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Health care expenditure, health status and national productivity in Nigeria (1999-2012)

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The major challenge facing policy makers is how to allocate limited resources across the range of preferences that contribute to poverty reduction and economic development; including capital expenditures on health, education, infrastructure and recurrent expenditures. The aim of this study is to establish the relationship between healthcare expenditure, the health status and national productivity in Nigeria. The motivation for this study is the relevance of the subject matter. Most of the studies in this area have treated the impact of government's expenditure on health in Nigeria, without linking such expenditure appropriately to productivity. This study is situated in applied economics and the relevance of applied research cannot be overestimated. Since the public and private health care sectors are broad, we focused on the public healthcare expenditure from 1999-2012 for objective analysis. We reviewed several literatures and also used secondary data to run regression. We also used questionnaires to elicit responses. Public health care expenditure is considered as the explanatory variable for health status, productivity and poverty reduction. However, the causal relationship is weak in the Nigeria scenario. If people are a country's principal asset, then their health status defines the course of development, and their health characteristics determine the nature and direction of sustainable human development. Nigeria needs investment in health research and innovation. We recommend a universal healthcare coverage; a system that everyone can access healthcare. More so, in an increase ngly globalized world, it is recognized that high levels of investment in research and innovation are essential, both for economic competitiveness, and to yield innovation in areas such as healthcare and environmental technologies. These make tangible improvements to quality of life. The challenges and prospect of the primary healthcare delivery for rural development need further study.

Key words: Federal Government of Nigeria, productivity, health status, reproductive health, sustainable development, primary healthcare.

INTRODUCTION

Funding healthcare expenditure 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). However, a high unemployment rate, soaring prices and a particularly more difficult economic situation for the majority of the poor population has severe consequences on the health status of Nigerians. The aim of this study is to establish the relationship between healthcare expenditure, the health status and national productivity in Nigeria. The motivation for this study is the relevance of

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the subject matter. Most of the studies in this area have treated the impact of government expenditure on health in Nigeria, without linking such expenditure appropriately to productivity. This study is situated in applied economics and the relevance of applied research cannot be overestimated. Healthcare expenditure has serious implications for the welfare of Nigerians. The outbreak of the global financial crisis in 2008 was a heavy blow to the world economy, and its negative impacts are still being felt, especially for developing countries that are import-dependent for health, food and other basic necessities. Low levels of nutrition reduce productivity by damaging physical and mental health; from conception, infant, school age, and onwards. In November 2010, the United States launched its second round of quantitative easing monetary policy, implemented the bond purchase plan of $600 billion and retained short-term interest rates at almost a zero point rating. All these lead to the depreciation of the dollar and a new round of commodity soaring prices, which gave the developing countries and emerging markets huge inflationary pressure. The oil price remains high and fluctuates between $90 and $100 a barrel. Meanwhile, prices of agricultural products keep on increasing, leading to inflation in Nigeria and other developing countries; exerting pressures on the livelihoods of the lower and middle classes of citizens. Nigeria is a mixed economy, with reforms moving toward the direction of a free and market-oriented economy. As a developing country, Nigeria does not belong to the BRICS (Brazil, Russia, India, China and South Africa), but it belongs to the Next Eleven (South Korea, Mexico, Indonesia, Turkey, the Philippines, Egypt, Vietnam, Pakistan, Nigeria, Bangladesh and Iran). However, among all the emerging markets, Nigeria's economic power is still relatively weak and limited to a mono-product economic structure. The rural population accounts for 65% of the total; the share of agriculture dominates the GDP, while crude oil is the major foreign exchange earner. Non-oil exports are increasing in recent period of deepening democratization and economic reforms with little impact on the livelihoods and particularly health status of the poor majority. As an agricultural country, Nigeria still needs to import food in large amounts. In 2010 alone, Nigeria spent 635 billion Naira on wheat ($1=150 Naira), 356 billion Naira on importation of rice, 217 billion Naira on sugar imports, 97 billion Naira importations of fish (with all the marine resources, rivers, lakes and creeks which the country is naturally blessed with). This is not fiscally, economically or politically sustainable. The budget that would have gone to health infrastructure is spent on undue foods importation, as nutrition is part of health. Poor urban and rural households spend 70-80% of their incomes on food, with nothing left for health maintenance and education. Despite the economic growth recorded in the GDP over the years, unemployment, poverty and inflation highlight the suffering of the poor. About 60% of the population lives on less than $2 per day. In 2011, the inflation rate reached 10 %. The official unemployment rate is 9%, while actually about 40% of the population cannot find a job (30% are youths and women are the worst hit) (Eneji et al., 2013; Uwem and Ndem, 2012). In the light of all these, how much could the poor save and spend on their health? How much is government spending on health, given all the budgetary pressures? And what impact has government expenditure on health status of Nigerians? In attempt to answer these questions, the remaining part of this paper is organized into ten (10) sections for ease of analysis and comprehension. Section 2 deals with conceptual issue; section 3 is statement of the research problem. In section 4, we identify and explain the methodology of research, the general health indicators in Nigeria are presented in section 5, while section 6 presents the health reforms in Nigeria. The relationship between health and human capacity development is treated in section 7, section 8 presents the regression results, using a linear multiple regression analysis. The findings, recommendation and conclusion are in sections 9, 10 and 11 respectively.

Conceptual issue

Public health and human rights are complementary approaches to promoting and protecting human dignity and wellbeing (Aniekwu, 2006). There is a link between macroeconomics and health status. A very important component of economic development of a country is its people's state of health. In fact, there is the argument as to whether it is health that causes development or economic development causes health improvements. 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. According to WHO (2010), 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. History is a witness that important breakthrough in public health,

diseases control and improved nutritional intake have given rise to great takeoffs in economic development. Rapid growth of Britain during the industrial revolution, rapid growth of Japan in the 20th century, Europe and East Asia in the 1950s and 1960s were as a result of improvement in health status (Sein and Dalpatadu, 2005). The measurement of health is regarded as health status. Since health is multi-dimensional, health status is also multi-dimensional, and thus has a variety of measures (Mwabu, 2008). The measure that this research adopts is referred to as the general health indicators which include mortality and morbidity rates, life expectancy at birth, and various indicators of diseases burden, example; disability adjusted life span and quality adjusted life span. Health status determines job productivity, the capacity to learn at school and the ability to grow intellectually, physically and emotionally. Elimination of diseases and improvement of individual health will 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. The demand for health care is derived from the demand for health itself. Both health care 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 health care 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. Irwin et al. (2008) explained that material circumstances which include factors such as housing and neighbourhood quality, consumption strength and the physical work environment can affect the health status. Wilson et al. (2008) outlined 12 social determinants of health as income/social status, social support networks, education/literacy, employment/occupation, social environment, physical environment and personal health practices. This is supported by Heynes and Borman (2008) who affirmed that poverty, physical environment; genetic factors and the socio-economic conditions (including lifestyle) are key determinants of health status in Africa. The level of household income, household demography and health behaviours can affect health status.

