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Research Article

Analysis of The Impact of Health Expenditures on Health Status in Nigeria

Nuhu Musa[1]

Abstract

Expenditures on healthcare are vital for the enhancement of health conditions through reduction in infant mortality rate. This study is aimed at investigating the relationship between government spending on health sector and health status in Nigeria using annual time series data from 1986 to 2020. The dependent variable of the model is infant mortality rate used as health indicator while the independent variables include; health capital expenditure, recurrent expenditure, GDP per capita, and level of education. The study employed co-integration and error correction model (ECM) for the analysis. Results indicated that health capital expenditure and recurrent expenditure dampen infant mortality in Nigeria during the period under study. Furthermore, GDP per capita and level of education had negative and insignificant relationship with infant mortality rate. Based on these empirical findings, the study recommended that government should give priority attention to the funding and maintenance of health care system for the realization of better and improved health conditions of citizens.

Keywords: Health Expenditure, Life Expectancy, Infant Mortality, GDP Per Capita, Error Correction Model.

JEL Codes: H51, 110, 118.

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Araştırma Makalesi

Nijerya'da Sağlık Harcamalarının Sağlık Durumuna Etkisinin Analizi

Nuhu Musa [1]

Öz

Sağlık hizmetlerine yapılan harcamalar, bebek ölüm hızının azaltılması yoluyla sağlık koşullarının iyileştirilmesi için hayati önem taşımaktadır. Bu çalışma, 1986'dan 2020'ye kadar yıllık zaman serisi verilerini kullanarak Nijerya'da sağlık sektörüne yapılan devlet harcamaları ile sağlık sonuçları arasındaki ilişkiyi araştırmayı amaçlamaktadır. Modelin bağımlı değişkeni sağlık göstergesi olarak kullanılan bebek ölüm hızı iken, bağımsız değişkenleri; sağlık harcaması, cari harcama, kişi başına GSYİH ve eğitim düzeyidir. Çalışmanın, analizinde eş-bütünleşme ve Hata Düzeltme Modeli (ECM) kullanmıştır. Sonuçlar, sağlık harcamalarının ve tekrarlayan harcamaların, incelenen dönemde Nijerya'da bebek ölümlerini azalttığını göstermiştir. Ayrıca, kişi başına düşen GSYİH ve eğitim düzeyi, bebek ölüm hızı ile negatif ve önemsiz bir ilişkiye sahipti. Bu ampirik bulgulara dayanarak, çalışma, vatandaşların daha iyi ve daha gelişmiş sağlıklı yaşam koşullarının gerçekleştirilebilmesi için hükümetin sağlık sisteminin finansmanına ve iyileştirilmesine öncelik vermesi gerektiğini ortaya koymuştur.

Anahtar Kelimeler: Sağlık Harcaması, Ortalama Yaşam Süresi, Bebek Ölümleri, Kişi Başına GSYİH, Hata Düzeltme Modeli.

JEL Kodlar: H51, 110, 118.

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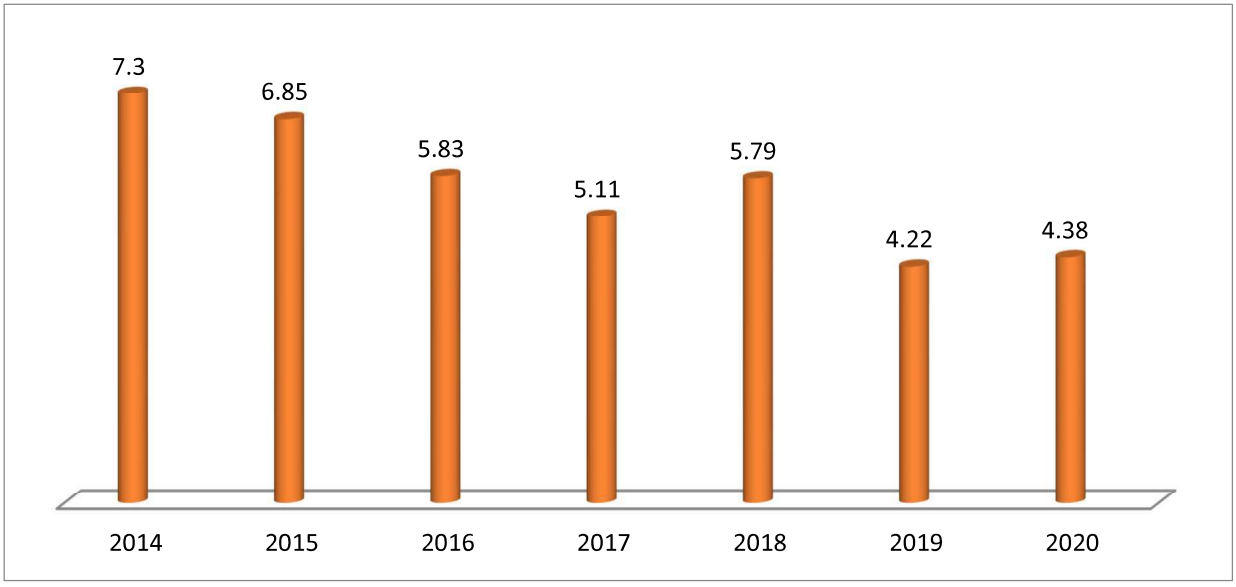
1. Introduction

