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Analysis of the Growth Impact of Health Expenditure in Nigeria

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Abstract: *A nation with healthy people is considered a wealthy nation. This study is designed to evaluate the impact of health expenditure on economic growth in Nigeria. Most empirical studies in literature pay little or no attention to this area but majorly focus on how people achieve better health when there is economic growth. This could be as a result of the general consensus that economic growth leads to improved health status while the attention was not given to whether causality exists in the reverse direction. This study is carried out to breach this gap. Multiple regression analysis was employed and the result shows that gross capital formation, total health expenditures and the labour force productivity are important determinants of economic growth in Nigeria while life expectancy rate has negative impact on growth for the period covered by the study. As a result, the following policy measures are suggested among others that government should encourage savings and investments in the economy, increase expenditures on health provisions, induce the level of labour productivity and place priority on the issues of security to lives and properties in Nigeria.*
Keywords: *health expenditure, growth, life expectancy, Nigeria, human capital.*

I. Introduction

The effect of health on worker's productivity suggests a relationship between health and aggregate output. Healthy workers lose less time from work due to ill health and are more productive when working. Health gains had the economic consequences of widespread economic growth and an escape of ill-health traps in poverty (World Health Organization, 1999). There has been a growing interest to extend the relationship between health and economic growth, catalyzed in considerable extent by a 1993 World Bank report on health (World Bank 1993). Barro (1996) comments health is a capital productive asset and an engine of economic growth. Fifty percent of economic growth differentials between developed and developing nation is attributable to ill-health and low life expectancy (World Health Organization, 2005). Developed countries invest a substantial proportion of their budgetary allocations on provision of health care because they are convinced that their residents' health can serve as a major driver for economic growth. As health is wealth, no amount spent on health by a nation is considered too much. The United Nation (UN) recommended for a country, an average of 8 to 10 percent of the GDP as benchmark expenditure on health. Governments in Nigeria, over the years have made deliberate efforts at ensuring that there is increase in the level of public expenditure on health. For example, the capital expenditure of government rose from N7.3 million in 1970 to N126.75 in 1987. In 1988 there was a significant rise to N297.96m. The figure rose steadily from N586.2 million in 1993 to N17717.42, N33396.97 and N34647.9m in 2003, 2005 and 2007 respectively. The capital expenditure on health increased from N64922.9 in 2008 to N98211.51 in 2010. In a similar manner, in 1970, recurrent expenditure on health was N12.48 million. This figure rose significantly to N52.79 million and N134.12 million in 1979 and 1986 respectively when the recurrent expenditure percentage of total expenditure stood at 77.4% percent. The value of recurrent health expenditure reduced significantly in 1987 to N41.31m before it rose steadily from N422.80 in 1988 to N24522.27m in 2001. This figure rose again from N40621.42 in 2002 to N44551.63, N58686.56 and N72290.07 in 2005, 2006 and 2007 respectively. By 2008, recurrent expenditure increased from N73990 to N77657.43 in 2010. The above trends clearly show that health care expenditure in Nigeria has been on the increase over the years. This is because of the importance of health to nation building and as a facilitator of economic progress. It should however be noted that despite the increase in government expenditure on health provisions in Nigeria, the contribution of this to human health is still marginally low. Moreover, the extent and magnitude of its impact on economic growth is yet to be adequately investigated probably because of the general unidirectional impression that economic growth facilitates better health. Off course, for example, economic growth could lead to increased availability of food for better healthy living; increased earning which makes health spending more affordable; and also raises demand for good health services. Higher growth could also imply higher public revenue which can translate into higher investment in health infrastructure. Therefore, there is a question of whether causality exists in the reverse direction? In other words, does improved health lead to higher growth? If yes, then to what extent and in what magnitude does health contribute to economic growth especially when one accounts for other potential factors that are empirically known to drive growth? It is therefore likely that causality exists in both directions. However, the question of which direction dominates could be an area of interest for further studies. Therefore, this study seeks to evaluate the growth impact of health expenditure to determine the extent and magnitude of its contributions to the Nigerian economy, from

1970 to 2010. The paper is presented as follows; the introductory section is followed by the literature review and theoretical framework; the next section presents the methodology of the study; while section four is for data analysis and discussion of result. In section five, policy recommendations are made and section six concludes the paper.

