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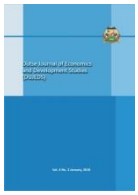

PATTERN OF GOVERNMENT EXPENDITURE ON HEALTH AND WORKFORCE PRODUCTIVITY IN NIGERIA 1981-2016: A CHOW BREAK POINT AND FORECAST ANALYSIS

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Abstract
Sustained expenditure on health overtime ensures a healthy and productive workforce. This paper aimed to examine the relationship between government expenditure and workforce productivity in Nigeria. Using a sample (data set) of 36 years (1981-2016) for GDP, recurrent expenditure and capital expenditure on health in Nigeria, this paper applied the Chow breakpoint and forecast tests to examined the possible impact of the post structural adjustment (1986-1999) and post millennium (2001—2016) recurrent and capital expenditures pattern in the health sub-sector on GDP and workforce productivity in Nigeria. The paper found out that there were no significant changes in the pattern of expenditures (recurrent and capital) in the health sector during the post structural adjustment and post millennium periods. The paper also found out there was however significant relationship between increases in health expenditure (particularly recurrent) and workforce productivity in Nigeria. The paper concludes that this relationship was however more significant in the post millennium period (2001-2016) than during the post structural adjustment years (1986-1999), and recommends that a sustained increase in capital expenditure in the health sector could improve health care delivery and workforce productivity in Nigeria

Keywords: Expenditures, Health, Productivity, Workforce, Breakpoint
JEL classifications JEL: H51

Introduction

A healthy workforce is a very important factor and source of economic growth and productivity. This is because there is a mutual interaction between a population's health level and the level of its productive output since healthy individuals are fit both physically and mentally; they are therefore expected to contribute to production more than a sick person and increase productivity and have a positive impact on economy. When a person is healthy, life expectancy increases and this promotes individual savings and private investments. Thus for the workforce to be productive, government must devote a high proportion of its resources to financing and upgrading health facilities, equipment, materials, and personnel for effective health care delivery.

With its multiplier effect, increased health expenditures leads to an increase in total expenditures and aggregate demand. Apart from that, the health sector constitutes an area of employment in the economy and increased health expenditures leads to a rise in the number of those employed in the sector along with the total income of those employed, which contributes to total expenditures and increases aggregate demand. Such effects health expenditures on total expenditures, aggregate demand, and total production are termed direct effects. Direct effect is expected to be positive. On the other hand, because sick people are more inefficient, and impose burdens on their families and countries due to reasons associated with their diseases, this leads to disruptions in production and prevents expenditures made in the health sector to be utilized in such more productive sectors as infrastructure, investments and the like. Not only that, viability in the healthcare market spreads to the other sectors associated with the health sector and can vitalizes these other sectors as well; and increases the trade and production volumes in these segments. Such indirect effects are called effects. Despite this however, while health care needs are increasing, government finances for health in developing counties seem to be declining. This has resulted in

the emergence of more chronic diseases with expensive treatment outlays.

According to the World Health Organization, government financing of the health sector in Nigeria does not seem to have done much towards ensuring an efficient health care delivery system that could ensure a sustained improvement of the health and productive capacity of the citizenry. Healthcare expenditure funding in Nigeria is from a variety of sources which include government, private sector, international donor agencies and NGOs. This study focuses on government funding. Government has the bulk of healthcare expenditure in Nigeria, which comprises budgetary allocations from government at all levels (Federal, States and Local Government).

Despite Nigeria's enormous potentials in both Human and natural resources as well huge internally and internationally generated revenue, statistics from the WHO regarding Nigeria's health status is disturbing. The average life expectancy of Nigerians at 54 years is below the global average, maternal mortality is 608 per 100,000 live births, twice as high as South Africa and almost 10 times Egypt. Additionally, for example, only 3% of HIV-positive patients receive anti-retroviral treatment (WDR 2012).Also women, children, and adults especially the core poor die from avoidable health problems such as infectious diseases, malnutrition, polio, tuberculosis, measles, complications at pregnancy and childbirth etc.

