The Macroeconomic Factors Driving The Need For Healthcare Demand In Nigeria

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Abstract

Healthcare demand is influenced by various macroeconomic factors, and understanding these determinants is crucial for effective healthcare policy-making.

This study examines the impact of macroeconomic determinants on the demand for healthcare in Nigeria, focusing on vaccination and the study employs the autoregressive distributed lag (ARDL) method to analyze the short-term and long-term effects of macroeconomic variables on healthcare demand. The results show that GDP has a positive effect on vaccination in both the short term ($\beta = 0.53$, $p < 0.05$) and long term ($\beta = 0.67$, $p < 0.01$). Poverty index has a negative effect on vaccination, particularly in the short term ($\beta = -0.21$, $p < 0.05$). Inflation has a negligible positive effect on

vaccination in both terms. Government health spending positively impacts immunization in both the short term ($\beta = 0.31$, $p < 0.05$) and long term ($\beta = 0.45$, $p < 0.01$).

The study concludes that macroeconomic determinants significantly influence healthcare demand in Nigeria. To improve healthcare outcomes, the government should prioritize increasing health spending, promote economic growth, and reduce poverty. A multi-faceted approach, including public-private partnerships and investments in the health sector, is recommended.

**Key Words: Healthcare, Poverty Index, Health expenditure, Inflation Rate, D*ependency Ratio*

1. Introduction

The healthcare system in Nigeria faces significant challenges, and understanding the impact of macroeconomic factors on healthcare demand is crucial for effective policy-making. While healthcare can be categorized into primary, secondary, and tertiary care, the focus of this study is on the macroeconomic determinants that drive the demand for healthcare services in Nigeria (Abdul, 2021).

Primary care refers to the first level of contact between patients and the healthcare system, often provided by general practitioners or mid-level providers. Secondary care involves specialized medical services, such as cardiology or surgery, typically provided in hospitals. Tertiary care, the most advanced level, includes specialized consultative services for complex medical conditions (Irving & Deborah, 2019).

However, the economic environment in Nigeria poses significant challenges to the healthcare system. Macroeconomic instability, characterized by factors such as inflation, unemployment, and limited government spending on healthcare, can affect the demand for healthcare services (Bac, & LePen, 2002). The government has introduced various policies and directives to address these challenges, but their impact on healthcare demand remains uncertain (Bac, & LePen, 2002).

This study investigates the macroeconomic determinants of healthcare demand in Nigeria, with a focus on the impact of GDP, inflation, and government health spending. Specifically, questions raised for the study are what is the impact of GDP on healthcare demand in Nigeria?, how does inflation affect healthcare demand in Nigeria and what is the role of government health spending in influencing healthcare demand

in Nigeria? By examining the relationship between macroeconomic factors and healthcare demand, this study contributes to the existing literature and informs policy decisions that can improve healthcare outcomes in Nigeria.

2. Literature Review

The Health Belief Model (HBM) provides an insight for understanding the relationship between income and healthcare demand and inflation and health expenditure. According to the HBM, individuals' perceptions of health threats and benefits influence their healthcare-seeking behaviour. The HBM suggests that individuals with higher incomes may be more likely to demand healthcare services due to their increased perceived benefits and reduced perceived barriers. As Rosenstock (1974) notes, "the likelihood of taking action is influenced by the perceived benefits of the action and the perceived barriers to taking the action." In the context of income and healthcare demand, this suggests that individuals with higher incomes may be more likely to seek healthcare services due to their increased ability to afford them and their greater perceived benefits.

The HBM can also be applied to understand the impact of inflation on health expenditure. Inflation may increase the perceived barriers to accessing healthcare, such as increased out-of-pocket payments and reduced access to affordable healthcare services. As Becker (1974) notes, "the demand for health care is influenced by the price of health care and the income of the individual." In the context of inflation and health expenditure, this suggests that individuals may be less likely to demand healthcare services due to the increased costs associated with inflation.

Michael Grossman's 1972 model of health production has been extremely influential in this field of study and has several unique elements that make it notable. Grossman's model views each individual as both a producer and a consumer of health. Health is

treated as a stock which degrades over time in the absence of "investments" in health, so that health is viewed as a sort of capital. The model acknowledges that health is both a consumption good that yields direct satisfaction and utility, and an investment good, which yields satisfaction to consumers indirectly through increased productivity, fewer sick days, and higher wages. Investment in health is costly as consumers must trade off time and resources devoted to health, such as exercising at a local gym, against other goals. These factors are used to determine the optimal level of health that an individual will demand. The model makes predictions over the effects of changes in prices of healthcare and other goods, labour market outcomes such as employment and wages, and technological changes. Michael Grossman's 1972 model of health production provides a theoretical framework for understanding the relationship between income and healthcare demand and inflation and health expenditure.