Statement of the problem

Childhood immunization, maternal mortality, HIV/AIDS life-saving anti-retroviral drugs are regarded as some of the most effective public health interventions in modern history. However, recent statistics from the WHO regarding Nigeria's health status is disturbing; the average life expectancy at 54 years is below the global average, maternal mortality is 608 per 100,000 live births, twice as high as South Africa's 300 per 1,000 and almost 10 times Egypt's 66 per 1,000. Besides, only 3% of HIV-positive mothers receive anti-retroviral treatment. According to Omeruan et al. (2009), the major challenges of Nigeria healthcare system have been largely due to the unplanned consequences of social policy. Consequently, health services in Nigeria have suffered from decades of neglect, endangering Nigeria health status and national productivity. The healthcare system management is in three tiers; tertiary healthcare- 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. It is the primary healthcare that suffers the most neglect. Women, children, and especially the core poor die from avoidable health problems such as infectious diseases, malnutrition, polio, guinea worm, measles, complications at pregnancy and childbirth. Government's 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. Nigerians are being denied quality healthcare services, especially those in the rural areas. Between 2005 and 2012, Nigeria's 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 the federal government expenditures shrank from an average of 3.5% in the 1970s to less than 2% in the 1980s and 1990s (FMOH, 2004). Nigeria was ranked 187th among the 191 United Nations member states in 2000. That same year, Nigeria spent 4USD per capita on health, below WHO's minimum benchmark of 14USD per capita for developing countries (WHO,2000). By 2002, total health expenditure was disma l figure of 4.7% (WDR,

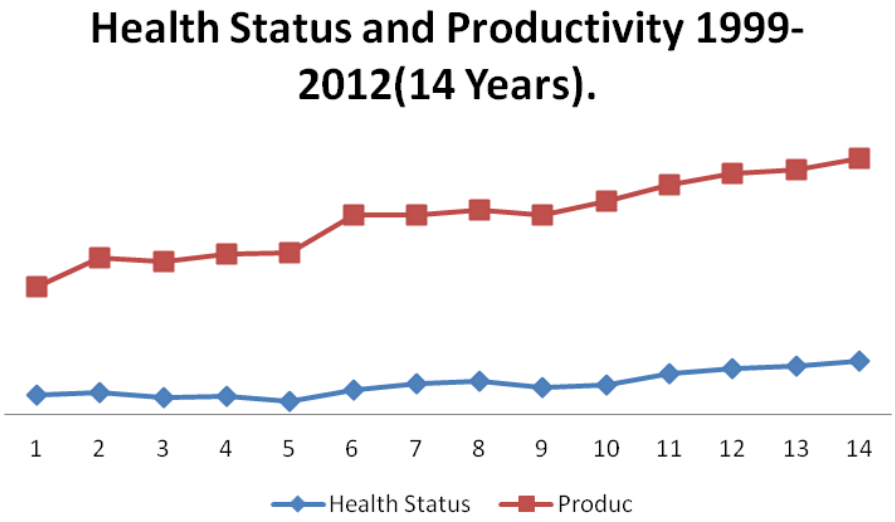

Figure 1. Health status and productivity.

2005). In 2012, total health expenditure as percentage of GDP stood at 5.3%, ranked 153 out of 187th countries and territories. 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. Increase in government expenditure and growth in per capita output in Nigeria do not speak for increase in social welfare and health status in particular. In studies by Laudau (1983), Baumol (1986) and Bhargava et al. (2001), productivity was found to be positively related to total investment in human and physical capital, political and international conditions. Deverajan et al. (1996), using a sample of 14 OECD countries, found that spending on health, transport and communication has positive impacts, whereas spending on education and defence did not have positive impact on productivity. But all these variables are determinants of productivity. Nigeria's fiscal scenario poses significant risks to sustainable development, given that oil boom has increased government's expenditure from historical experiences of the 1970s. However, the size of government's non-productive spending and corruption has always swollen deficit budget. This calls for serious concern by policy makers to check the growth of government wage bills. Political corruption is responsible for budgetary inflation in Nigeria.

METHODOLOY

In the literature, some researchers have analyzed the effect of health on countries' growth and productivity. However, they do not take into account (as in this paper) other factors that can also raise productivity. This study captures such other effects as technology, education, infrastructure and capital in a separate regression analysis. Data for this study were sourced from primary and secondary sources. Macro and state level data collection is being used. We used time series data to estimate the relationship between the variables (Freeland and Micabe, 2004); in linear models (Grunwald et. al, 2000). The secondary sources include 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). Other sources are textbook, journals, seminar papers and the internet. The scope of study covers the period from 1999-2012. The choice of this period is informed by the era of the introduction of health reforms following political democratisation. In the quantitative analysis, the measures that this study uses are health status, the mortality and morbidity rates, life expectancy and some aspects of public expenditure to improve same. We use infant mortality rate (IMR) as a proxy for health status. The measurement of health is referred to as health status, which can be measured by life expectancy, mortality rate and the productivity of workers. According to Janet (2006), health status has many domains; mental, physical, chronic conditions, nutritional, environmental exposures and injuries and various indicators of diseases burdens or disabilities (e.g. polio). The relationship between health expenditure, health status and productivity is not constant (Figure 1). It is subject to upward and downward trend (Brown et al., 1975).

Estimates of the magnitude of productive returns to investment in health are subject to considerable uncertainty, qualified by limitations in data and analytical methods. This study attempts to fill in the gap.

