Journal of Academic Research in Economics

Volume 11 Number 3 December 2019

ISSN 2066-0855

PROOFREADERS

MIHAELA BEBESELEA, Spiru Haret University
ONORINA BOTEZAT, Spiru Haret University
MIHAELA CIOBANICA, Spiru Haret University
DANIEL DANECI, Spiru Haret University
MIHNEA DRUMEA, Spiru Haret University
CLAUDIA GUNI, Spiru Haret University
PAULA MITRAN, Spiru Haret University
LAVINIA NADRAG, Ovidius University Constanta
IULIANA PARVU, Spiru Haret University
LAURA PATACHE, Spiru Haret University
MEVLUDIYE SIMSEK, Bilecik University
ADINA TRANDAFIR, Spiru Haret University

CONTENTS

HEALTH EXPENDITURE AND ECONOMIC GROWTH IN NIGERIA. NEW EVIDENCE

OZIENGBE SCOTT AIGHEYISI[1]
Department of Economics and Statistics,University of Benin,
Benin City, Nigeria
Email: oziengbeaigheyisi@gmail.com

KOLADE CHARLES EBIAKU
Department of Economics and Statistics, University of Benin,
Benin City, Nigeria

ERHUNMWUNSEE FOLORUNSHO
Department of Economics and Statistics,University of Benin,
Benin City, Nigeria

Abstract

The paper employs the ARDL (bounds test) approach to cointegration and error correction analysis to investigate the long run and short run effects of health expenditure on economic growth in Nigeria in the period from 1995 to 2013, while controlling for the effects of domestic investment, net foreign direct investment and exchange rate. The empirical evidence validates the Mushkin's health-led growth hypothesis as total expenditure on health is observed to have had positive and significant long-run and short-run effects on the real GDP. Further evidence from the analysis is that gross capital formation (proxy for domestic investment) also impacts positively on real GDP in the long- and short-run. The effect of net FDI on real GDP is observed to be negative in the short-run, but statistically not significant in the long run. The short-run effect of currency depreciation on the real GDP is negative and significant, while the long-run effect is positive and significant. The paper recommends, inter alia, increased budgetary allocation to the health sector to enhance its contribution to the growth of Nigeria's economy.

Keywords: Health Expenditure, Economic Growth, Bounds Test.

JEL classification: H51, I51.

[1] Corresponding author

1. INTRODUCTION

The role of human capital in the growth and development of every nation cannot be overemphasized. It coordinates and harnesses all other factors of production (capital, technology, etc) to achieve economic growth. Adequately playing this role no doubt requires that humans are imbued with the requisite skills (through training and education) and soundness of health (through preventive and curative medicine). A key determinant of economic growth as seen in the augmented Solow growth model is human capital. As a matter of fact the augmented Solow growth model is also referred to as the human capital-augmented Solow growth model. This is in recognition of the importance of human capital in the growth of every economy. Investment (expenditure) in human capital comprising investment expenditure on education and health is therefore seen as key to knowledgeable, healthy and vibrant economy. Mushkin (1962) considers (expenditure in) health as an investment capable of spurring economic growth. Mushkin proposition has come to be known as the health-led growth hypothesis in the field of Economics. Economic backwardness is partly a reflection of weak human capital. While expenditure on education and training is targeted at enhancing the skill of labour to contribute to output growth, expenditure on health is targeted at enhancing the ability of labour to work or function optimally, as weak and unhealthy skilled labour cannot contribute optimally to economic growth and development.

The health-led growth hypothesis posits that health is a strong driver of economic growth. Healthy and skillful human resources, all things being equal contribute positively to economic growth. The objective of this paper is to investigate the effect of health expenditure on Nigeria's economic growth, with a view recommending policies that are germane to strengthening human capital in the country thereby enhancing its contribution to economic growth. To achieve this objective, we shall be testing the null hypothesis that health expenditure does not affect economic growth in Nigeria.