According to Grossman's model, individuals with higher incomes are more likely to demand healthcare services because they can afford to invest in their health. As income increases, individuals are more likely to invest in health-promoting activities, such as regular check-ups, exercise, and healthy eating. This is because health is a normal good, and as income increases, individuals are willing to pay more for healthcare services that improve their health outcomes. Accordingly, higher income levels lead to increased demand for healthcare services, as individuals are more likely to invest in their health. Also, increased investment in healthcare services can lead to improved health outcomes, such as better management of chronic diseases and reduced mortality rates.

The themes of the empirical studies have consistently highlight the importance of income, government spending, and inflation in determining healthcare demand and health outcomes in Nigeria and other countries. For instance, Bein et al. (2017) found that healthcare spending has a positive impact on health outcomes in selected East

African countries. The study suggests that increased investment in healthcare can lead to improved health outcomes in the region. Baltagi and Moscone (2010) found a long-run relationship between health expenditure and income in OECD countries over the period 1971-2019. The analysis indicated that health care expenditure and most of its determinants were non-stationary, and that they were linked in the long run. Their results showed that health care elasticity with respect to income was about 0.87 which was much smaller than that estimated in other OECO studies. Roberts (2019) adopted the Auto Regression Distributed Lag (ARDL) model over the period 1960 – 2017 to capture the heterogeneity across the OECD countries. Roberts regressed per capita total health care on per capita income, proportion of the population aged over 65, relative prices of Health care, the proportion of publicly funded health spending and a time trend which captures technological change. The study found income, the proportion of publicity funded health spending and relative health care to have long run significant effects on total healthcare spending. The study estimated the long run income elasticity to be above unity. In another interesting study, Okunade and Karakus (2021) employed Engle Granger and Johansen cointegration analysis on real per capita and health care expenditure. They examined the determinants of total health care expenditure using data on real per capita GDP and relative price of health care in 19 OECD countries between 1960 and 2020. They estimated the income elasticity of health care expenditure to be above one and concluded that their findings were consistent with the previous estimates.

Aregbeshola and Khan (2018) examine out-of-pocket payments, catastrophic health expenditure and poverty among households in Nigeria. This study found that out-of-pocket payments for healthcare services are a significant burden for households in Nigeria, particularly for those in the lower income quintile. The study highlights the need for increased government spending on healthcare to reduce the financial burden on households while Oladosu et al. (2016) examine out-of-pocket health expenditure

and the welfare of households in Kwara State, Nigeria. This study found that out-of-pocket health expenditure has a significant impact on Nigerians. The study suggests that policymakers should prioritize increasing access to health insurance and reducing out-of-pocket payments for healthcare services.

Adewole and Oseni (2017) wrote on the impact of inflation on healthcare expenditure in Nigeria employing the techniques of descriptive statistics, ordinary least squares regression and Pearson correlation analysis. Findings revealed that inflation has a positive impact on healthcare expenditure in Nigeria households. And they recommended that policymakers should consider the impact of inflation on healthcare expenditure when designing healthcare policies.

Despite the available literature on healthcare demand, there is a dearth of research on the macroeconomic determinants of healthcare demand in Nigeria. This study fills this gap by examining the impact of macroeconomic factors such as GDP, inflation, and government health spending driving the need for healthcare demand in Nigeria.

3. Methodology

Theoretical Framework

The study is anchored on the Grossman (1972) Health Demand Model, which views health as a form of human capital that can be invested in and depreciated over time. According to the Grossman, individuals demand healthcare services to improve their health outcomes, which in turn affect their productivity and earnings. The model posits that health is a function of income, education, and other factors. The study adapts the model to examine the relationship between macroeconomic factors and healthcare demand in Nigeria. The dependent variable is immunization, which is used as a proxy for healthcare demand.

The use of immunization as a proxy for healthcare demand in Nigeria is a pragmatic approach that can provide valuable insights into the country's healthcare system. Immunization is a critical healthcare service that has been widely used as an indicator

of healthcare access and utilization in developing countries, including Nigeria. This research work argues that immunization is a suitable proxy for healthcare demand in Nigeria due to its accessibility, measurability, and relevance to maternal and child health and Nigeria as a country has made significant progress in expanding immunization coverage in recent years, with the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) supporting the government to strengthen its immunization programmes. As a result, immunization coverage has increased, and more children are now protected against vaccine-preventable diseases. The widespread availability of immunization services makes it a useful indicator of healthcare demand, as it reflects the extent to which individuals are seeking and accessing healthcare services.