Our model of analysis is of the form:

HS=f (EXPMC, EXWH, EXCHC, GHIV/AIDS, OAHC) ---------- (1)

Where HS= Health Status,
EXPMC= Expenditure on Maternity Healthcare,
EXWH= Expenditure on Workers 'health,
EXCHC= Expenditure on Child healthcare,
GHIV/AIDS= Government expenditure on HIV/AIDS, and
OAHC= Old age healthcare

For lack of accurate data, we transformed equation 1 into equation 2:

RGDP= f(RHE, CHE) ---------- (2)

RGDP= Real GDP
RHE= Recurrent Health Expenditure, CHE = Health Capital expenditure

Table 1. Measurement of health status- general health indicators using descriptive statistics.

Health status	Coefficient estimates	Standard Errors	Mean of Dep.Var	Evaluation	H/h weight%
Infant mortality	-0.0671	0.0045	0.054	3	0.55
Life expectancy	-0.0358	0.0062	0.038	3	0.3
Malaria	2.6471	0.0414	0.056	4	0.43
HIV/AIDS	0.0059	0.0083	0.653	3	0.28
Tuberculosis	0.0399	0.0285	2.106	3	0.25
Cholera	0.7443	5.33E-03	0.097	3	0.38
Diarrhoea	0.6175	0.8462	1.088	3	0.36
Mortality rates	1.0992	0.7539	0.714	3	0.44
Morbidity rates	3.0417	5.0996	0.094	3	0.18
Mental	-0.0684	4.86E-05	0.658	1	0.15
Physical	-0.7392	-3.55E-02	0.281	2	0.18
Environmental	0.5168	6.02E-44	0.096	3	0.24
Psychological	-0.48772	0.1186	-0.467	3	0.36

Source: Authors' computations. Evaluation: 1= excellent, 5=very poor. Each row is from a separate covariance analysis.

RGDP=f(HS) =f(GTHE, IMR)---------- (3)
Where GTHE= Government Total Health Expenditure, IMR= Infant Mortality Rate.

We use equations 2 and 3 to run two separate regression analyses.

However, in an attempt to properly capture the impact of health on productivity, we use the real GDP divided by the working population as a proxy for productivity, then we also introduce other variables than health that are capable of explaining changes in productivity. These are defined by equation 4;

RGDP/WP= f(EDU, CAP, HTH, TECH, ELEC/W/G)---------- (4)
Where RGDP/WP= real GDP over working population as a proxy for productivity.
CAP= capital expenditure in the budget
HTH=health variable
TECH=technology
ELEC/W/G=electricity, water and gas, as proxy for infrastructure.

Two separate regression analyses (4a and 4b) were carried out to explain these effects, presented under regression results in section 8.

There is a large literature on the indicators of health status, which may contribute to analysis of productive benefits of health to the national economy (David and David, 2000; Hartha, 2008; Jane, 2011).

General health indicators in Nigeria

Households suffer multiple deprivations in terms of health and education, especially in the rural areas. The health dimensions are based on some indicators as presented in Table 1. All indicators are taken from the household (H/h) level, and are weighted (column 6). The health deprivation scores are computed for the household survey. A cut-off of 40.5%, the equivalent of one-fourth of the weighted indicators, used to distinguish whether the health status is good or not good. If the deprivation score is 40.5% or greater, everyone in the household has poor health status. Household with deprivation score greater than or equal to 20%, but less than 40.5% are very vulnerable to diseases. Clements et al. (2011) pointed out that emerging economies' overall health status is relatively poor, compared to advanced economies. Funds to improve health status are limited. The minimum level of health spending to cover essential interventions estimated by WHO (2011) is $34 per capita; however, Nigeria is far short of this standard benchmark as she spends less than $5 per capita. Emerging country as Nigeria faces different public health spending challenges from developed countries. General health indicators such as mortality, morbidity, and expectancy rates, diseases burden statistics are at variance with huge health expenditures. World Health Organization's assessment of overall health status ranks Nigeria 187th among 191 countries. Nwakeze (2010) argues that Nigeria's health establishments are concentrated in the industrial and commercial parts of the country. The distribution of General Hospitals and local community dispensaries is geographically and structurally imbalanced.

The questions for this study are:

1. Has public expenditure on healthcare impacted on health status in Nigeria?
2. Is there any relationship between healthcare expenditure, human capital development and productivity?

Summary of descriptive statistics of the variables used in the empirical analyses is presented in Table 1. We adopt the covariance analysis (Pearson correlations and covariance) to find the statistical relationships amongst the variables.

Malaria is a major contributor to the disease burden of Nigeria, causing morbidity and mortality in infants, young children and maternal deaths. Other major contributors to loss in productivity are tuberculosis (TB), HIV/AIDS, diarrhoea, cholera and measles, as the household bears the highest burden of healthcare expenditure. The top five causes of death in Nigeria, according to WHO, are; Malaria, HIV/AIDS, influenza and pneumonia, diarrhoea and tuberculosis. About 51% of the rural population still have no access to safe water and reproductive health education. The share of government capital expenditure in GDP is expected to be positively and significantly correlated with economic growth and development. Increased government expenditure on health and education will raise the productivity of labour and increase the growth of national output. Similarly, increased government expenditure on infrastructure such as roads, communications, power, rail, sea and air transport reduces production costs, increases private sector investment and profitability of firms, thus, fostering economic growth. The life expectancy is summarized in the Table 2. Table 3 is a macroeconomic growth measure of health indicators.

Table 3 is the results of Pearson product moment correlation

Table 2. Nigeria- life expectancy history.

Year	Male	Female	Total	World rank
1960	37.2	40.3	38.7	153
1970	40.6	43.7	42.1	158
1980	43.8	46.9	45.3	159
1990	46.0	48.6	47.2	170
2000	46.1	47.8	46.9	169
2010	46.5	48.1	47.2	184

Source: The World Bank 2012.

Table 3. Macroeconomic growth measures of health indicators.