Ensuring adequate health condition of people is necessary for increased workers' productivity (Richardson, Chisom & Omeje 2017& Musa,2021).In order to curtail health challenges in Nigeria in particular and Africa in general, African Heads of State met on 27th April, 2001 and signed a declaration to spend at least 15 per cent of their annual budget on health sector. Despite this declaration, the federal government allocation to the health sector is still far below the minimum bench mark recommended by Abuja Declaration. Oluwatoyin, Folasade and Fagbeminiyi (2015) posited that the health capital expenditure of government stood at N3.4billion in 1986 and increased to N4.9b in 1994 and further rose to N9.2b in 1996 and increased further to N27.9b in the year 2000. In 2010, it rose to N151.2b but declined sharply to N97.4b in 2012. In 2019 capital expenditure on health fell to N51.7b and in 2020, the figure dropped to N44.5b.Similarly, the recurrent expenditure also increased substantially from N3.3b in 1986 to N3.02b in 1990 and rose from N40.6b in 2000 to N99.5b in 2010 and in 2014 it rose to N195.9b. However, in 2019 and 2020 it declined to N41.3b and N40.6b respectively. The sharp decline in the allocations to health sector could be attributed to the decline in federal government revenue following the downward swing in the crude oil prices coupled with the outbreak of COVID-19 Pandemic.

Generally speaking, federal government financial allocation to the health care services in Nigeria is not encouraging compared to other African countries such as Bostwana, Rwanda, Zambia, Togo, Ghana, Mali, Malawi, Burkina Faso, Ethiopia, Kenya and Mozambique that spend over 15 percent of their annual total budget on health sector, Nigeria spends less than 7 per cent on the average compared to other African countries. For example, in 1990, percentage allocation to health sector was 4.5 and rose to 7.3 per cent in 2014, 6.85 per cent in 2015, 5.83 per cent in 2016, 5.11 per cent in 2017, 5.79 per cent in 2018, 4.22 per cent in2019 and 4.38 per cent in 2020 respectively. These figures are far below the minimum benchmark recommended by Abuja Declaration.