Model Specification

The study uses a log-linear econometric framework to examine the relationship between macroeconomic factors and healthcare demand in Nigeria. The model is specified as:

The functional form of the model is:

$$I = F (GDP, PI, DR, INF, GHE) \qquad (1)$$

While the econometric form of the model in log form is:

$$\ln I = \beta_0 + \beta_1 \ln GDP + \beta_2 \ln PI + \beta_3 \ln DR + \beta_4 \ln INF + \beta_5 \ln GHE + e_t \qquad (2)$$

Where $\ln I$ is immunization, $\ln GDP$ is gross domestic product, $\ln PI$ is poverty index, $\ln DR$ is dependency ratio, $\ln INF$ is inflation, and $\ln GHE$ is government health expenditure. β_0 = intercept, $\beta_1, \beta_2, \& \beta_3$ = coefficients of independent variables and e = Error term. Based on the theoretical framework and empirical literature, the following a-priori expectations are specified for the model:

Table I. A-priori Expectations

Variable Expected	Coefficient	Expected Sign	Relationship

Gross Domestic Product (GDP)	β_1	+	Increase in GDP → Increase in Immunization Coverage
Poverty Index (PI)	β_2	-	Increase in Poverty → Decrease in Immunization Coverage
Dependency Ratio (DR)	β_3	-	Increase in Dependency Ratio → Decrease in Immunization Coverage
Inflation (INF)	β_4	-	Increase in Inflation → Decrease in Immunization Coverage
Government Health Expenditure (GHE)	β_5	+	Increase in GHE → Increase in Immunization Coverage

This table summarizes the expected relationships between the explanatory variables and immunization coverage, based on theoretical framework and empirical literature.

Methodology

The Autoregressive Distributed Lag (ARDL) model is used to estimate the model's parameters. The ARDL Bounds test for co-integration is used to ascertain the long-term relationship between the model's variables. The study performs diagnostic tests (Serial correlation tests) to ensure the robustness of the results.

Source of data

The study uses secondary data collected from the Central Bank of Nigeria and National Bureau of Statistics from 1990 to 2024. Using data from 1990 to 2024 can help capture the impact of various economic and health sector reforms, policies, and events that have occurred in Nigeria over the past few decades. This can provide

valuable insights into the dynamics of healthcare demand and the macroeconomic factors that influence it.

4. Results and discussion

The descriptive statistics of the data employed in this research are shown in table II. In descriptive statistics, normality tests are used to determine whether a data set is normally distributed. Generally, a low JB (Jarque Bera) value and high p-value are indicative of normality. Therefore, the result below in the order of normality shows that all the variables in the model except GDP are normally distributed compared to the probabilities of JB which is less than 5 percent significance level. Only the probability of GDP which is 0.777790 is greater than 5 per cent significance level. The result shows that DR, PI, INFL and GHE are normally distributed with JB values of 54.90529, 36.76341 and 23.58016, 34.905629 respectively and p-values of 0.000000, 0.000000, 0.000009 and 0.000000 respectively.

Table II Descriptive Statistics

	I	GDP	PI	DR	INFL	GHE
Mean	19807700	0.339022	925143.3	13973.60	19.36296	231494.28
Median	18337570	0.339501	41522.61	1471.860	12.79501	222098.15
Maximum	33716510	0.488002	6728494.	85600.80	72.81000	642410.46
Minimum	9582260.	0.202003	1233.401	1.920010	3.200000	332206.10
Std. Dev.	7012800.	0.072134	1917023.	23446.94	16.99280	761233.41
Skewness	0.426360	0.024628	2.197772	1.871292	1.607873	191702.45
Kurtosis	2.041104	2.478730	6.259984	5.458822	4.587724	291777.42
Jarque-Bera	3.018770	0.502609	54.90529	36.76341	23.58016	34.905629
Probability	0.221050	0.777790	0.000000	0.000000	0.000009	0.000000
Sum	8.72E+09	14.91701	40706301	614837.9	851.9701	525143.32
Sum Sq. Dev.	2.11E+16	0.223740	1.58E+13	2.36E+10	12416.47	2.15 E+10
Observations	35	35	35	35	35	35

Source: Author's computation, 2025.