Variable	Year	Results (%)
Log% of GDP spent on healthcare	1999-2012	0.026
Log GDP growth rate per capita	1999-2012	0.035
Log difference of GDP per worker	1999-2012	0.44
Log difference of GDP per working age person	1999-2012	0.034
Log of life expectancy at birth	1999-2012	0.086

(PPMC) and the Spearman's rank order correlation coefficient. Working with ranks overcomes the problem of manipulating large numbers, especially when the distributions are large. The PPMC meets the assumption of linearity of regression.

For instance, an estimate of 0.086 means that a one standard deviation increase in life expectancy(14 years) raises GDP growth rates per capita by 8.6% per year. 0.055 means that each extra year of life expectancy leads to an increase in productivity of 5.5%.

We use infant mortality as a proxy for health status, and GNP as a proxy for productivity. The two variables do not move in opposite direction; they move in the same direction and both are dependent on each other. The relationship is positive, but poorly defined because the health sector's contribution to national development is still an issue. The results show that there has not been significant improvement in the health status since the health reforms in 1999. If health status improves, it further raises national productivity and vice versa. There is a correlation with productivity, growth and health status. Productivity growth rates are important for the improvement of a country's living standard (Harris, 1999). Human capital is a key factor in the determinants of productivity growth. Education, skills and health status are forms of human capital (Steckel, 2002). The macroeconomic relationship between health status and productivity has been captured in many literatures, both theoretically and empirically (Grossman, 1972, 2000). Emile (2002) investigates such evidence for both developed and developing countries for a period that spans over 200 years. The review focuses on the implications for public policy and firm- level practices in developed countries, particularly Canada. The objective of the strategy is improving health status and the human capital. According to Grossman and Kaestner (1997), health capital provides a flow of healthy time that is uniform in quality. The selected demographic characteristics and health statistics for Nigeria are shown in Table 4.

An average life expectancy of less than 55 years, high incidence of poverty and high morbidity rate imply that many parents either die before their children complete schooling, are too poor or too sick to give their children sound childhood nurturing and care. Several poorly nourished and ill-nurtured children start too early to take charge of their own lives, take care of younger siblings and surviving parents who are incapacitated by illness or poverty. Adult morbidity of 0.020% (for those aged 40 and above) means that there is likelihood that 2% of those aged above 40 years will become incapacitated by accident or diseases, to the extent that they are unable to move about or contribute actively in the economy.

Health reforms in Nigeria

Nigeria inherits its healthcare system from the British, structured in primary, secondary and tertiary levels, with the primary health care system suffering the most neglect (Figure 2). We used 1000 questionnaires to elicit responses from 200 households and individuals in Plateau State. Since the return of democratic rule in 1999, reforms have been promised in the health sector. Historically, as part of government efforts to address the poor and costly health status, the National Health Insurance Scheme (NHIS) was established in 1960, blurred by political instability, until 1984 when the National Council on Health (NCH) facilitated its implementation. NHIS was repackaged to ensure full participation of the private sector, giving birth to the Social Health Insurance (SHI) (NHIS, 2005). In support of the efforts to attain the Millennium Development Goals (MDGs), maternal and new-born health, water supply and sanitation sector reforms are ongoing in Nigeria. The Federal Government of Nigeria (FGN) and the Federal Ministry of Health (FMOH) undertake to carry out a comprehensive health sector reform in order to reposition the public health sector to be more responsible and responsive to the public health needs. This is to make sure that Nigerians live healthier, longer and productive lives.

The maternal and new-born health support programme is to help in improving the health status of women and children through an enhanced and sustainable primary health care delivery system while the Water Supply and Sanitation Sector reform is to increase access to safe adequate and sustainable water, sanitation and hygiene services. The 2012 National Health Bill was presented to the National Assembly, with the second reading held in December, 2012, and the public hearing in February 2013. It is aimed at protecting and prioritising the rights of Nigerians to get basic minimum package of healthcare. The national health bill pledges a budget of N60 billion ($380 million) for primary healthcare annually, and promises to ensure the provision of free medical care for the

Table 4. Selected demographic characteristics /health statistics 199-2012.

Health Statistics	Average demography (%)
Literacy(women)	54
Literacy (men)	74
Fertility Rate	5.7
Use of family planning	10
Adult Morbidity Rate(>40years)	2.0
Maternal Healthcare Urban/Rural	58/39
Immunization coverage	23
Stunting	41
Life expectancy at birth (>55 years)	10
Comprehensive knowledge of HIV prevention (Male/Female)	23/36
Household drinkable water	56
Household sanitation facilities	27
Access to electricity	25

Source: Nigeria Demographic and Health Survey fact sheet, NPC, 2012.

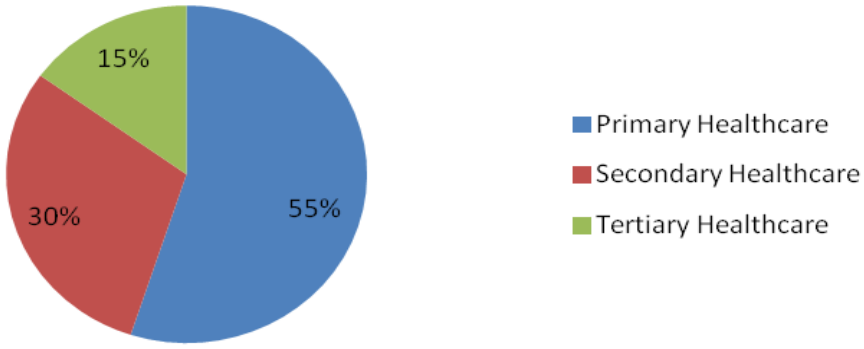

Figure 2. Neglect problems of public health care services in Nigeria.

most vulnerable. The bill establishes minimum guarantee of basic healthcare services for select groups-such as children below 5 years, pregnant women, adults above 65 years and people with disabilities, (Angie and Asoka,2011). It will help extend primary healthcare to 60% of Nigerians living in hard-to-reach rural communities. The bill also plans to remove barriers to access emergency healthcare as it instructs medics to treat any emergency first, before asking for money or police report. Included also in the reforms are; recruitment, training, and professional development of health sector workers.