II. Literature Review And Theoretical Framework

2.1 THE REVIEW OF RELEVANT LITERATURE

The study of the relationship between health care spending and economic growth is rather a new phenomenon in economic literature and it has received a lot of attention in recent times. Health as human capital affects growth directly through, for example, its impact on labour productivity and the economic burden of illness. Bloom and Canning (2000: 2003) describe how healthy populations tend to have higher productivity due to their greater physical energy and mental clearness. According to them, healthier individuals might affect the economy in four ways: (a) They might be more productive at work and so earn higher incomes; (b) They may spend more time in the labour force, as less healthy people take sickness absence or retire early; (c) They may invest more in their own education, which will increase their productivity; and (d) They may save more in expectation of a longer life—for example, for retirement—increasing the funds available for investment in the economy. Health is so important as both a source of human welfare and a determinant of overall economic growth. Baldacci (2004) explores the role played by health expenditures. He constructed a panel data set for one hundred and twenty developing countries from 1975-2000 and found that spending on health within a period of time affects growth within that same period while lagged health expenditures appear to have no effect on growth. He inferred from this result that the direct effect of health expenditure on growth is a flow and not a stock effect. Another study by Aguayo-Rico and Iris (2005) examines the impact of health on economic growth for 13 European countries, 12 African countries, 16 American countries, and 11 Asian countries over the period 1970-80 and 1980-90 using ordinary least square (OLS), the authors find that health capital has a significant effect on economic growth, especially with a variable that captures all the determinants of health. Some other studies on health and economic growth conducted earlier found a positive relationship between the two. Barro (1991) and Barro and Sala-i-Martin (1992); Knowles and Owen (1995) and (1997) have investigated the positive effect of health on economic development. They also found a strong effect of health in explaining income per capita differences. Other studies such as Greiner (2005), Agenor (2007), Strauss and Thomas (1998) and Martins (2005) conducted for other countries all emphasized that health expenditure is positively related to economic growth. What differ from one country to another is the extent and magnitude of its contributions. In a study of 15 states from India for the period 1973/74, 1977/78, 1983, 1987/88, 1993/94, 1999/2000, Gupta and Mitra (2003) show that per capita public health expenditure positively influence health status, that poverty declines with better health, and that growth and health have a positive two-way relationship.

Similarly, some empirical and historical studies have analyzed the relationship between health and economic growth. They establish an endogenous relationship between them and, at the same time, argue that there are exogenous factors, which determine the health conditions of a person (Hamoudi and Sachs 1999). Aurangzeb (2001) investigates the relationship between health expenditure and economic growth within an augmented Solow Growth model for Pakistan during the period 1973-2003, Johansen cointegration technique and error correction model (ECM) are applied. The author finds a significant and positive relationship between GDP and health expenditure in both short- and long-run. Haider ali shah bukhari, and Sabihuddin butt(2007) also support for the existence of a long run relationship between GDP and health expenditure and the exogeneity of GDP in Pakistan. Cuddington and Hancock (1995), used a neoclassical one sector, two factor growth model to predict economic growth in Tanzania and Malawi. They found that over the period 1985-2010, average annual G.D.P. growth would be reduced by 1.1 percentage points in Tanzania and 1.5 percentage points in Malawi. Also, should AIDS treatment costs be entirely financed from savings, the AIDS epidemic would reduce per capita G.D.P. growth by 0.3 percentage points and 0.1 percentage points in Malawi and Tanzania respectively. Gallup, Sachs and Mellinger (1998) supported the positive relationship between health and economic growth. They find a strong relationship between initial levels of health and economic growth, using life expectancy at birth as their basic measure of overall health of the population. They conclude that improved health is associated with faster economic growth. In his own reaction, Philips (2005) affirms that over the past 50 years, life expectancy has improved and infant mortality declined continuously in all parts of the world, except sub-Saharan African in the 1990s; Good health can reinforce economic growth by enabling people to be more productive especially in countries that have little corruption, poor health can constrain economic growth because it reduces the quality and quantity of labour. Also, in a study of India, the World Bank (2004) examines the impact of per capita GDP, per capita health expenditure and female literacy on infant mortality using state-level data over the period 1980-99. The study observes that both per capita public spending on health and per capita GDP are inversely related to infant mortality rate, but the results were observed not to be very robust to alternative specification of the model. In the same vein Lustig, (2006) in the study on the direct relationship

