CAN PUBLIC HEALTH EXPENDITURE INFLUENCE NATIONAL PRODUCTIVITY IN AN AGRARIAN ECONOMY? EVIDENCE FROM NIGERIA

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ABSTRACT: *Despite the nation's wealth in natural and human resources, productivity measure in Nigeria has not been satisfactory. Several factors have been alluded to be responsible for this. This paper investigated the impact of public health expenditure (with gross capital formation and secondary school enrolment as control variables) on national productivity (real GDP divided by working population as proxy) in Nigeria between 2000 and 2020. The theoretical foundation was based on Solow Neo-classical and Romer Endogenous growth models. The unit root test showed that variables were stationary at level. The descriptive result shows significant fluctuations in government domestic expenditure on health with an average of 18% of total health expenditure. Regression results showed a significant and positive relationship between healthcare service expenditures and productivity in Nigeria. The study recommended that Nigerian health policies should focus on developing the domestic health sector by increasing yearly budgetary allocation to the sector.*

KEYWORDS: *health expenditure, healthcare service expenditure, output growth, Nigeria*

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INTRODUCTION

The development of the human capital component of any economy should be paramount to the agenda of the government in order to ensure national productivity or output growth. This is particularly pertinent to agrarian economies where production is labour-intensive and the health of the farmers have a direct impact on productivity (Awoyemi, Afolabi & Akomolafe, 2017). When a person is healthy, life expectancy increases and this promotes individual savings and private investments in education. Thus, contributions are made to investments and the development of human capital (Kurt, 2015). The nexus between economic development and health outcomes has been previously established, in fact, the direction of causality is still being debated (Ogunjimi & Adebayo, 2020; Eneji, Dickson & Bisong, 2013; Nurudeen and Usman, 2010). This is even more pertinent to developing countries where production is labour-intensive thus economic growth depends highly on labour output and as observed by Kurt (2015), labour is scarce and capital is an abundant factor of production. Thus, an increase in workforce loss as a result of ill health creates more significant impacts and losses on the production power as compared to those in the developed countries, hence the need for investing more in healthcare service delivery. Statistics from the WHO regarding Nigeria's health status are disturbing; the average life expectancy at 55 years is below the global average (approximately 71 years), and there are also persistent fluctuations and sometimes rise in the burden of controllable diseases like malaria and HIV-AIDS (World Bank, 2022; Eneji et al., 2013). Health services in Nigeria have suffered from decades of neglect, endangering Nigeria's health status and national productivity (Omeruan et al., 2009). Weakness in the planning and implementation of healthcare policies has been attributed to the poor performance of the healthcare system. The healthcare system management is in three tiers; tertiary healthcare- is provided by the Federal Government of Nigeria (FGN), mostly coordinated through the University teaching hospitals and federal medical centres. The secondary healthcare provision is by the state governments which manage the General Hospitals. The third tier is the Local Government (774 LGAs) which focuses on primary healthcare services administered in the dispensaries. The primary healthcare services are the most accessed by the majority of Nigerians, unfortunately, it is the primary healthcare that suffers the most neglect (Eneji et al., 2013). Women, children, and especially the core poor, who constitute the labour force for food production in rural areas, die from avoidable health problems such as infectious diseases, malnutrition, polio, guinea worm, measles, and complications during pregnancy and childbirth. This has a lot of implications for national output because Nigeria is largely an agrarian economy.