The relationship between health and human capital development

Health is demanded and consumed because it affects the total time available for the production of income and wealth, (James, 2011; David and Heather, 2007). It is a source of utility itself. Improved health status of a country decreases the aggregate amount of sick time by producing more healthy days, weeks, months and years. This may present an opportunity for increased GNP, by working more healthy hours. Pritchett and Summers (1996) used GDP per capita as measures and found that OECD countries do have longer life expectancies and lower mortality rates compared with poorer countries. The former have higher budget expenditures on health. OECD (1995) reports health spending per capita to be positively correlated with life expectancy, and negatively correlated with potential years of life lost, infant mortality and prenatal mortality. The difficulty in this research is the scarcity of up-to-date data. Individuals hide their health disabilities, thus the accurate health status is difficult to measure. There are many people with unreported poor health status. One of the reasons being poverty, the other is for fear of losing their job to ill health. We rely mostly on secondary data.

REGRESSION RESULTS

There are shown in Eqns 2, 3, 4a, 4b (Tables 5, 6, 7, 8). It means that health expenditure and health status explain about 53 and 46 percent changes in national productivity (RGDP). The estimated parameter for RHE is statistically significant with t-statistic value at 3.644, well above 2. The estimated coefficient of CHE is negative at -0.360, and also statistically insignificant with a t-statistic value of -1.425 (Table 5). Overall, more government expenditure, especially capital expenditures are needed in the Nigeria health sector. The coefficient of the

Table 5. Regression results

	Coefficient	Std. Error	t-Statistic	Prob.
C	1658.832	4241.673	0.391080	0.7026
RHE	0.222043	0.060931	3.644144	0.0034
CHE	-0.360455	0.252932	-1.425104	0.1796
R-squared	0.535609	Mean dependent var		7986.051
Adjusted R-squared	0.458210	S.D. dependent var		9359.016
S.E. of regression	6888.831	Akaike info criterion		20.69005
Sum squared resid	5.69E+08	Schwarz criterion		20.83166
Log likelihood	-152.1754	Hannan-Quinn criter.		20.68854
F-statistic	6.920145	Durbin-Watson stat		1.714733
Prob(F-statistic)	0.010030			

Dependent Variable: RGDP; Method: Least Squares; Date: 05/31/13; Time: 08:54; Sample: 1 15; Included observations: 15. R-squared=0.53 and adjusted R2=0.46.

Table 6. Regression results.

	Coefficient	Std. Error	t-Statistic	Prob.
C	47460.78	15974.83	2.970972	0.0117
IMR	-404.7934	148.2646	-2.730208	0.0183
GTHE	-0.008937	0.036038	-0.247997	0.8083
R-squared	0.416263	Mean dependent var		7986.051
Adjusted R-squared	0.318974	S.D. dependent var		9359.016
S.E. of regression	7723.465	Akaike info criterion		20.91877
Sum squared resid	7.16E+08	Schwarz criterion		21.06038
Log likelihood	-153.8908	Hannan-Quinn criter.		20.91726
F-statistic	4.278603	Durbin-Watson stat		1.027821
Prob(F-statistic)	0.039564			

Dependent Variable: RGDP; Method: Least Squares; Date: 05/31/13; Time: 09:08; Sample: 1 15; Included observations: 15.

constant term is positive, which meets apriori expectation.

In equation 2, we run a separate regression, using the RGDP as a proxy for productivity, and infant mortality rate (IMR) as a proxy for the health status. Infant mortality rate and government total expenditure on health (GTHE) are the two explanatory variables in equation 2. The regression results proof that infant mortality has negative consequences on national productivity. The goodness of fit is also weak at o.42, and adjusted R-squared=0.32. In equation 4(a,b), we include variables such as education, infrastructure(expenditure on electricity, water and gas), technology (expenditure on R&D), as controlled variables. The reason is because, the estimated coefficient of the health variable in equations 2 and 3, where these control variables are not excluded from the model, may be correlated with them, heaping all variation in productivity on health variable. The result of such correlation may be low overall explainability of the model, with an uncontrolled larger effect of health over productivity appearing in the findings. The repeated regression analyses for equation 4b using ARCH (autoregressive conditional heteroskedasticity estimation) is to investigate the extent to which capital, technology, infrastructure and education may be correlated with the health variable in raising productivity. Compared with equations 2 and 3, where they were not included in the model, a reduced effect of health status on productivity is noticed. There is an improvement in the explainability of the model (R^2) from 0.535609 in equation 2 to 0.661231 in equation 4b (see section 8). Regression result in equation 4b is therefore a heteroskedasticity robust estimation. An effect that shows that increasing health expenditure, ceteris paribus (keeping other variables constant; no increase in capital, technology, infrastructure, education etc) will not bring the desired (optimum) increase in the country's productivity (Tables 6-8).

FINDINGS

The objective of this study is to find out whether health expenditure by the government has translated into

Table 7. Regression results.

	Coefficient	Std. Error	t-Statistic	Prob.
C	2.44536	3.117927	0.645082	0.8214
CAP	-0.002068	0.001223	-1.691709	0.1022
HTH	-0.032144	0.027823	-1.155301	0.2581
TECH	145.0572	1384.743	0.104754	0.9173
ELEC	4.198254	7.030998	0.597106	0.5554
R-squared	0.764624	Mean dependent var		2117.817
Adjusted R-squared	0.729754	S.D. dependent var		1577.754
S.E. of regression	820.1985	Akaike info criterion		16.39957
Sum squared resid	18163590	Schwarz criterion		16.62859
Log likelihood	-257.3931	Hannan-Quinn criter.		16.47548
Durbin-Watson stat	0.406540			

Dependent Variable: RGDP; Method: Least Squares; Date: 08/29/13; Time: 18:24; Sample: 1 15; Included observations: 15.

Table 8. ARCH-autoregressive conditional heteroskedasdicity estimation.