According to Omeruan *et al*. (2009), the major challenges of Nigeria healthcare system have been largely due to the un-planned consequences of social policy apparent in the low expenditure in health care delivery services. Consequently, health services in Nigeria have suffered from decades of neglect, thereby endangering the health status of the average Nigerian in particular, the workforce in general, and drastically lowering national productivity. Government expenditure has not provided adequate health infrastructure, especially in the rural areas of primary health care. The health sector suffers from the dearth of qualified healthcare personnel and regulations, as Nigeria's promising doctors, pharmacists, nurses and other health professionals continue to leave Nigeria to apply their services more profitably in other countries.

To determine whether there were changes in the pattern of government recurrent and capital expenditure in the health sector during the structural adjustment and post millennium periods using the Chow breakpoint and forecast tests. There were no changes in the pattern of government recurrent and capital expenditure in the health sub-sector during the post structural adjustment and the post millennium periods. There is no significant relationship between government recurrent and capital expenditure in the health sub-sector and workforce productivity in Nigeria. This paper is divided into five sections. The sections one to five covers the introduction, literature review, methodology, result and discussion as well as conclusion and recommendations respectively.

Literature Review

Health care financing is the process through which revenues are collected, pooled and allocated for efficient health care delivery purposes (Murray and Frenk 2000, Yadav et al 2009). The World Health Organization views health financing as concerned with how financial resources are generated, allocated and used in health systems with particular emphasis on where to raise sufficient funds for health, how to overcome financial barriers that exclude many poor from accessing health services, as well as how to provide an equitable and efficient mix of health services (WHO 2014).

Similarly, according to the World Bank report on health financing, all health financing approaches should fulfill basic principles of public finance which includes: to raise enough revenues to provide individuals with the intended packages of health services that assure health and financial protection against catastrophic medical expenses caused by illness and injury in an equitable, efficient and financially sustainable manner; to manage these resources to fund health risks equitably and efficiently; and to ensure the payment for or the purchase of health services is carried out in ways that are allocatively and technically efficient (WBR 2013)

This paper will apply the Keynesian theory of government intervention in the economy, Wagner's theory of increasing government expenditure, as well as the Peacock and Wiseman displacement effect hypothesis to explain the nexus between government intervention in health through financing and the impact or otherwise of workforce productivity in the economy. The Keynesian school of thought advocates for government spending for the purpose of investment and economic growth (Keynes 1936). Keynesian economics therefore relies strongly on the machinery of government spending to move a recessionary economy into economic buoyancy (Vitez 2009). This analogy of expansionary government expenditure to stimulate economic growth of an economy in recession could be extended to sectors within an economy. In other

words, an expansionary government spending on a sector such as health sector may have the multiplier effect of increasing the productivity of the existing workforce (Vitez 2009).

Wagner's law of increasing expansion of public and particularly state activities also referred to as the law of expansion of fiscal requirements, suggest that the share of public sector in the economy will rise as the economic growth proceeds owing to the intensification of existing activities and extension of new ones (Gowda 1987). Wagner was of the opinion the increasing state activities leads to a resultant increase in government expenditure. In this respect therefore increases in population and in the workforce overtime and in order to increase and sustain the productive capacity of the workforce, this will increase the demand for better health care delivery and subsequently increase government expenditure on the health sector (Jain 1989).

The main thesis of Peacock and Wiseman popularly called the displacement effect hypothesis suggests that public expenditure does not increase in a smooth and continuous manner but rather in jerks or step like fashion. The hypothesis also contends that large scale disturbances such as war, influx of refugees, diseases outbreak leads to displacements in revenue generation and expenditure specifically to a higher level, and even after such large scale disturbances, the level of public expenditure does not return to the level it was before the events (Bhatia 2008)

Empirical review

Hashimati (2001) studied the relationship between health expenditure and macro economic growth in OECD countries from 1970 using the Solow growth model found a positive relationship between the variables under study.

In a related study in turkey however, Kar and Taban (2003) applying co-integration technique to a data of 1971 to 2000 found a negative relationship between health expenditure and macro economic growth.

Chackroun (2009), using multivariate nonlinear estimation technique to a data on 17 OECD countries from 1975-2003 found out a positive relationship between health expenditure and macroeconomic growth.

Yumuşak and Yıldırım (2009) on the other hand who studied the relationship between health expenditure and economic growth in Turkey using a data from 1980-2000and applying Co-integration method found a negative relationship between the variables under study.