Besides the problem of poor facility provision and management, the Nigerian health sector suffers also from insufficiently qualified healthcare personnel, and a lack of adequate motivation and regulations to curb brain drain in this sector. Many of Nigeria's promising doctors, pharmacists, nurses and other health professionals continue to leave Nigeria to apply their services more profitably in other countries. Nigerians are being denied quality healthcare services, especially those in rural areas and this has a lot of implications for agricultural activities. Between 2005 and 2012, Nigeria's Human Development Index (HDI) value increased from 0.434 to 0.471, an average annual increase of about 1.2% (HDR, 2013). However, health spending as a proportion of federal government expenditures shrank from an average of 3.5% in the 1970s to less than 2% in the 1980s (Eneji *et al*., 2013) and the situation has not improved much since then. Beyond this, there is scanty information on the extent of the contribution of healthcare expenditure to economic growth. Statistics showed that even though Nigeria was ranked 187th among the 191 United Nations member states in 2000, per

capita expenditure on health stood at 4 USD which is clearly below WHO's minimum benchmark of 14 USD per capita for developing countries (WHO, 2005). High-profile individuals, especially the political class, continue to fly abroad on regular basis for medical treatment, further widening the inequality in accessing healthcare services.

Nigeria's fiscal scenario poses significant risks to sustainable development, given that the oil boom has increased government expenditure from historical experiences of the 1970s. However, the size of the government's non-productive spending and corruption has always swollen the deficit budget. This calls for serious concern by policymakers to check the growth of government wage bills. Political corruption is responsible for budgetary inflation in Nigeria. It is against this background that this study examined the trend of government expenditure on healthcare services in Nigeria and its influence on national productivity.

THEORETICAL FRAMEWORK

The theoretical framework for this study draws from Solow's (1956) neoclassical growth model and Romer's (1990) growth theory. The former is exogenous while the latter is an endogenous growth theory. Hitherto, Roy Harrod and Elvsey Domar had advanced economic growth theory (called the Harrod-Domar model) which holds that growth in the economy can be engineered either by increasing savings or by improvement in the capital-labour ratio (Bedir, 2016). In their view, growth is based on capital accumulation although in the long run. This model suggests that the economic growth rate is proportional to the rate of capital accumulation at a given level of technology. One major criticism of the Harrod-Domar model which Solow came to correct was fixity in the capita-labour proportion which eliminates the possibility of increasing output by increasing the supply of one factor alone meaning that the slope of factor substitution is zero.

The Solow model stipulates that the level of savings-capital accumulation affects growth in the transition period; however, neglects human capital, which is an important input. It acknowledges the impact of technological developments on growth; however, technological progress is exogenous in the Solow model. In this respect, the Solow model fails to explain how economic growth occurs. Even when the Solow model was expanded with the inclusion of an exogenous variable of human capital to the production function, this addition did not prove sufficient to explain how growth occurs.

Romer (1990) developed an endogenous growth model (coined "learning by investment") as an alternative approach in the 1980s. He opined that capital is not limited to physical capital, but also includes knowledge, skills, and experience owned by the labour input as well. Thus, growth is considered a function of human capital too, and not of physical capital only. The components of human capital, knowledge, skills, abilities and experience are developed through investment in health and education.

Clearly, sustainable growth depends on increased human capital shocks due to better education, a higher level of health and the new learning-application processes (López-Casasnovas et al., 2005). Economic performance in developing countries increases with the improvement of public health. Bloom et al. (2001) observed that health makes a significant positive impact on economic growth. They concluded that an annual improvement of one year in life expectancy increased growth by 4%. Mayer et al. (2001) emphasised that, although education is germane

to the development of human capital, the existence of a healthy population may be more important for human capital in the long term.

EMPIRICAL LITERATURE REVIEW

As previously established in this article, a very important component of the economic development of a country is the state of health and well-being of citizens. Nurudeen and Usman, (2010) observed that increasing expenditure on health can result in an increase in economic growth. Thus, they suggested that government should focus attention on increasing its expenditure in the development of the health sector since it enhances productivity and economic growth. In the same vein, Berger and Messer (2002) view health as a form of capital, such that health care is both a consumption good that yields direct satisfaction and an investment good that yields indirect utility through increased productivity, fewer sick days and higher wages.