	Coefficient	Std. Error	z-Statistic	Prob.
EDU	0.036746	0.015835	2.320564	0.0203
CAP	-0.000806	0.001009	-0.798489	0.4246
HTH	-0.002759	0.027159	-0.101585	0.9191
TECH	149.6551	1451.698	0.103090	0.9179
ELEC	1.557964	7.624649	0.204333	0.8381
Variance Equation				
C	368947.9	310297.5	1.189013	0.2344
RESID(-1)^2	0.994434	1.332217	0.746450	0.4554
GARCH(-1)	-0.432102	0.469528	-0.920290	0.3574
R-squared	0.661231	Mean dependent var		2117.817
Adjusted R-squared	0.562424	S.D. dependent var		1577.754
S.E. of regression	1043.678	Akaike info criterion		16.25319
Sum squared resid	26142306	Schwarz criterion		16.61962
Log likelihood	-252.0510	Hannan-Quinn criter.		16.37465
Durbin-Watson stat	0.190808			

Dependent Variable: RGDP; Method: ML - ARCH (Marquardt) - Normal distribution; Date: 08/29/13;Time: 18:32; Sample: 1 15; Included observations: 15. Pre-sample variance: backcast (parameter = 0.7); GARCH = C(6) + C(7)*RESID(-1)^2 + C(8)*GARCH(-1).

positive health status and national productivity in Nigeria. 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. The dwindling health status of the poor and low productivity is a manifestation of the negative multiplier effects of other macroeconomic indices. However, it has been established that improvement in health care expenditure is a necessary condition for enhancing human capital development in most economies. Thus the level of government expenditure on health improves the health status and therefore determines the ultimate level of human capital development which eventually leads to better, skilful, efficient and productive economy (Riman et al., 2010).

Though there is a significant relationship between government health expenditure and health status, the former has not significantly impacted on the latter in Nigeria. In Figure 3, Government support free or subsidized health services to improve health status, but the poor do not benefit as much as the better-off groups (the political class and the middle income class), from the public subsidies in health. Besides, the share of the budget on health (at federal, state and local government levels) is low. Hence, health spending in Nigeria is low.

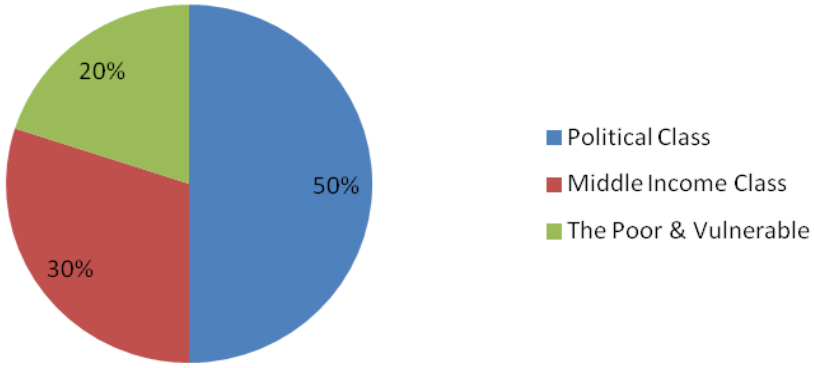

Figure 3. Beneficiaries from public subsidies in health services.

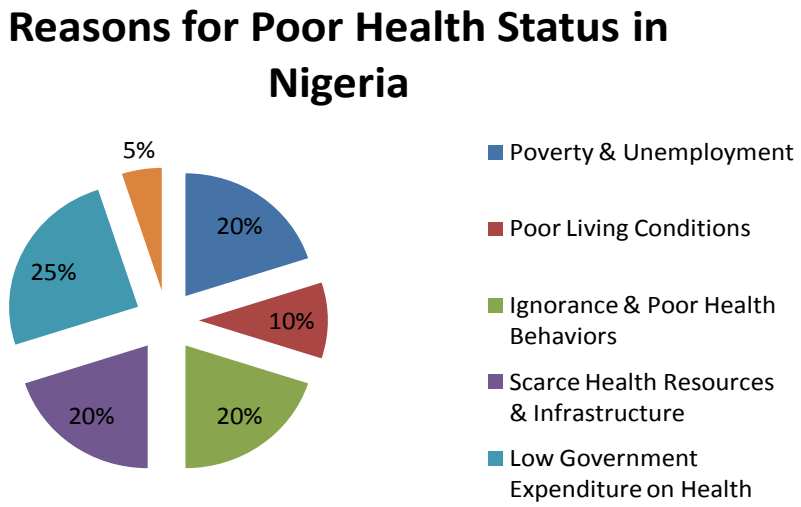

Figure 4. Reasons for poor health status in Nigeria (from specific population group).

The health system is faced with financing difficulty among other competing needs in the budget. The poor cannot afford to pay for their health needs, for lack of employment and poor human capital development. There is very limited access to healthcare and gross inequality in healthcare services. Thus people are forced to patronize substandard drugs, leading to high mortality and morbidity rates which bear negative outcome on national productivity. Poor economic status yields poor health status and poor health status further worsens the poor economic status.

The level of household income, household demography and health behaviours can affect health status. The poor and vulnerable are about 43% of the population. These are people without adequate nutritional nourishment, sound education and healthcare. Given the percentage of their benefits from public subsidies in figure 2(20%), it means that they are grossly under-benefited. The rural dwellers have very limited access to health services. They have neither resources, nor importance attached to regular health check. Absolute poverty makes them more vulnerable to diseases and diseases have made them poorer. The major causes of hypertension, stroke, diabetes, HIV/AIDS, malnutrition, unwanted pregnancy, polio, blindness and so on-are associated with poverty, poor living conditions, and ignorance. They have low seasonal income from farming and petty-trading, low income, no savings, which feeds into a vicious cycle of poverty.

The prevalence of large scale health problems (such as high infant mortality rate and low life expectancy) are as a result of the scarce health resources and infrastructure (Figure 4). Healthcare budgets are far below the developed countries. Besides, the few health infrastructures available are unbalanced between urban-rural areas.

In Figure 4, we take a specific population group of undergraduate students at the University of Jos, as a sample to confirm the results of our analysis. The sample size is 2000, and we use structured questionnaires. We received 80% of the responses. Although the sample size is unrepresentative of the entire population, the responses provided related results that confirm our findings.

There is a link between family background and mother-child healthcare status. Children from poor households are subject to more negative health events than children from the rich households. Factors such as parent's education, income, and parent health affect directly the child's health and education. Public expenditure on health should aim at reducing the inequality in access to health services by the poor and middle class households. Public health expenditure is an intervention mechanism to reduce poverty from generation to generation, as the poor cannot afford the expensive private health services.