between health and growth in Mexico uses 1970-95 data and uses life expectancy and mortality rates for different age groups as health indicators. He observed that health is responsible for approximately one-third of long- term economic growth. He considered health to be an asset with an intrinsic value as well as instrumental value. Good health according to him is a source of wellbeing and highly valued throughout the world. By using the adult survival rate as an indicator of health status, Bhargava, et al. (2001) finds positive relationship between adult survival rate and economic growth. Results remains similar when adult survival rate is replaced by life expectancy. However, fertility rate have a negative relationship with economic growth. Due to the fact that life expectancy is highly influenced by the child mortality, growth in workforce is mostly lower than population growth. Consequently, high fertility rate reduces the economic growth by putting extra burden on scarce resources. Bloom, Canning and Sevilla (2001) in their study agreed with others on the positive and significant effect of health on economic growth. They therefore suggested that a one year improvement in a population life expectancy contribute to a recent increase in output. In the field of health economics, the endogenous causality between health and income has been the topic of several studies whose purpose is to establish the direction of the causality. Luft (1978) gives an informal explanation of this causality: "a lot of people who otherwise would not be poor are, simply because they are sick; however, few people who otherwise would be healthy are sick because they are poor" . In order to explain the direction of the causality of the impact of health over income, Smith (1999) uses life cycles models, which link health condition with future income, consumption and welfare. According to this, Bloom and Canning (2000) explain this direction of the causality with education, indicating healthy people live more and have higher incentives to invest in their abilities since the present value of the human capital formation is higher. The higher education creates higher productivity and, consequently, higher income. Also, Hartwig (2010) conducts causality testing for a panel of 21 OECD countries using panel Granger causality test over the period 1970-2005, the author find that health capital formation fosters long term economic growth in all the OECD countries under study. Devlin and Hansen (2001) examined Granger causality between health expenditure and GDP and showed some (mixed) evidence that indeed there might be bi-directional (Granger) causality between health spending and income. Mehrare and Musai (2011) examines the relationship between health expenditure and economic growth for Iran over period 1979-2008 by employing Gregory-Hensen (1996) cointegration techniques which allows the presence of potential structural breaks in data. The authors find the presence of a long run relationship between health expenditure and the income elasticity for health care spending is greater than one during the period under study. The results also suggest one-way causality relationship running from GDP to health expenditure, thereby concluding that health expenditure does not granger caused economic growth. A more recent study by Mehrara and Musai (2011) examines the Granger causality tests between health expenditure and economic growth among 11 oil exporting countries during the period 1971-2007 by using panel unit root tests and panel cointegration techniques. The results suggest strong causality running from revenues and economic growth to health expenditure in the oil exporting states. Also, health expenditure does not have any significant effects on GDP in both short and longrun. Another study by Baltagi and Moscone (2010) estimates a regression equation for health care expenditure as a function of GDP and other control variables using data on 20 OECD countries over the period 1971-2004 by using maximum likelihood estimation (spatial MLE) techniques to estimate and test fixed effects and spatially correlated errors. The authors find that health care expenditure is a necessity rather than a luxury with an elasticity much smaller than that estimated in previous studies.