However, Arisol et el(2010) who also studied the relationship between health expenditure and economic growth in Turkey using a data from 1960-2005 and applying Co-integration method found a positive relationship between the variables under study.

Cevin and Ecevit (2010), using pooled OLS estimation technique to a data on 15 OECD countries from 1990-2006 found out there was no relationship between health expenditure and macroeconomic growth.

Elmi and Sadegi (2012), using a data on developing countries from 1990-2009 and applying panel co-integration causality in VECM method found short run causality between GDP to health but a bi-directional causality in the long run.

Lago-Penas et al (2013),using a data on 31 OECD countries from 1970-2009 and applying fixed effect modeling found out that private health expenditure are more productive than government expenditures.

Nurudeen and Usman, (2010) argue that rising government expenditure on health results in an increase in economic growth. They among others, suggest that government should raise its expenditure in the development of the health sector since it enhances productivity and economic growth. In the same flow, 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. In the literature, while some authors (Abu and Abdullahi, 2010) established a negative relationship between increased government expenditure and economic growth; others (Bakare and Olubokun, 2011) still found that the relationship is unidirectional; that government expenditure impacts very little on growth, and that growth does not impact on government expenditures.

Similarly, Mathias et al (2013) in a paper that investigated the relationship between health expenditure and health status in Nigeria form 1999-2012 and applying multiple regression analysis found out there appear to be strong causal link between poverty, unemployment, nutrition, health status and national productivity in Nigeria. Government expenditure on health is not enough to bring about the needed improved health status. Thus they concluded that though there is a significant relationship between government

health expenditure and health status, the former has not significantly impacted on the latter in Nigeria.

On the other hand however, in a study that investigates health care expenditures and economic growth in Nigeria Bakare and Sanmi (2011) found that there was a significant relationship between health expenditure and economic growth in Nigeria.

In three studies on the relationship between health expenditure and macro-economic growth in Nigeria, Odunbunmi et al (2012), Temitope and Bola (2013), as well as Oni (2014); using Nigerian data from 1970-2009, 1977-2010, 1970-2010; and applying co-integration and multiple OLS respectively all found a positive relationship between health expenditure and macro-economic growth in Nigeria.

Methodology

This paper applies the Chow break-point analysis (test) to determine whether there were significant changes in the pattern of expenditure in the health sub-sector particularly in the post structural adjustment and the post 21st century periods. Also using Multiple OLS, the paper estimated the relationship between government expenditure in health and workforce productivity over the years using a model adopted from *linear models* (Grunwald et. al, 2000) cited in (Freeland and Micabe 2004) . The data used was secondary sourced from the World Health Organization (WHO) publications, the National Bureau of Statistics of Nigeria (NBSN), Central Bank of Nigeria (CBN) statistical bulletin, the Federal Ministry of Health (FMH), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the National Planning Commission (NPC).

The scope of the study covers a period of 38 years (1981-2016) broken into two minor samples of 15 years (1986-2000) and 16 years (2001-20016) respectively. The aim is to determine the impact of government expenditure on health on the productivity of the workforce during the post-structural adjustment years vis a vis the impact of government expenditure on health during first post twenty first millennium years when both national and international emphasis was focused on health care financing in order to achieve and sustain the millennium and sustainable development goals. The whole sample will also be estimated also using OLS to determine the impact of government expenditure on health on workforce productivity over the years 1986-2016.

Model Specification

Adopted from linear models Grunwald et al 2000 cited in Freeland and Micabe 2004.

WFP=RGDP/WP= f (RHE, CHE, HPGDP) ……. (1)

Where:

RGDP/WP = Real GDP divided by the working population as proxy for productivity

REH= Recurrent Expenditure on Health

CEH = Health Expenditure on Health

HPGDP= Total Health Expenditure as Percentage of GDP

The general form of the model becomes:

$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \mu$……. ……..... (2)

This further becomes defined as:

$WFP = \alpha + \beta 1REH + \beta 2CEH + \beta 3HPGDP + \mu$ …….. (3)

Results and Discussion

Table 1: Summary of Regression Result

Dependent Variable: Productivity proxied by GDP/TWF		
Independent Variables		
Recurrent Expenditure on Health (REH)	352.8176	
		(15.23164)
		[0.0000]***
Capital Expenditure on Health (CEH)	72.68466	
		(2.176436)
		[0.0368]**
R^2		0.950441
$Adjusted\ R^2$		0.947437
F-Statistic	316.4366	
Prob (F-Statistic)	0.000000***	

t-ratios in Parenthesis ( ), probabilities in brackets [ ], Parameters significant at 1% (***) and 5% (**) respectively.