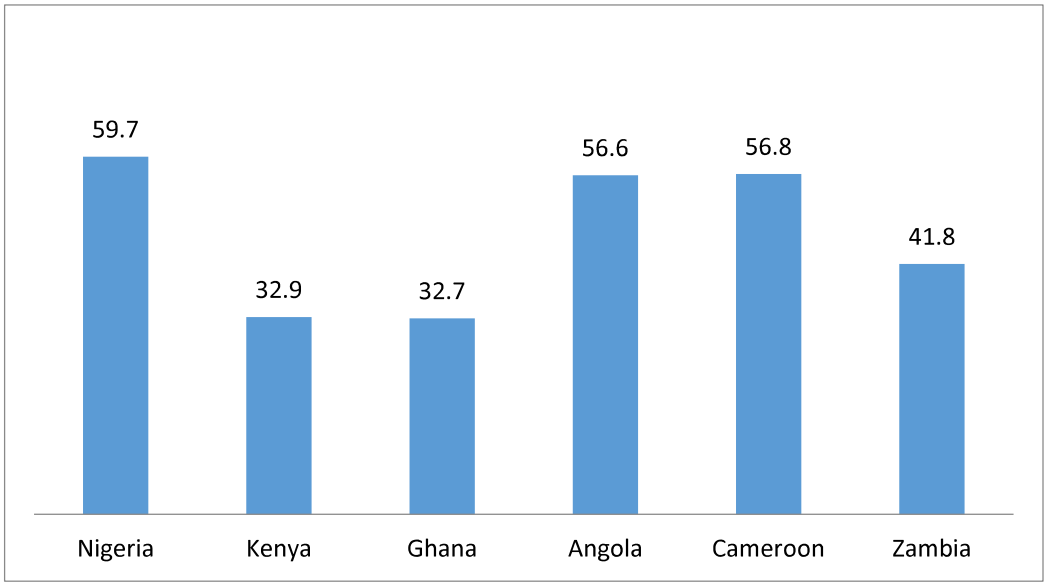
Figure 1: Allocation to Health Sector in Nigeria,2014-2020



Source: CBN Statistical Bulletin (2020)

The worry of this study is that, despite the fact that Nigeria is richly endowed with abundant human and material resources which if fully harnessed will transform the country into a fastest growing economy. It is disturbing to note that the world over, Nigeria is one of the countries having the highest infant mortality rate (WDI, 2020).

Figure 2:Infant Mortality Rate,2020: A Comparative Analysis



Source: World Development Indicators Database (2020).

As shown in figure 2, in 2020, infant mortality rate in Nigeria stood at 59.7 per cent as against 32.7 in Ghana, 41.8 per cent in Zambia, 42.3 per cent in Togo, 43.5 per cent in Angola while Cameroon and Kenya had 56.8 and 32.9 per cent respectively. In Nigeria, infant mortality rate is so high because health sector has not been accorded adequate financial attention in the federal government annual budgets and this has adversely affected its overall performance. This study attempts to examine the nexus between federal government health expenditures and health status in Nigeria. This study decomposed public health expenditure into two components (health capital expenditure and health recurrent expenditure) with a view to identifying the component that has higher impact on health status.

2. Literature Review

World Health Organization (2016) defines health expenditure as the financial resources spent for the purpose of improving the health condition of citizens. Jhingan (2010) decomposed public expenditures into two components (capital and recurrent expenditures). Capital expenditure on health refers to the investment on real assets such as building of hospitals, and other social infrastructure while recurrent expenditure on health consist of payment of workers' salaries and maintenance of already existing facilities.

The paper adopted Wagner's Law of Increasing State Activity as its theoretical framework. This theory was developed in 1863 by Adolph Wagner, a famous German economist. This theory expresses a direct and proportional relationship between government expenditures on health and demand for healthcare services. According to this theory, as per capita income increases, the demand for healthcare services also increases leading to improved health conditions of citizens through reduction of infant mortality rate. This means that. as per capita income increases, the disposable income of individual gets improved and this will help him improve his health conditions.

This theory has practical relevance to Nigerian setting because it explains more lucidly the relationship between health expenditure and health conditions. As people's income gets improved they are likely to access and afford health care services which would help improve their health conditions and those of their children.

2.1.Empirical Review

Micheal, Ramu and Tatjana (2018) conducted a study on health expenditures and health status in Ghana from 1980 to 2014. The study employed OLS estimation technique for the analysis. Using some control variables such as GDP, literacy rate and labour market, results indicated that health spending significantly influenced infant mortality rate. This result implies that healthcare expenditure reduced infant mortality rate in Ghana.

Furthermore, Byaro and Musonda (2016) carried out a study on the relationship between health expenditure and health outcomes in Tanzania using data from 1995 to 2013. The variables used were GDP, public (PUB) and private (PRI) expenditures. The result revealed that PUB and PRI health spending had no significant impact. This finding indicates that public and private spending on healthcare were not significant in influencing infant mortality rate.

Employing Autoregressive Distributed Lag (ARDL) and co-integration framework, Ahmed and Hasan (2016) investigated health expenditure and health outcomes in Malaysia using data set from 1984-2009. After controlling variables such as corruption and government stability, it was discovered that health expenditure significantly led to the reduction of infant mortality rate.