Moreover, some empirical evidence also emerged from Nigeria. For example, Odior (2011) conducts a study on the relationship between health and economic growth by using an integrated sequential dynamic computable general equilibrium (CGE) model over the period 2004-2015 to investigates the impact of government expenditure on health on economic growth. The findings suggest that the re-allocation of government expenditure to health sector is significant in explaining economic growth in Nigeria. Similarly, Dauda (2011) examines the relationship between health expenditure and economic growth for Nigeria spanning from 1970-2009 by employing descriptive statistics, Johansen cointegration technique and error correction model (ECM), the author suggest that health expenditure is positive and statistically significant but the coefficients of the second and third lags are negative and statistically significant. The results of error correction model is statistically significant and has expected negative sign with the coefficient of 40% implying that the speed of adjustment to is 40%. Again, Chete and Adeoye (2002), studied the empirical mechanics through which human capital influences economic growth in Nigeria. They attempted to achieve this objectives using vector Auto regression analysis and ordinary least square to capture these influences. They however concluded that there is an unanticipated positive impact of human capital on growth which the various Nigerian governments since the post independence have appreciated by prodigious expansion of educational infrastructure across the country; but they are quick to point out that the real capital expenditure on education and health have been rather low. In addition, Adeniyi and Abiodun (2011) used ordinary least square (OLS) to examine the impact of health expenditure on economic growth over the period 1985-2009. The authors suggest that if funds are properly channeled and appropriate expended to both the recurrent and capital projects in

health, the existence of a positive relationship between economic growth and health will be more widened. Arguing in same line, Bakare and Sanmi (2011) also used ordinary least square (OLS) multiple regression for annual time series data for Nigeria covering 1974-2008, the results show a significant and positive relationship between health expenditure and economic growth. Therefore, the study recommends that policy makers should place more priority to the health expenditure by increasing its yearly budgetary allocation to the sector. Ogundipe and Lawal (2011) examined the impact of health expenditure on economic growth in Nigeria. Using the OLS technique, they found a negative effect of total health expenditure on growth. Bloom et al (2004) estimate a production function of aggregate economic growth as a function of capital stock, labour and human capital (education, experience and health).Their main result is that health has positive, statistically significant effects on economic growth. They however, do not consider how health is created. Olaniyi and Adams (2000) descriptively analysed the adequacy of the levels and composition of public expenditures and conclude that education and health expenditures have faced lesser cuts than external debt services and defence, but allocations to education and health sectors are inadequate when related to the benchmark and the performance of other countries.

2.2 THEORETICAL FRAMEWORK

More than one hundred years ago, Adolph Wagner (1883) formulated the 'Law of the Increasing Extension of State Activity'. He asserted that there is a long run propensity for the scope of government to increase with higher levels of economic development. Wagner's hypothesis deals with the growing relative importance of government activity and has come to be known as Wagner's Law. According to Wagner, there are three reasons to expect an expanding scope of public activity: first, as nations develop there is an increased complexity of legal relations and communications – along with greater urbanization and population density – and it forces government to produce the regulatory framework that will accompany the greater intricacy of relations among economic agents. Second, as income increases, societies demand more education, entertainment, a more equitable distribution of income, and generally more public services. Finally, the technological needs of an industrialized society require larger amounts of capital infrastructure than are forthcoming from the private sector, hence the need for government to step in to fill in the gap. Wagner's law has been tested empirically for various countries and the results differ considerably. Abizadeh and Gray (1985) analyze the period 1963-1979 and find support for Wagner law in wealthier countries but not in poorer ones. Diamond (1977), Ram (1986), Afxentiou and Serletis (1996), Chang, et al. (2004), and Akitoby, et al. (2006) analyze different countries and time periods and find limited support for the law. Wu, et al. (2010), on the other hand, utilizing a dataset of 182 countries for the period 1950-2004, find strong support for Wagner's law. Afxentiou and Serletis (1991), and Ahsan et al. (1996) have analyzed Wagner's Law for Canada, with findings generally in support of the law. Mann (1980), Nagarajan and Spears (1990), Murthy (1993), Ashworth (1994), Hayo (1994) and Lin (1995) have found mixed results for Mexico. Vatter and Walker (1986), and Yousefi and Abizadeh (1992) have examined the law for the United States with results generally in favour of the law. Tobin (2005), focusing on China, finds support for the law. The more recent set of papers analyzes Wagner's law using disaggregated public expenditure data. For example, Chlestos and Kollias (1997) on Greece; Asseery, et al. (1999) on Iraq; Biswal, et al. (1999) on Canada; and Magazzino (2010) on Italy. Furthermore, Gupta and Verhoeven (2001), concentrating on expenditures on health and education, find inefficient spending on a set of 37 African countries; and Abu-Bader and Abu-Qarn (2003), find a negative, bidirectional causality between military expenditures and economic growth in Egypt, Israel and Syria. Is Wagner's hypothesis applicable to developing nations such as Nigeria? This is one of the questions pertinent to this study and the result shows the universal nature of Wagner's law.