DISCUSSION

Government expenditure, as fiscal instrument serves roles in the process of controlling inflation, unemployment, economic depression, balance of payment equilibrium and foreign exchange rate stability. Aggregate demand, production and supply of goods and services are pushed upwards, in a depressed economy, by increased government spending. Government expenditure has multiplier effects on the economy. It affects health status and productivity. Health status impacts on productivity. However, it is not only the health variable that pushes for productivity. Expenditure on public goods such as education, infrastructure, and also technology, as well as the capital stock affect productivity. They are also pushing factors for productivity. Technology and infrastructure problems have led to low capacity utilization in the health sector, education sector, industrial sector and every other sector of the Nigerian economy. They include information and communication technology (ICT), electricity, telecommunication infrastructure, trans-port infrastructure, telephony facilities, computer facilities, health information and other health infrastructure. Underdevelopment of these necessary infrastructural facilities has been largely responsible for the poor health status and low productivity of the Nigerian economy. Technology can be acquired through research and development (R&D), technology transfer and the adoption of new technology. Nigeria's investment in these areas has been grossly inadequate, and quite limited. The quality of human capital development is still very low and, it is fed by the deterioration in the quality of education, incessant strike action in the higher institutions of learning etc. Public expenditure on education is too low as shown in the data for regression for equation 4a and 4b in the appendices. Worse still, the rate of brain drain is very high which negatively affects national productivity. The low availability of primary inputs, labour, capital and entrepreneurs has negative multiplier effects on productivity. The common determinants of poverty status across the African continent include access to education, health care services, housing, household income and food security. Health and education are critical determinants of growth and development. Public capital expenditure on them is an investment. The results of our research show that there has been poor allocation to the healthcare system in Nigeria. This has manifested in the average health status as presented in the data. Most health indicators are on the average, while some are very poor. According to Todaro and Smith (2007), increasing incomes may be insufficient for increasing health status, with a presentation of evidence of income inelasticity of demand for calories. The human capital approach is used to analyze investments in health and education, calculated on the basis of private and social returns for countries and regions. The overall health status and quality of life of Nigerians are still poor on the average. Investments in health, education and water supply have been focused largely on the cities. As a result, the rural population has extremely limited access to services such as schools and health centres, and about half of the population lacks access to safe drinking water. There is a strong relationship between health status and productivity, though health is not the only factor with effect on productivity. Others are technology, capital, infrastructure and education. Health status can affect labour force participation since healthier people work more and are physically and cognitively stronger. They are likely to be more productive, earn more incomes with higher life expectancy rate. A larger share of healthy-working –age Nigerians in the population of over 160 million people is an important determinant for increased labour force productivity, higher per capita income and long term economic growth. Increased public expenditure on healthcare will raise individuals' capacities to be productive. It is an escape route from poverty. Besides, sound health status reduces chronic illnesses and enhances physical and mental work capacities.

In our presented analysis, some aspects need improvement in future research; such as, other factors (apart from health) that can push for productivity. The need for improvement in further research in this aspect is to minimize the chances for aggregating all effects of productivity on health factors which may be misleading. Further research may also consider the effect of corruption and embezzlement on productivity and health status in Nigeria. Good nutrition improves health status which in turn increases productivity. Fighting poverty and pro-poor empowerment will make healthcare expenditure effective. Functional limitations on activities of daily lifestyle (example alcohol abuse, smoking, drugs, eating habit) are viewed as more reliable evidence imposed by health status which could result to hypertension, diabetes, obesity etc that could reduce the ability of labour to work. Reduction in these functional limitations can seek to establish the cost efficiency of household and public expenditures on health.

RECOMMENDATION

Government needs multi-dimensional efforts to improve health status; housing infrastructure, nutrition, education,

employment, environment, electricity, water and sanitation- all affect health status. We advocate efficiency of investment and expenditure control and administration. Government expenditure must be cost-effective and kept at levels that are consistent with the nation's resources. Expenditure should target productivity and general economic stability. Nigeria government at all levels will have to pay closer attention to the health status and other livelihood issues. It should focus on agricultural growth, food sufficiency and rural development; it should speed up the industrialization process and provide more job opportunities for the poor; it should improve human resources training and enhance people's ability to make use of economic opportunities. Nigeria should pay more attention to young people's employment and the girl child's reproductive health education. We recommend policy options for making the healthcare services universal, and the system more relevant to poverty reduction and development needs. We also recommend public-private synergy-the role of the private sector in reducing maternal mortality and child morbidity cannot be over estimated.

Nigeria and other developing countries must invest more resources in health and education. The use of health care during pregnancy and childbirth, and healthcare for infants is very critical to national productivity, and must be stepped up through increased public/private health investments. We recommend the integration of healthcare expenditure into comprehensive and well conceived gender-sensitive strategies for human capital development, including supportive measures in vital and related areas such as population, health, nutrition, water, sanitation, housing, communication, education and training, and science and technology. The mandate for Nigeria and other developing countries is to give the issues of healthcare and sustainable environment practices serious priority in national budgets and policy decisions. The alignment of priorities to the MDGS 4,5,6 and 7 related to child health, maternal health, communicable diseases, and environmental sustainability captures this essence. Achieving universal access to quality health services will contribute positively to national productivity. Nigeria should move toward at least 15% allocation of government national budgets focused on health care issues, as an example for other African countries to follow. Huge government expenditure is not enough; national health ministry must have effective and efficient checks and balances in place, and the adoption of the appropriate capacity building measures, to ensure that health care resources and interventions are being directed to the needy and those that are at serious health risk.

Conclusion

There has been poor allocation to the healthcare system in Nigeria. The challenges of health care services include coverage, affordability, inequality, quality and sustainability of healthcare services. Poverty and household income affect child-mother healthcare and education. Worsening of access to healthcare services and quality of services has negative consequences on Nigeria's health status and national productivity. It pays for Nigeria to invest in health. Paying attention to the population health is not merely of political value, but also in the interest of national and global economic development. Health expenditure and health status have impact on national economy, households and individuals. Therefore putting health high on the political agenda and implementing the necessary health policy will uplift national productivity. Increased proportion of national budget should be spent on healthcare.