There have been opposing opinions in the literature as to the relationship between government expenditure and economic growth. For example, Abu and Abdullahi (2010) argued that there exists a negative relationship between increased government expenditure and economic growth while Bakare and Olubokun (2011) are proponents that that government expenditure impacts, though very little, on growth and that growth does not impact on government expenditures, meaning that the relationship between government expenditure and growth is unidirectional. Public health expenditure consists of recurrent and capital spending from government budgets, external borrowings and grants (including donations from international agencies and NGOs), as well as compulsory health insurance funds (WHO, 2010).

Historically, a global breakthrough in public health management and disease control has given rise to great takeoffs in economic development. Bakare and Olubokun (2011) observed that the rapid growth of Britain during the industrial revolution, the rapid growth of Japan in the 20th century; Europe and East Asia in the 1950s and 1960s were a result of improvement in healthcare service delivery in these economies and thus the health status of the citizen. Investment in the elimination of disease conditions and improvement of individual health is expected to enhance income-earning capacity (WHO, 2004).

Nigeria's health reform agenda is well articulated in the National Economic Empowerment and Development Strategy (NEEDS), engineered by the National Planning Commission (NPC, 2004). The goal of this health reform is to improve the health status of Nigerians in order to attain a globally acceptable level of poverty reduction. Aranda (2010) noted that the major reason for health expenditure is the expectation of improved health status and that health status is governed by health investment. Eneji et al. (2013) observed that the demand for healthcare services is derived from the demand for health itself. Both healthcare expenditure and improved health status are means to an end; the end is increased productivity and national development. Similarly, Berger and Messer (2002) explained that one of the basic ways by which governments can alter their healthcare delivery systems is to increase public funding of healthcare infrastructure. Clement et al. (2011) identified demographic and non-demographic factors that affect healthcare expenditure. The demographic factors include changes in age distribution within the population while the non-demographic factors include rising incomes, health technology innovation, health policies and institutions. In a related study, Denton et al.

(2004) identified structural, behavioural and psychological factors that determine health. The structural factors include age, family characteristics, occupation, education, income and social support. Denton and Walters (1999) also underline structures of social inequality as the most important determinants of health. All these studies identified the importance of improving healthcare service delivery to national output productivity. This paper is a further contribution to the body of knowledge on this subject.

METHODOLOGY

The theoretical foundation of this study is based on Wagner's Law of Increasing State Activities which holds that there exists a functional relationship between the growth of an economy and the growth of government activities (Bakare & Olubokun, 2011). This is aligned with the Solow and Romer models as earlier reviewed.

Data for the analysis was sourced from World Health Organisation (WHO) publications, the National Bureau of Statistics of Nigeria (NBSN) and the Central Bank of Nigeria (CBN) statistical bulletin. The scope of the study covered the period between 2000 and 2020.

According to the Solow model economic growth or output is a function of capital accumulation, an expansion of the labour force and technological progress which makes physical capital and labour more productive. That is:

$$Y_t = (K_t, A_t, L_t) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where

Y_t = Aggregate real output.

K = Capital stock

A = Efficiency factor

t = Time dimension

L = Labour

Following Bakare and Olubokun (2011) and Odusola (2002) and drawing from the Romer model, human capital influences economic growth and hence, the model can be modified by adding Human capital (H). Thus the theoretical model becomes

$$Y_t = (K_t, H_t, A_t, L_t) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

However, in an attempt to properly capture the impact of health on national productivity, we use the real GDP divided by the working population as a proxy for productivity. Also,

K_t = capital stock is proxied as Gross Capital Formation (GCF)

H_t = human capital is proxied as Health Care Expenditure (HCE)

L_t = labour is proxied as Secondary School Enrolment (SSE)

RGDP/WP= f(GCF, HCE, SSE) ……………………………………….……… (3)

Adopting this theoretical model to this study, the empirical model becomes

$\ln (RGDP/WP) = \alpha_0 + \alpha_1 \ln(GCF) + \alpha_2(HCE) + \alpha_3 \ln (SSE) + e_i$ ……….………… (4)

The a priori expectation

In line with economic theory, it is expected that healthcare service expenditure is expected to have a positive influence on productivity since an increase in public health expenditure is expected to improve the health of the labour force and consequently increase their productivity. Capital formation represents an increase in investment and this is expected to cause an increase in national output productivity. The effect of labour force productivity is expected to be positive. This is because an increase in labour force productivity will mean that greater output will be produced. At the same time, it enhances aggregate supply and sustainable development.

