.97288)
D(LNDD)	-0.031311
	(0.34759)
D(INF)	76.30725
	(29.0138)

2 Cointegrating Equation(s):		Log likelihood	-21.68625	

Normalized cointegrating coefficients (standard error in parentheses)

LNHS	LNTPCE	FD	LNDD	INF
1.000000	0.000000	-0.021274	0.007835	-0.001205
		(0.00288)	(0.00554)	(0.00048)
0.000000	1.000000	0.086398	-0.995575	-0.054719
		(0.06354)	(0.12238)	(0.01052)

Adjustment coefficients (standard error in parentheses)

D(LNHS)	0.022592	0.001962
	(0.02944)	(0.00114)
D(LNTPCE)	1.233673	-0.257690
	(1.62802)	(0.06299)
D(FD)	24.75406	-0.204641
	(7.36252)	(0.28488)
D(LNDD)	-1.540961	0.043678
	(0.92730)	(0.03588)
D(INF)	55.53308	6.250402
	(81.3819)	(3.14897)

3 Cointegrating Equation(s):		Log likelihood	-12.36829	

Normalized cointegrating coefficients (standard error in parentheses)

LNHS	LNTPCE	FD	LNDD	INF
1.000000	0.000000	0.000000	-0.025788	0.012274
			(0.01317)	(0.00182)
0.000000	1.000000	0.000000	-0.859028	-0.109458
			(0.12823)	(0.01774)
0.000000	0.000000	1.000000	-1.580440	0.633575
			(0.69166)	(0.09569)

Adjustment coefficients (standard error in parentheses)

D(LNHS)	0.084624	0.006530	-0.000589
	(0.05046)	(0.00326)	(0.00068)
D(LNTPCE)	-0.348872	-0.374233	-0.041418

	(2.87577)	(0.18603)	(0.03859)
D(FD)	37.51744	0.735293	-0.601494
	(12.7793)	(0.82667)	(0.17149)
D(LNDD)	-0.323584	0.133330	0.031101
	(1.62730)	(0.10527)	(0.02184)
D(INF)	-269.9137	-17.71650	0.816967
	(124.361)	(8.04473)	(1.66889)

4 Cointegrating Equation(s): Log likelihood -7.799614

Normalized cointegrating coefficients (standard error in parentheses)

LNHS	LNTPCE	FD	LNDD	INF
1.000000	0.000000	0.000000	0.000000	0.030451
				(0.00480)
0.000000	1.000000	0.000000	0.000000	0.496028
				(0.09192)
0.000000	0.000000	1.000000	0.000000	1.747549
				(0.27730)
0.000000	0.000000	0.000000	1.000000	0.704850
				(0.12315)

Adjustment coefficients (standard error in parentheses)

D(LNHS)	0.030220	0.006516	-0.000379	-0.005028
	(0.05110)	(0.00297)	(0.00062)	(0.00339)
D(LNTPCE)	-0.775856	-0.374348	-0.039767	0.410320
	(3.19702)	(0.18572)	(0.03891)	(0.21183)
D(FD)	47.78959	0.738063	-0.641204	-0.994647
	(13.5287)	(0.78592)	(0.16466)	(0.89641)
D(LNDD)	0.903115	0.133660	0.026359	-0.196680
	(1.73374)	(0.10072)	(0.02110)	(0.11488)
D(INF)	-234.4912	-17.70695	0.680029	19.69454
	(137.642)	(7.99603)	(1.67522)	(9.12012)

OLS RESULT

Dependent Variable: LNHS
Method: Least Squares
Date: 06/26/18 Time: 11:45
Sample: 1981 2017
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTPCE	-0.017968	0.006875	-2.613398	0.0135
FD	0.007637	0.001474	5.180027	0.0000
LNDD	0.029406	0.007565	3.886990	0.0005
INF	-0.000589	0.000184	-3.203417	0.0031
C	3.660275	0.013029	280.9355	0.0000

R-squared	0.928870	Mean dependent var	3.853661
Adjusted R-squared	0.919979	S.D. dependent var	0.063159
S.E. of regression	0.017867	Akaike info criterion	-5.086685
Sum squared resid	0.010215	Schwarz criterion	-4.868994
Log likelihood	99.10368	Hannan-Quinn criter.	-5.009939
F-statistic	104.4705	Durbin-Watson stat	0.823155