Source: Author's computation using E-views 10

Table 2: Summary of Regression Result

Dependent Variable: Productivity proxied by GDP/TWF			
Independent Variables			
Recurrent Expenditure on Health (REH)		240.8296	
			(3.206332)
			[0.0052]***
Capital Expenditure on Health (CEH)		96.37137	
			(2.143340)
			[0.0468]**
R^2			0.844207
$Adjusted\ R^2$			0.825878
F-Statistic		46.05946	
Prob (F-Statistic)			0.000000***
Chow breakpoint test (1987)	(0.000583)	1.0000 # F-stat	
	(0.002099)		1.0000# LLR
	(0.001749)		1.0000### W-Stat.

Source: Author's computation using E-views 10

(#) Not significant even at 10% indicating the acceptance of the null and rejection of the alternative hypothesis that there was no structural breaks (in terms of government recurrent and capital expenditure in the health sector) despite the structural adjustment program embarked by the then military administration to revamp the economy by increasing its economically active potentials through a healthy and productive workforce.

Thus, the Chow forecast test summary below indicates stability in the recurrent expenditure in the health sector for the years 1986-2000 despite the structural adjustment program.

Table 3: Chow Forecast Test Summary

Chow forecast test (1986-2000)	128661.2 F-Stat	
		(0.0000)*** Prob. F-Stat
		522.2080 Likely hood ratio
		(0.0000)*** Prob. LHR
Parameters significant at 1% (***) and 5% (**) respectively.		

Source: Author's computation using E-views 10

Table 4: Summary of Regression Result

Dependent Variable: Productivity proxied by GDP/TWF			
Independent Variables			
Recurrent Expenditure on Health (REH)		356.8188	
			(9.191895)
			[0.0000]***
Capital Expenditure on Health (CEH)		88.22819	
			(1.248066)
			[0.2340]
R^2			0.888197
$Adjusted\ R^2$			0.870996
F-Statistic		51.63790	
Prob (F-Statistic)		0.000001***	
Chow breakpoint test (2001)		0.9612 # F-stat	
			0.9510# LLR
			0.9618### W-Stat.

Source: Author's computation using E-views 10

(#) Not significant even at 10% indicating the acceptance of the null and rejection of the alternative hypothesis that there was no structural breaks (in terms of government recurrent and capital expenditure in the health sector) despite the millennium development goals emphasis on increasing expenditure on health to improve health care delivery particularly in developing countries. Therefore, the Chow forecast test summary below indicates stability in the recurrent expenditure in the health sector for the years 2001 -2016.

Table 5: Chow Forecast Test Summary

Chow forecast test (2001-2016)	150.8294 F-Stat	
		(0.0000)*** Prob. F-Stat
		178.6516 Likely hood ratio
		(0.0000)*** Prob. LHR
Parameters significant at 1% (***) and 5% (**) respectively.		

Source: Author's computation using E-views 10

Conclusions and Recommendations

Through statistical estimations and tests (regressions, break point and forecast test), this paper has on one hand demonstrated that there were no significant changes in the pattern of health expenditure in Nigeria over the last 30 years despite mass structural changes in the economy in the mid-late 80's and the millennium years vis-a-vis the priority given to structural adjustment program and the millennium /sustainable development goals. On the other hand, however, the recurrent expenditure on health have over the years been found out to have significant impact on workforce productivity in Nigeria, while capital expenditure have been found not to have significant impact on workforce productivity even at 10% LOS. The delay in constructing and equipping standard health facilities across the nation might have contributed to the latter, while recruitment of health personnel to at least diagnose health related problems in rural and urban settlements across the nation might have contributed to the former analysis. This paper recommends that a sustained increase in capital and recurrent expenditure in the health sector will enable mass improvement in infrastructure and qualified health care personnel respectively. This will subsequently lead to improved health care delivery and workforce productivity in Nigeria.

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