Also, using time series data from 1990 to 2002, Boachie and Ramu (2015) conducted a study on the relationship between health expenditure and health status in Ghana. The study employed OLS estimation technique and discovered that increase in government spending led to decline in infant mortality rate in Ghana. Similarly, using Autoregressive Distributed Lag (ARDL), and data set from 1983 to 2011, Barenberg, Basu and Soylu (2015) carried out a study in Malaysia on health expenditure and health status. Results indicated health spending significantly reduced infant mortality rate in Malaysia.

Furthermore, Novignon, Olakojo and Nonvignon (2012) investigated the impact of healthcare expenditure on health status in some selected developing countries using panel data from 1995-2010. Using GDP per capita, private expenditure, public expenditure and sanitation facilities, results indicated both public expenditure, private expenditure, GDP per capita and sanitation had significant impact on infant mortality rate. Results revealed public healthcare spending had relatively higher impact than private healthcare. Employing Structural Vector Auto-Regression (SVAR) for 47 African countries from 1980 to 2005, Anyanwu and Erhijakpor (2007) discovered public spending improves health conditions.

Eboh, Abba and Fatoye (2018) conducted an empirical study in Nigeria using data from 1994 to 2017. The study employed Ordinary Least Squares (OLS) technique. Results revealed no significant relationship between government health expenditure and infant mortality rate.

Using Ordinary Least Squares (OLS) estimation technique, Richardson, Chisom and Omeje (2017) explored health expenditure and health outcomes in Nigeria from 1981 to 2014. They discovered health expenditure has a long term impact on health conditions of people in the country.

In another study, Muftaudeen and Bello (2014) investigated the link between health expenditure and health outcomes in Nigeria. The study period spanned from 1970 to 2011.

ARDL was used for analysing the data. Results revealed a significant negative relationship between public health expenditure and infant mortality rate in Nigeria. This means that health expenditure plays significant role in reducing infant mortality ratein Nigeria.

2.2. Research Gap

A review of the existing literature indicates that a number of empirical studies have been carried out in this area. However, there are some salient gaps that the current study intends to address. The empirical literature revealed inconsistent and diverse findings which may be due to different approaches used in measuring health conditions. In addition, some scholars employed Ordinary Least Squares (OLS) estimation technique without subjecting the variables to post estimation or diagnostic test which may invariably be prone to spurious results. This current study bridged the gaps by employing ECM and conducted some diagnostic measures to make the results robust for policy analysis.

This study makes significant contributions to the existing literature by decomposing health expenditure into two components: capital and recurrent expenditure. Justification for examining the effect of both capital and recurrent expenditure independently was to assist policy makers in the country to identify which components have higher impact on health conditions of people.

3. Methodology

The method of data analysis employed in this study is Co-integration and Error-Correction Model (ECM). The dependent variable is IMR used as indicator for health status while the independent variables include; health capital expenditure (CAP), health recurrent expenditure (REC), GDP per capita (GDPC), and education (EDU).

The model is specified as follows:

IMR = f (CAP, REC, GDPC, EDU) [1]

The model in Equation [1] is transformed in Equation [2]

$IMR = \lambda_0 + \lambda_1 CAP + \lambda_2 REC + \alpha\lambda_3 GDPC + \lambda_4 EDU + \mu$ [2]

The error correction model specification for this study is specified as follows:

$$\Delta lnIMR_t = \lambda_0 + \sum_{j=1}^{p} \lambda_1 \Delta lnCAP_{t-j} + \sum_{j=2}^{p} \lambda_2 \Delta lnREC_{t-j} + \sum_{j=3}^{p} \lambda_3 \Delta lnGDPC_{t-j} + \sum_{j=4}^{p} \lambda_4 EDU_{t-j} + u_t \quad [3]$$

where: IMR represents infant mortality rate, GDPC is GDP per capita, CAP represents capital, REC is recurrent, λ_1–λ_4 are the coefficients of the variables to be estimated, λ_0 represents constant intercept and μ_t is error or disturbance term.

3.1. A priori Expectations

On a priori ground, it is expected that parameter estimate for all variables included in the model would be negative and greater than zero; suggesting health expenditures would boost health conditions through reduction of infant mortality rate.