RESULTS AND DISCUSSION

Trends in government expenditures on health in Nigeria

The trend of government health expenditure in Nigeria between 2000 and 2020 is shown in Table 1. There were many fluctuations in Government domestic health expenditure as a percentage of total current government health expenditure in Nigeria within the study period which is an indication of inconsistencies in government policy regarding healthcare. Domestic health expenditure never exceeded 26% throughout the period despite instances of pandemics like the Bird flu, Ebola and recent COVID-19 which had a significant impact on national output productivity. A significant drop was experienced between 2004 and 2010 from 25% to as low as 13%. Clearly, since the year 2000 government domestic expenditure on health has been less than 26% of total government expenditure on health in Nigeria. This is poor compared to other countries even in Africa (World Bank, 2022).

Table 1: Government healthcare expenditure (2000-2020)

Year	Domestic health expenditure as a percentage of current health expenditure
2000	18.32
2001	26.89
2002	21.33
2003	18.4
2004	25.94
2005	25.56
2006	21.18
2007	19.91
2008	17.87
2009	15.92
2010	13.6
2011	14.44
2012	16.2

2013	14.3
2014	13.32
2015	16.45
2016	13.02
2017	14.19
2018	16.1
2019	15.95
2020	15.95

Source: Authors computation (2022)

Descriptive statistics and diagnostic tests

The mean of all the variables lies between the minimum and maximum values which indicated adequate and symmetrical distribution (Table 2). However, looking at the wide range of minimum and maximum values for real GDP divided by the working population (used as a proxy for productivity), shows the high fluctuation of this variable.

Table 2: descriptive statistics of variables

	RGDP/WP	GCF	HCE	SSE
Mean	2736.37	17.99	17.94	30.579
Maximum	10151.79	89.84	26.89	55.90
Minimum	493.44	2.02	13.02	13.60
Std. Dev.	2.904	2.601	4.29	1.059
Kurtosis	1.088	1.649	2.64	0.812
Jarque-Bera	1.508922	3.072538	2.648269	2.018153
Probability	0.470264	0.215182	0.266033	0.364555
Observations	21	21	21	21

All the variables in this study have values of kurtosis less than 3, meaning they are normally distributed. Therefore, they are continuous in nature and can be differenced more than once. The result of the Jarque-Bera for all the variables shows that none of the residuals is statistically significant. This is desirable because it shows that there is no serial correlation or heteroskedasticity problem.

To further test for heteroskedasticity of the variables, the Breusch-Pagan-Godfrey test was conducted. The result is presented in Table 3. The general rule is to accept the existence of heteroskedasticity if the test is significant at 5% or less. Our test shows a 72% level thus there is no existence of heteroskedasticity rather the residuals are homoskedastic which is desirable.

Table 3: Output of Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.436979	Prob. F(5,10)	0.8132
Obs*R-squared	2.868988	Prob. Chi-Square(5)	0.7202
Scaled explained SS	0.836910	Prob. Chi-Square(5)	0.9746

The correlation matrix for the independent variables presented in Table 4 also indicated that there exist low correlations among these variables since all the values of the coefficient of correlation are less than 0.75.

Table 4: Correlation matrix for the independent variables

	GCF	HCE	SSE
GCF	1		
HCE	.412*	1	
SSE	.570*	.579*	1

*Significant at 5% or less

Unit Root Tests Analysis

The standard Augmented Dickey-Fuller (ADF) unit root test was employed to check the order of integration of all the variables in the model. Based on the ADF test statistic in Table 5, it was observed that all the variables were stationary at level. Thus there is no serial auto-correlation among the variables.