Our search of the literature reveals that most of the previous studies on the health expenditure-economic growth nexus for Nigeria employed multiple regression analysis and cointegration and Granger causality test. None to our knowledge employed the more conventional methodology of cointegration and error correction modeling based on the ARDL Bounds test (considering the possibility of mixed order of integration of variables incorporated into the model specified for the investigations and the effectiveness of the methodology for estimating models involving small and finite data sizes). A contribution of this paper to the extant literature is its usage of the ARDL Bound test approach to cointegration and error correction to investigate the short-run and long-run effects of health expenditure on economic growth in Nigeria, while controlling for the effects of other relevant variables as gross capital formation (domestic investment), foreign direct investment, inflation and exchange rate. A previous study by Nasiiru and Usman (2012) only employed the ARDL approach to test for cointegration without proceeding to estimate the short run and the long run effects of health

expenditure on economic growth in Nigeria. This paper addresses this shortcoming in the literature.

2. SOME BACKGROUND INFORMATION/STATEMENT OF PROBLEM

In spite of the theorized importance of human capital to economic growth, the share of public expenditure on health in government expenditure in Nigeria has consistently been below 20%. Data from the World Bank's World Development Indicators of 2014 indicate that public health expenditure as percentage of total government expenditure was 9.26% in 1995. It dropped to 5.53% in 1999, and rose to 10.27% the following year. In 2006, it recorded its highest of 19.84% and went down to 11.60% in 2010, and thereafter stood at 17.97% in 2011 (See Figure 1).

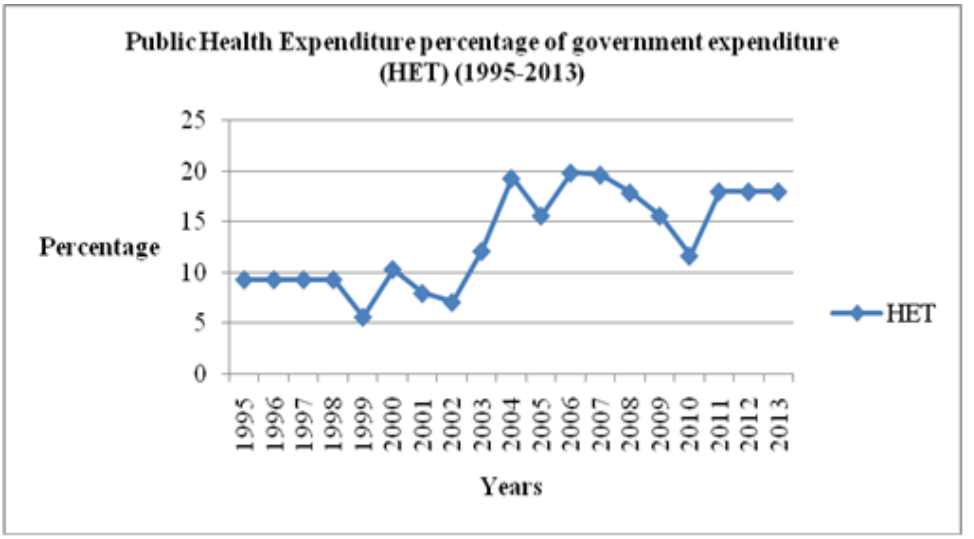

Figure 1. *Public Health Expenditure Percentage of Government Expenditure (1995-2013)*

Health expenditure percentage of GDP for Nigeria was less than 5% in the period under consideration. It rose from 2.82% in 1995 to 3.47% in 1998 and thereafter decreased steadily to 2.43% in 2002. Between 2003 and 2013, health expenditure percentage of GDP ranged between 3.41% and 4.47% (See Figure 2).