3.2. Data Sources, Justification and Measurement

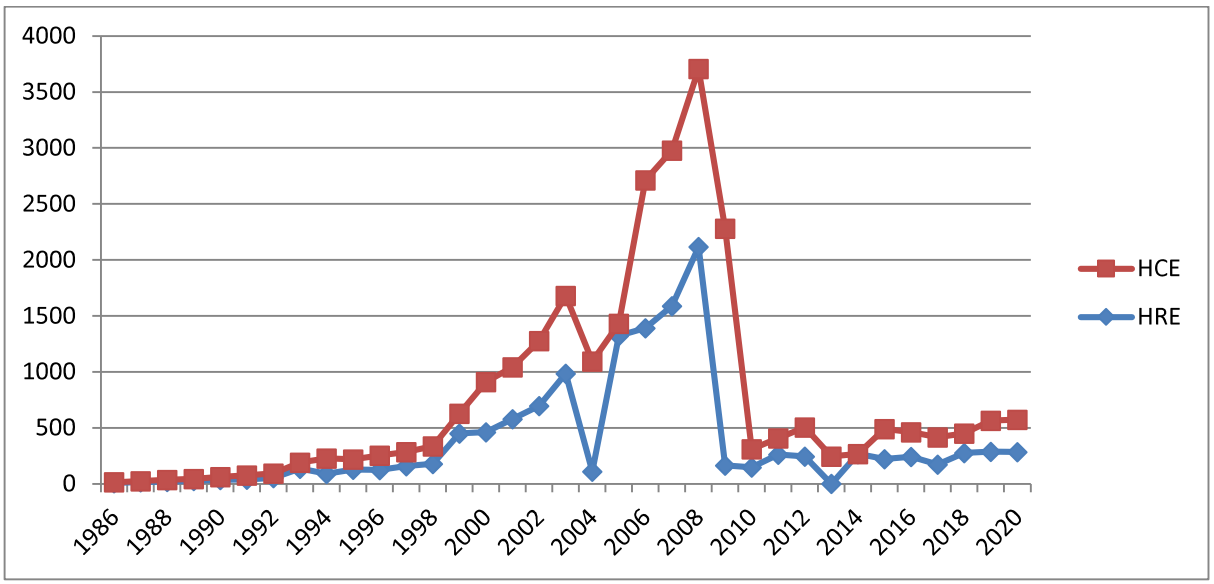
Data for this study were annual time series data from 1986- 2020 obtained from CBN Statistical Bulletin (2020). Following economic theory and previous empirical literature, health status was captured using infant mortality rate and education (EDU) was measured by adult literacy rate. Justifications for examining the effect of both capital and recurrent expenditure independently was to enable us identify which components have higher impact on health conditions of people, for policy formulation, prescription and analysis.

4. Presentation and Discussion of Results

4.1. Trend Analysis

Data on public health expenditure in Nigeria is presented in graphical form to show its behavioural pattern. The result of the trend analysis of public expenditure which is decomposed into health and recurrent expenditure in Nigeria from 1986 to 2020 is shown below.

Figure 3: Stylized Facts of Health Capital Expenditure & Recurrent Expenditure in Nigeria, 1986-2020.



Source: Data from CBN Statistical Bulletin & Computation by Author (2022)

Figure 3 shows the trend of capital and recurrent expenditures in Nigeria within study period 1986-2020. The trend analysis indicates that recurrent and capital expenditures were very low as from 1986 to 1998 but started rising as from 2000 and peaked between 2004 and 2010 as shown in the figure. However, the situation changed dramatically as from 2010 to 2020 when both recurrent and capital expenditures started showing downward trend as indicated in the graph.

4.2. Descriptive Statistic Test

Descriptive statistic test was conducted to observe if the variables of interest (i.e. IMR, CAP, REC, GDPC and EDU) are normally distributed. The results are shown below.