III. Methodology

Based on a modified neo classical Solow production function this study employs a multiple regression technique to estimate the relationship between health expenditure and economic growth. The model expresses Aggregate Real Output (Y) as a function of Capital Stock (K), Human Capital (included to follow Odusola, 1998), Labour Factor (L) and Life Expectancy (included to follow Lustig, 2006).

$Y= f(K_t, H_t, L_t, E_t)$ (1)

Where, aggregate real output which is an indicator for economic growth is proxied as Gross Domestic Product (GDP), capital stock proxied as Gross Capital Formation (GCF); human capital proxied as Total Health Expenditure (THE), labour factor proxied as Secondary School Enrolment (SSE), Life Expectancy Rate (LR) at birth defined as an average number of years a child lives from birth.

Based on the above formulations, the model can be re-written as:

$GDP = \beta_0+ \beta_1GCF+ \beta_2THE_+ \beta_3SSE+\beta_4LE$ (2)

The logarithmic conversion of the equation above yields the structural form of production function as:
$LGDP = \beta_0 + \beta_1 LGCF + \beta_2 LTHE_+ \beta_3 LSSE + \beta_4 LLR$ (3)
B_0, β_1, β_2 β_3 and β_4 are coefficients of elasticities.
The a *priori* economic expectations are:
$\beta_0 > 0$, $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$ $\beta_4 > 0$
The Econometric-view software is used to estimate the model above.

IV. Data Analysis And Discussion Of Results

4.1 DATA ANALYSIS

The data used for this study are basically time series data covering 1970– 2010, a period of forty (41) years. The data were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin (various editions) and African Statistical Year Books produced by the African Development Bank (various issues). The result of the equation estimated to verify the impact of Health expenditures on economic growth is presented in table 4.1 below:

Table 4.1: Results of the regression exercise

Dependent Variable: LOG(GDP)
Method: Least Squares
Date: 05/11/13 Time: 16:22
Sample(adjusted): 1970 2010
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.428420	2.223287	2.668533	0.4287
LOG(GCF)	0.833978	0.215936	4.093676	0.0323
LOG(THE)	0.718671	0.073627	11.96660	0.0042
LOG(SSE)	0.437477	0.229302	1.954781	0.0704
LOG(LR)	-0.315085	0.219426	-1.464772	0.1623

R-squared	0.763397	Mean dependent var	12.77130
Adjusted R squared	0.746337	S.D. dependent var	2.352277
S.E. of regression	0.631936	Akaike info criterion	2.024417
Sum squared resid	12.43333	Schwarz criterion	2.321171
Log likelihood	-32.41903	F-statistic	34.73933
Durbin-Watson stat	1.992064	Prob (F-statistic)	0.000321