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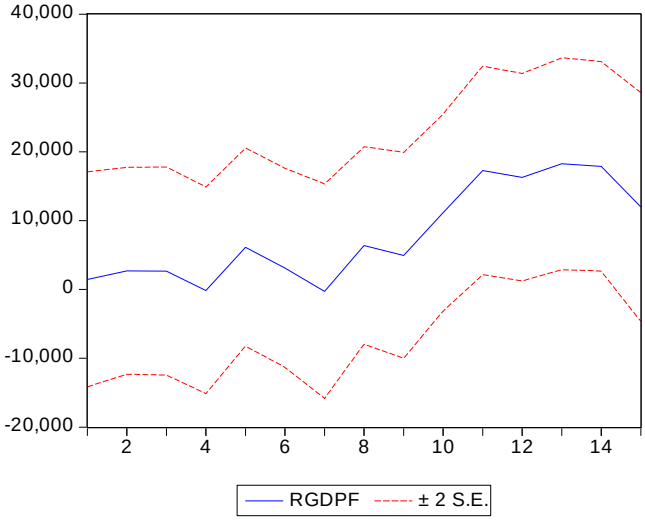
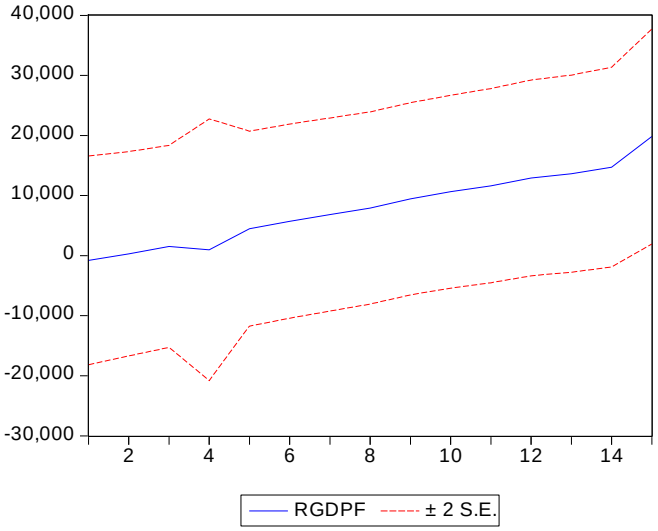
APPENDICES



Forecast: RGDPF
Actual: RGDP
Forecast sample: 1 15
Included observations: 15

Root Mean Squared Error	6161.558
Mean Absolute Error	4870.090
Mean Abs. Percent Error	115.4743
Theil Inequality Coefficient	0.274642
Bias Proportion	0.000000
Variance Proportion	0.154832
Covariance Proportion	0.845168

Forecast of health status on productivity: Equation 1.



Forecast: RGDPF
Actual: RGDP
Forecast sample: 1 15
Included observations: 15

Root Mean Squared Error	6908.077
Mean Absolute Error	5330.422
Mean Abs. Percent Error	109.5090
Theil Inequality Coefficient	0.314672
Bias Proportion	0.000000
Variance Proportion	0.215669
Covariance Proportion	0.784331

Forecast of health status on productivity for Equation 2

Data for regression Eqns 2 and 3.

YEAR	RGDP	RHE	CHE	GTHE(Nm)	HSGR/GDP	IMR/1000
1998	8,712	4,742.27	3,495.53	8237.8	1.7	119
1999	1,023.10	16,638.77	7,386.80	24,025.57	1.7	116.00
2000	1,392.00	15,218.08	6,569.20	21,787.28	1.6	113.00
2001	1,323.60	24,522.27	20,128	265,355.00	1.6	109.00
2002	1,595.60	40,621.42	12,608	53,229.42	1.8	105.00
2003	1,777.30	33,267.98	16,431	49,698.98	2	102.00
2004	2,593.20	34,197.14	26,410	60,607.14	3.8	99.00
2005	3,115.80	55,661.63	21,171.00	76,832.63	3.8	96.00
2006	3,257.00	58,686.56	27,086.00	85,772.56	2.3	92.00
2007	3,613.50	72,290.07	18,186	90,476.07	2	89.00
2008	3,989.40	98,200	17,158	115,358.00	1.8	86.00
2009	25,225.10	90,202.06	14,975	105,177.06	2.5	83.00
2010	29,498.60	100,176.71	15,684	115,860.71	3	81.00
2011	15,955.63	108,204.74	21,653	129,857.74	3.2	78.00
2012	16,718.94	108,208.99	38,040	146,248.99	3.8	65.00

Sources: CBN public finance statistics; FRN Official Gazettes; World Bank Data. HSDR/GDP= Health Sector Growth Rate of GDP. IMR/1000= Infant Mortality Rate in 100,000th birth. Government Expenditures are in million Naira ($1=150 Naira).

Data for regression EQns 4a and 4b

Year	GDP/WP	EDU	CAP	HTH	TECH	ELEC/W/G
1999	2,846	16,840.00	49802.76	4,742.27	134.12	210.90
2000	2,694.40	23,668.10	23945.09	16,638.77	41.31	243.50
2001	2,939.60	27,713.50	43869.65	15,218.08	422.80	266.20
2002	2,881.30	40,364.30	32137.81	24,522.27	575.30	258.86
2003	2,914.80	79,850.41	24,688.30	40,621.42	500.70	265.80
2004	3,246.60	80,530.88	351300	33,267.98	618.20	280.30
2005	3,352.60	64,782.15	519500	34,197.14	150.16	281.00
2006	3,569.20	76,524.65	53872.21	55,661.63	155.60	306.50
2007	3,550.50	82,795.06	55,238.58	62,300.00	158.27	310.40
2008	3,864.30	87,294.56	56,972.67	81,900.00	251.83	322.80
2009	3,890.50	89,358.40	58,264.65	98,200.15	266.65	468.30
2010	4,336.40	107,529.39	70,882.43	90,851.43	324.78	465.90
2011	4,698.20	136,719.28	759,323	95,098.56	350.55	498.70
2012	4,985.50	164,000.00	1,123,458	102,620.73	569.44	495.50

Sources: CBN Public Finance Statistics, 1970-2012; Authors' compilation, 2013.