Table 1: Results of Descriptive Statistic

	VARIABLE				
Test-Statistic	**IMR**	**REC**	**CAP**	**GDPC**	**EDU**
Mean	20.87672	379.5038	371.5600	22918.14	57.98000
Median	21.03396	178.0978	173.7637	8742.647	55.30000
Std. Dev.	6.704910	503.2940	507.0003	42195.29	6.462962
Skewness	0.172431	2.020702	2.012814	3.183736	0.491106
Kurtosis	2.276098	6.324875	6.277157	12.51079	1.925141
Jarque-Bera	0.937656	39.94047	39.29543	191.0413	3.091758
Probability	0.625735	0.000000	0.000000	0.000000	0.213124

Source: Author's computation (2022)

An examination of the results indicates that the values for all the variables under consideration [IMR, REC, CAP, GDPC and EDU] are positively skewed. The results indicate all variables skewed to the right suggesting that there is asymmetry in all the series under consideration.

Table 2: Results of Stationarity

	At levels		At 1st difference			
Variables	ADF statistics	Critical value at 5%	ADF statistics	Critical value at 5%	Order of integration	Decision
IMR	-0.074	-2.971	-5.786	-2.951	1(1)	Stationary
REC	-0.064	-2.951	-5.409	-2.954	1(1)	Stationary
CAP	-0.683	-2.954	-5.324	-2.951	1(1)	Stationary
GDPC	-0.713	-2.951	-4.714	-2.954	1(1)	Stationary
EDU	-2.146	-2.954	-5.135	-2.951	1(1)	Stationary

Source: Author's computation (2022)

The analysis indicate all series (IMR, REC, CAP, GDPC, EDU) are stationary at order one 1(1).

Table 3: Results of Co-integration

Number of co-integrating equations	**Trace stat.**	**5%**	**λ_{max}**	**5%**
None *	48.27122	37.85613	28.40240	27.58434
At most 1	19.86882	29.79707	12.77607	21.13162
At most 2	7.092747	15.49471	6.525621	14.26460
At most 3	0.567126	3.841466	0.567126	3.841466

Source: Author's computation (2022)

Table 4: Static Regression Results

Dependent Variable: IMR

Variables	Co-efficients	Standard Error	t-calculated	P-values.
REC	-0.777863	0.175789	-4.424968	0.0000
CAP	-0.616661	0.269066	-2.291859	0.0329
GDPC	-0.428823	0.135315	-3.169066	0.0048
EDU	-0.312739	0.502442	-0.622437	0.5384
C	42.83029	4.311727	-9.933443	0.0000
R-squared	0.852847			
Adjusted R-squared	0.770364			
D-W Statistic	1.690787			
F-statistic	10.45418			

Source: Author's computation (2022)

Table 5*:* ECM Estimation Results

Dependent Variable: IMR

Variables	Co-efficient	Standard Error	t-calculated	P-values
REC(-1)	-0.857351	0.205688	-4.168204	0.0005
CAP(-1)	-1.154677	0.655137	-1.762498	0.0933
GDPC(-1)	-0.626080	0.638159	-0.981072	0.3372
EDU(-1)	-0.172956	0.632616	-0.273398	0.7874
CointEq(-1)	-0.576110	0.105231	-5.474699	0.0000

Source: Author's computation (2022)

The findings from the error correction model in table 5 indicate that health recurrent expenditure is negatively signed, indicating that infant mortality rate responds negatively to change in recurrent expenditure by about 0.85 %. This finding is in agreement with studies conducted by Eboh, Abba and Fatoye (2018).

The result also indicates that capital expenditure reduces infant mortality rate. A unit change in capital expenditure reduces infant mortality rate by about 1.15 units. This finding corroborates with Richardson, Chisom and Omeje (2017). The result of the analysis indicates that recurrent expenditure has relatively higher impact than the capital expenditure component.

The analysis also indicates that EDU is negatively signed but statistically insignificant. The insignificant effect could be attributed to the low level of literacy rate in Nigeria. This means that those who are literate have the possibility of accessing healthcare services which will help improve health conditions than their counterparts that are not literate.

The results also indicate that GDPC helps in reducing infant mortality rate. As GDPC increases, the disposable income of individual gets improved and this will help him improve his health conditions and those of his children.

The coefficient of ECM is significant. It shows 33% disequilibrium in previous years would be corrected in current year. Thus it will rightly act to correct any deviation of the GDP from its long run equilibrium value.