Table 5: Result of unit root (ADF) test

Variables	Level I(0) Constant and trend
RGDP/WP	-1.072436
GCF	-2.090129
HCE	-1.002428
SSE	-1.966901

Source: Computed from result output (2022)

Regression result

The result for the equation to determine the influence of healthcare service expenditure on national output productivity is presented in Table 6 which shows the Ordinary Least Square multiple regression outputs.

The diagnostic result for the regression model shows that the adjusted R-square is 0.74 which indicates that 74 per cent of the variation in the dependent variable is caused by the variations in the independent variable which shows that the model has high goodness of fit. The F-statistics is significant at 1%, thus the model is statistically significant at 1% indicating that the explanatory variable significantly explains the dependent variable which is national output productivity. The value of the Durbin-Watson statistics shows that there is no serial autocorrelation since the value is greater than 2.

Table 6: OLS Regression results

Variables	coefficient	Std. error	t-statistics	probability
Constant	2.44536	3.11704	0.64502	0.5213
GCF	0.72062*	0.20401	2.09083	0.0342
HCE	0.53508**	0.06072	3.56414	0.0026
SSE	0.36740	0.20245	1.98420	0.0801
R-square	0.76546	F-statistics	38.7258	
Adjusted R-square	0.73534	Prob (F-statistics)	0.00245	
Log likelihood	-257.3931			
Durbin-Watson stat	2.006540			

**Sig @ 1%; *sig @ 5%

Source: Computed from result output (2022)

According to the results in Table 6, the coefficient of gross capital formation (GCF) has positive coefficients and it is significant at the 3% level (less than 5%). This result implied a direct relationship between capital formation and national output productivity in Nigeria. The result indicates that a unit increase in gross capital formation will increase output productivity by about 0.72 per cent. This result is consistent with our a priori expectation and with a previous study by Bakare and Olubokun (2011). The coefficient of healthcare service expenditure (HCE) also has a positive sign and is significant at the 1% level. This result suggests a direct relationship between health expenditure and output productivity in Nigeria. A percentage increase in public healthcare service expenditure will lead to a 0.5 per cent increase in output productivity. It implies that the increasing health expenditure over the years has potentially boosted national output productivity. Thus, *ceteris paribus*, government policies that enhance healthcare service expenditure in Nigeria will contribute positively to national output productivity in Nigeria. This result is expected because increasing healthcare service expenditure will raise healthcare service delivery which will reduce disease conditions, increase life expectancy and invariably raise output productivity. This result is consistent with Eneji et al. (2013), and Bakare and Olubokun (2011) but contrary to Abu and Abdullahi (2010). Secondary school enrolment (SSE) which served as a proxy for the Labour force has positive coefficients and it is significant at the 8% level. This variable appears to be the only factor that is significant at greater than 5 per cent level and also seems to contribute least to output productivity in Nigeria. A percentage increase in secondary school enrolment will lead to a 0.4 per cent increase in output productivity in Nigeria. However, this result agrees with a priori expectations and previous results by Bakare and Olubokun (2011).

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

This paper investigated the influence of domestic public healthcare service expenditure on national output productivity in Nigeria between 2000 and 2019, using the ordinary least square technique. The findings show a positive relationship between Healthcare expenditure and output productivity which is in conformity with stated *a priori* expectations. The same relationship was found to exist between gross capital formation, secondary school enrolment and national output productivity in Nigeria. It can be concluded that healthcare expenditure has a vital influence on the national output productivity in Nigeria. In contribution to previous submissions on this subject, the paper thus recommends that Nigerian policymakers should invest more in the health sector to improve healthcare service delivery. This can be achieved by increasing the yearly budgetary allocation to the health sector and ensuring that funds budgeted for healthcare services are appropriately expended for that purpose.

Finally, there should be deliberate recruitment and training of healthcare workers so that they can be more efficient in healthcare service delivery.

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