4.2 DISCUSSION OF RESULTS

The regression results show that the explanatory variables explained approximately 76 percent variations in economic growth in Nigeria while the remaining 24 percent variations can be
explained by variables outside the model. The F statistic of 34.73 is significant at 5% level and this shows that the equation has a good fit, that is, the explanatory variables are good explainer of changes in GDP in Nigeria. The value of Durbin Watson is 1.992064 for the model. This falls within the determinate region and indicates the absence of autocorrelation among the explanatory variables in the model. According to the above results, gross capital formation has positive coefficients and it is significant at the 3% level. This result suggests a direct relationship between capital formation and gross domestic output in Nigeria. It indicates that a unit increase in the gross capital formation will increase the GDP by about 83 percent. This result is consistent with our a priori proposition. The health expenditure has a positive sign and it is significant at 1% level. This result suggests a

direct relationship between health expenditure and GDP in Nigeria. It implies that the increase in health expenditure over the years has boosted national income. It shows that 1 percent increase in the health expenditure leads to about 71 percent increase in the real GDP. This could be as a result of an enhanced public expenditure policy of Nigeria which has contributed positively to real output growth in Nigeria. Another discovery from the estimation is that labour force has positive coefficients and it is significant at 7% level. This variable appears to be the least out of the factors that contribute to output growth in Nigeria. This is, however, supported by the low magnitude of its coefficient. A 1% increase in this variable increases output by 43 percent.. Life expectancy rate at birth has negative coefficients and it is insignificant at 5% level. This result is not consistent with our a priori proposition. This is, evident by the sign and magnitude of its coefficient. A 1% increase in this variable reduces output by 31 percent. This is probably because as people's health improves due to relative increase in health expenditures which enhances their level of productivity, people are however, experiencing untimely death associated with rising tension of hash economic conditions, insecurity of lives and properties, incessant air and road accidents, socio-political and religious crisis and many other life shortening problems. All these cumulate into negating the positive effects of health spending on life expectancy of an average Nigerian worker. In summary, this study shows a significant relationship between the dependent variable and all the independent variables except for the life expectancy rate. Therefore, we accept the alternative hypothesis and reject the null hypothesis for all the other independent variables (Bloom and Canning, 2003) while we accept the null hypothesis and reject the alternative hypothesis for life expectancy rate at birth.

V. Policy Recommendations

The above findings have important policy implications. Firstly, since gross capital formation, total expenditure on health and labour force productivity enhance the level of economic growth, hence, government should encourage savings and investments in the economy, increase expenditures on health provisions and induce the level of labour productivity. Meanwhile, life expectancy does not impact positively on economic growth, therefore, government should be more sensitive to the issue of insecurity to lives and properties (Oni, L. B., 2012), promote the rate of social and infrastructural development, create job opportunities, control the rate of inflation, encourage religious and social tolerance, ensure the adequate provisions of health and medical facilities, promote the welfare of health and medical workers, organise regular workshops and seminars for air and road transport operators, monitor and regulate the operations of aviation industries, ensure the availability of good vehicles on the road, be fair and just in the distribution of political and economic powers, ensure the free operation and enforcement of the rule of law, guarantee the freedom of the press and be sincere in fighting corrupt practices both in private and public sectors. All these would minimise tension and accident related death and reduce the menace of attacks on lives and properties, thereby, enhancing the longetivity of workers' lives for increased productivity and economic growth in Nigeria.

VI. Conclusion

It is established by this study that gross capital formation, total health expenditures and the labour force productivity are important determinants of economic growth in Nigeria while life expectancy rate is the only variable that exerts negative impact on growth for the period covered by the study. The regression results reveal that gross capital formation is characterised by the highest positive value of coefficient followed by total health expenditures while labour force productivity has the lowest. It should therefore, be noted that, public health expenditure has a vital relationship with growth and development of any nation. It is capable of improving the health, the life expectancy, the efficiency, productivity and income of labour as well as the level of investment in the economy.

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