The coefficient of determination in table 4 indicates that the overall fit is satisfactory with an R^2 = 0.85 and its adjusted counterpart of 0.77 per cent. Also, the F-value is highly significant, thus, making results robust for policy analysis.

4.3. Diagnostic Test

In order to ascertain whether the results are robust, heteroskedasticity and Ramsey were conducted.

Table 6: Results of Diagnostic Test

Test	F-calculated	Prob. Value
Serial Correlation LM Test	14.78300	0.0004
Heteroskedasticity Test:	21.35197	0.0247
Ramsey RESET Test	51.23463	0.0002
Jarque-Bera	3.284528	0.5932

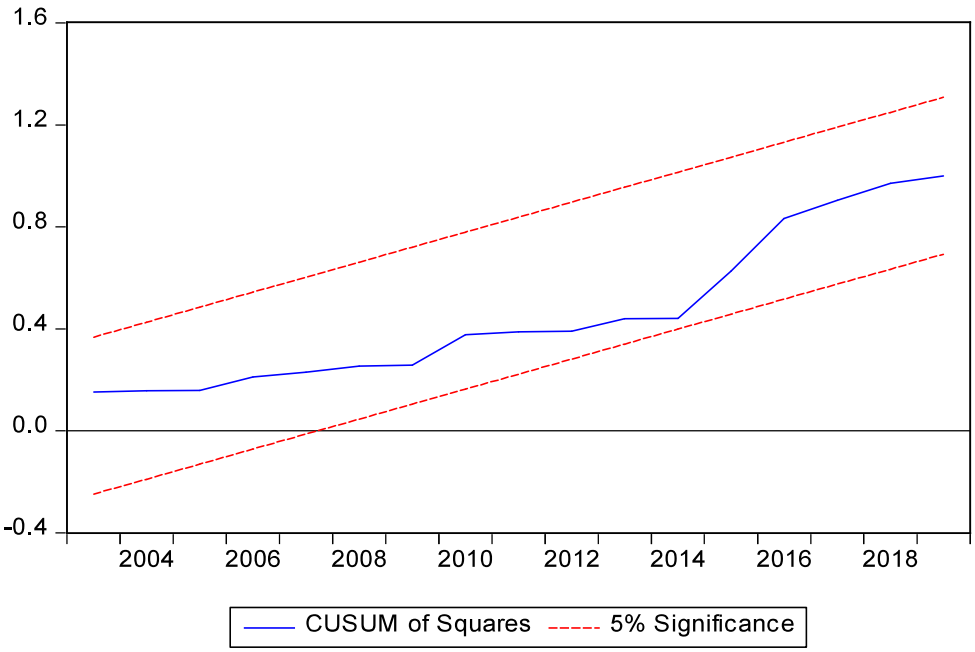
Source: Author's computation (2022).

The analysis indicates absence of heteroskedasticity problem. Ramsey test also indicates that the model is correctly specified.

4.4. Stability Test

Recursive residual was conducted. The result of the CUSUMSQ is shown below.

Figure 4: CUSUMSQ Result



Source: Author's computation (2022).

Results indicate that no cumulative sum of the residual fell outside the two critical lines. The residuals in the model remained within the two critical bound.

5. Conclusion and Recommendations

The study explored nexus between health expenditures and health status in Nigeria from 1986 to 2020. Data collected for the study was analysed using co-integration and ECM. The effect of capital and recurrent healthcare expenditures on health outcomes were examined independently. The study found that both components significantly reduced infant mortality rate in Nigeria. However, recurrent expenditure had relatively higher impact than capital expenditure component. Results also indicated that GDP per capita and level of education (EDU) had negative and insignificant effect on infant mortality rate. The reason for insignificant relationship could be attributed to the level of poverty and low level of literacy rate in Nigeria, which makes it difficult for people to access health care services. The study made the following recommendations.

1. Budgetary allocation to the health sector should be increased to 15% benchmark stipulated by international standards.
2. Government should ensure effective monitoring of monies voted to the health sector to avoid misappropriation/embezzlement. It should also ensure that monies voted to the health sectors are used honestly for the betterment of the citizens.
3. Infant mortality rate should be reduced through constant immunization. Both men and women should be given adequate orientation on the need for immunization to combat deadly diseases that are inimical to health conditions.

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