Prob(F-statistic)	0.000000

ARDL TEST

Dependent Variable: LNHS
Method: ARDL
Date: 06/26/18 Time: 11:48
Sample (adjusted): 1985 2017
Included observations: 33 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LNTPCE FD LNDD INF
Fixed regressors: C
Number of models evalulated: 2500
Selected Model: ARDL(3, 3, 2, 4, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNHS(-1)	0.939437	0.268409	3.500018	0.0044
LNHS(-2)	-0.146737	0.346713	-0.423223	0.6796
LNHS(-3)	0.447759	0.231416	1.934868	0.0769
LNTPCE	-8.39E-05	0.002699	-0.031077	0.9757
LNTPCE(-1)	0.013201	0.003382	3.903628	0.0021
LNTPCE(-2)	0.007497	0.004129	1.815669	0.0945
LNTPCE(-3)	-0.004727	0.003980	-1.187910	0.2578
FD	-0.002466	0.000688	-3.586836	0.0037
FD(-1)	0.000586	0.000964	0.608105	0.5545
FD(-2)	-0.001192	0.000561	-2.123472	0.0552
LNDD	-0.016979	0.005789	-2.933142	0.0125
LNDD(-1)	0.017135	0.011887	1.441507	0.1750
LNDD(-2)	0.004017	0.008852	0.453726	0.6581
LNDD(-3)	-0.004627	0.007931	-0.583436	0.5704
LNDD(-4)	-0.014638	0.007075	-2.068827	0.0608
INF	-2.94E-06	7.16E-05	-0.041074	0.9679
INF(-1)	-0.000138	6.35E-05	-2.168475	0.0509
INF(-2)	-4.75E-05	7.82E-05	-0.606666	0.5554
INF(-3)	-0.000204	7.70E-05	-2.648300	0.0212
INF(-4)	-9.44E-05	8.04E-05	-1.173918	0.2632
C	-0.853334	0.339283	-2.515109	0.0272

R-squared	0.999175	Mean dependent var	3.860236
Adjusted R-squared	0.997800	S.D. dependent var	0.063822
S.E. of regression	0.002994	Akaike info criterion	-8.523620
Sum squared resid	0.000108	Schwarz criterion	-7.571297
Log likelihood	161.6397	Hannan-Quinn criter.	-8.203192
F-statistic	726.6852	Durbin-Watson stat	2.156171
Prob(F-statistic)	0.000000		

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

BOUND TEST

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNHS)
Selected Model: ARDL(3, 3, 2, 4, 4)
Case 2: Restricted Constant and No Trend
Date: 06/26/18 Time: 11:49
Sample: 1981 2017
Included observations: 33

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.853334	0.339283	-2.515109	0.0272
LNHS(-1)*	0.240460	0.093804	2.563439	0.0248
LNTPCE(-1)	0.015887	0.005506	2.885571	0.0137
FD(-1)	-0.003072	0.000930	-3.305108	0.0063
LNDD(-1)	-0.015092	0.005995	-2.517376	0.0270
INF(-1)	-0.000486	0.000133	-3.650779	0.0033
D(LNHS(-1))	-0.301022	0.309733	-0.971878	0.3503
D(LNHS(-2))	-0.447759	0.231416	-1.934868	0.0769
D(LNTPCE)	-8.39E-05	0.002699	-0.031077	0.9757
D(LNTPCE(-1))	-0.002770	0.006027	-0.459530	0.6541
D(LNTPCE(-2))	0.004727	0.003980	1.187910	0.2578
D(FD)	-0.002466	0.000688	-3.586836	0.0037
D(FD(-1))	0.001192	0.000561	2.123472	0.0552
D(LNDD)	-0.016979	0.005789	-2.933142	0.0125
D(LNDD(-1))	0.015248	0.006062	2.515501	0.0271
D(LNDD(-2))	0.019265	0.006234	3.090042	0.0094
D(LNDD(-3))	0.014638	0.007075	2.068827	0.0608
D(INF)	-2.94E-06	7.16E-05	-0.041074	0.9679
D(INF(-1))	0.000346	0.000102	3.379393	0.0055
D(INF(-2))	0.000298	6.00E-05	4.974148	0.0003
D(INF(-3))	9.44E-05	8.04E-05	1.173918	0.2632

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTPCE	-0.066068	0.014814	-4.459984	0.0008
FD	0.012776	0.002361	5.411020	0.0002
LNDD	0.062764	0.012784	4.909577	0.0004
INF	0.002022	0.001081	1.870794	0.0860
C	3.548762	0.032887	107.9064	0.0000

EC = LNHS - (-0.0661*LNTPCE + 0.0128*FD + 0.0628*LNDD + 0.0020*INF + 3.5488)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)

			Asymptotic: n=1000	
F-statistic	5.057214	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
			Finite Sample: n=35	
Actual Sample Size	33			
		10%	2.46	3.46
		5%	2.947	4.088
		1%	4.093	5.532
			Finite Sample: n=30	
		10%	2.525	3.56
		5%	3.058	4.223
		1%	4.28	5.84