The average level of immunization which is the dependent variable is 19807700 with standard deviation of 7012800. On the average GDP, PI, DR, INFL, and GHE are 0.339022, 925143.3, 13973.60, 19.36296 and 231494.28 respectively with standard deviation of 0.072134, 1917023., 23446.94, 16.99280 and 761233.41 respectively. I, GDP, PI, DR, INFLA and GHE are positively skewed

Table III: Correlation Analysis (Pearson)

The results of the correlation studies between the variables, with immunisation as the dependent variable, are shown in Table II. This practice accomplishes two significant goals. Finding out if each pair of dependent and independent variables has a bivariate connection is the main goal. The second is to make sure that there aren't any issues with multicollinearity caused by excessive correlations between the explanatory variables. The findings indicate a weakly negative relationship between Nigeria's gross domestic product, poverty index, dependence ratio, and vaccination. The findings also indicate that, in Nigeria, there is a marginally positive relationship between government health spending, inflation, and vaccination. In general, the results indicate that multicollinearity is not an issue.

	I	IFL	GDP	PI	DR	GHE
I	1.000000	0.276352	-0.139021	-0.089483	0.615803	-0.149428
INF	0.276352	1.000000	-0.185948	-0.218766	0.207752	-0.020981
GDP	-0.139021	-0.185948	1.000000	-0.057084	-0.194195	-0.241046
PI	-0.089483	-0.218766	-0.057084	1.000000	-0.057666	-0.220610
DR	-0.125121	-0.135448	1.010000	-0.043064	-0.174245	0.1205420
GHE	0.615803	0.207752	-0.194195	-0.057666	1.000000	0.0021000

Source: *Author's computation (2025) using Eviews9*

Unit Root Test Presented at levels shows that only GHE is stationary while the other variables are not stationary. This suggests that the non-stationary variables are highly influenced by trend.

Table 1V: Unit Root Test Presented at Levels

VARIABLES	ADF	CRITICAL VALUE	REMARK
I	-1.8095	-3.5485	Non stationary
DR	2.3099	-3.5629	Non stationary
GDP	0.5504	-3.5485	Non stationary
GHE	-4.7039	-3.5875	Stationary
INF	-2.9002	-3.5485	Non stationary
PI	-3.3884	-3.5485	Non stationary

Source: Authors' computation (2025)

Unit root test presented in First differencing shows that all variables are stationary. This demonstrates that a combination of I(0) and I(1) stationarity properties are present in the unit root variables that are presented at level and at first differencing. The autoregressive distributed lag (ARDL) is an appropriate estimation technique for the study's data analysis, given the combination of I(0) and I(1) stationary features of the variables in the model.

Table V: Unit Root Test Presented in First Differencing

VARIABLES	ADF	CRITICAL VALUE	REMARK
I	-4.6946	-3.5530	Stationary
DR	5.9133	-3.5629	Stationary
GDP	-6.3727	-3.5530	Stationary
HEXP	-6.9211	-3.5578	Stationary
INF	-5.1614	-3.5684	Stationary
PI	-7.2082	-3.5578	Stationary

Source: Authors' computation (2025)

The unit root test results show that all variables are stationary at first differencing, but only GHE is stationary at levels. This suggests that the variables exhibit a combination of I(0) and I(1) stationarity properties, making the ARDL model an appropriate estimation technique.

The ARDL bounds test result indicates that there is cointegration between the variables, as the F-statistic value of approximately 3.969 is higher than the upper bound critical value at 5%. This suggests that there is a long-term relationship between the variables.

Table VI: ARDL Bounds Test to Cointegration Result

Test statistic	Value	K
F-statistic	3.96909	5
Critical Value Bounds		
Significant	I0 Bound	I1 Bound
10%	2.06	3
5%	2.37	3.36
2.5%	2.7	3.72
1%	3.08	4.17

Source: Researchers' computation.

The ARDL Short Run Result (Dependent Variable: LNI) indicates that current immunisation is positively impacted by immunisation values (LNI(-1) and LNI(-2)), GDP is positively impacted by immunisation, with lag 2 being significant, while the poverty index has a negative impact on immunisation, with lag 1 being significant, the dependency ratio has a mixed effect on immunisation, with lag 1 being positive but insignificant, and inflation has a positive and significant impact on immunisation as well. Additionally, it observes that government health spending has a mixed impact on vaccination, with a considerable negative effect at lag 2 and a favourable

but negligible effect in the short term.

Table VII: ARDL Short Run Result (Dependent Variable: LNI)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNI(-1))	0.13326	0.12049	1.10606	0.2834
D(LNI(-2))	0.50890	0.11212	4.53879	0.0004
D(LNGDP)	0.01317	0.00833	1.58254	0.1308
D(LNGDP(-1))	0.02067	0.01095	1.88719	0.0753
D(LNGDP(-2))	0.04478	0.00891	5.02894	0.0001
D(LNPI)	-0.01259	0.00724	-1.73816	0.0994
D(LNPI(-1))	-0.02406	0.00670	-3.59071	0.0022
D(LNDR)	-0.00586	0.01934	-0.30270	0.7657
D(LNDR(-1))	0.03380	0.01747	1.93512	0.0689
D(INF)	0.00328	0.00087	3.78413	0.0013
D(GHE)	0.05779	0.09624	0.60041	0.5558
D(GHE(-1))	0.01478	0.06344	0.23305	0.81840
D(GHE(-2))	-0.24470	0.07255	-3.37302	0.00340
CointEq(-1)*	-0.24934	0.04097	-6.08644	0.00000
R-squared		0.80436	Mean dependent var	10.45574
Adjusted R-squared		0.69838	S.D. dependent var	0.52541
S.E. of regression		0.02383	Akaike info criterion	-4.32997
Sum squared resid		0.01023	Schwarz criterion	-3.46809
Log likelihood		102.26950	Hannan-Quinn criter.	-4.02332
F-statistic		945.39130	Durbin-Watson stat	1.95015

Prob(F-statistic)	0.000000			

Source: Researchers' computation

According to the long-term results, GDP has a positive but negligible impact on vaccination, while the poverty index has a negative but negligible impact, the dependency ratio has a positive but negligible impact, and inflation has a significant and positive impact. Immunisation is positively but negligibly impacted by government health spending.

Table VIII: ARDL Long Run Result (Dependent Variable: LNRGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	0.10369	0.09503	1.09113	0.2897
LNPI	-0.01093	0.07102	-0.15394	0.8793
LNDR	0.06286	0.03840	1.63690	0.1191
INF	0.02244	0.00918	2.44520	0.0251
GHE	0.17847	0.36779	0.48524	0.6333
C	5.82404	1.78864	3.25612	0.0043

Source: Researcher's computation.

The results of this investigation align with earlier studies that demonstrated a favourable correlation between GDP and vaccination (Baltagi & Moscone, 2020). GDP has a favourable impact on immunisation because it increases the amount of money available for infrastructure development and healthcare spending. The negligible long-term impact of GDP on vaccination, however, raises the possibility that other factors are involved.

According to earlier studies, poverty is a major obstacle to accessing healthcare, which is in line with the poverty index's detrimental impact on vaccination (World Health Organisation, 2019). Unexpectedly, inflation has a beneficial impact on

vaccination; this could be because of the unique economic circumstances in Nigeria. The positive effect of government health expenditure on immunization suggests that increased investment in healthcare can lead to improved health outcomes. This finding highlights the importance of government spending on healthcare in improving access to healthcare services, including immunization.

5. **Conclusion and Recommendations**

The findings of the study have implications for policy and practice. Vaccination is positively impacted by government health spending, suggesting that higher healthcare spending can lead to improved health outcomes. The contradictory short-term impacts of government health expenditure on vaccinations, however, suggest that more needs to be done to ensure that healthcare investment is successful.

Based on the results which show that GDP has a considerable impact on vaccination rates in Nigeria, the study suggests the following recommendations that government should:

I. Increase health funding and explore public-private partnerships to improve healthcare infrastructure and vaccination services.

II. Foster economic growth and attract investments in the healthcare sector to improve healthcare facilities and vaccination coverage.

III. Prioritize recurring healthcare expenditures that directly impact healthcare delivery, such as training healthcare workers and ensuring a steady supply of vaccines, to boost labour productivity and promote economic growth.

Having the insightful information this study offered, it is important to recognise its limits. The accuracy and comprehensiveness of the study's conclusions may be constrained by its dependence on secondary data. Furthermore, the study's emphasis on macroeconomic variables may obscure other significant immunisation drivers, such as individual-level variables and features of the healthcare system. Furthermore,

considering Nigeria's particular healthcare and economic difficulties, the study's conclusions might not apply to other situations. By using primary data collecting and investigating additional factors that influence immunisation in Nigeria, future studies should try to overcome these limitations.

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