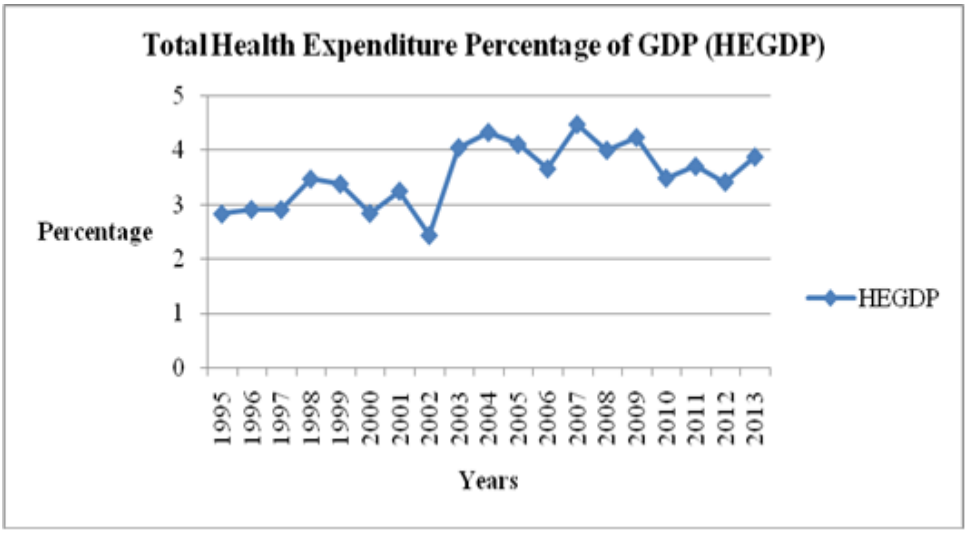

Figure 2. *Total Health Expenditure as Percentage of GDP (1995-2013)*

The low percentages of public health expenditure in total government expenditure and total health expenditure in GDP suggest that not much attention has been given to the health sector. Though there has been improvement in some health outcomes such as infant mortality rate which decreased from 123.7 per 1000 live births in 1995 to 72.3 in 2013 (WDI, 2014), same cannot be said of adult mortality rate. Life expectancy at birth as at end 2013 stood at 53 years for women, and 52 years for men according to the World Bank's WDI.

In the light of the foregoing expositions, the need for increased government expenditure on the healthcare sector of the economy to improve the health status of human capital and enhance its contribution to economic growth and development cannot be overstated.

3. LITERATURE REVIEW

Previous studies that investigate the effect of health expenditure on economic growth or the relationship between both variables include those of Bakare and Olubokun, 2011, Mehrara et al (2012), Nasiru and Usman (2012), Mehrara et al (2012) and, Elmi and Sadeghi (2012). Most of the studies give evidence in support of the health led growth hypothesis.

Bakare and Olubokun (2011) investigates the relationship between health care expenditure and economic growth in Nigeria in the 1970-2010 period using the ordinary least squares multiple regression analysis. The analysis indicates positive significant relationship between health care expenditure and economic growth in the country, and therefore suggests annual increment in budgetary allocation to the health sector.

Mehrara et al (2012), investigate the relationship between health expenditures and economic growth in Middle East and North Africa using panel cointegration analysis for a sample of 13 Mena Countries in the period from 1995 to 2005. The analysis indicates that health expenditure and GDP are cointegrated and that the share of expenditure in GDP decreases as the GDP rises, implying that health care is not considered a luxury good in the MENA region.

Nasiru and Usman (2012) examines the health expenditure-economic growth nexus in Nigeria in the period 1980-2010 period using the Bounds test approach to Cointegration and Granger causality test. The results indicate that both variables are cointegrated and that bidirectional causality exists between them.

Elmi and Sadeghi (2012) investigates the relationship between health care expenditure and economic growth in developing countries during the period from 1990 to 2009 using panel cointegration and causality with a vector error correction (VECM) framework. The analysis reveals short-run causality from GDP to health expenditure, and no short-run causality from healthcare expenditure to GDP. Further evidence from the analysis is that bidirectional long-run relationship exists between the variables, suggesting that income is an important factor explaining healthcare expenditure in developing countries as well as upholding the health-led growth hypothesis.

Wang (2011) examines the causality between healthcare expenditure and economic growth for a sample of 31 countries in the period from 1986 to 2007, using panel regression and quantile regression analysis. The panel regression analysis indicates that health expenditure growth stimulates economic growth, but economic growth reduces health expenditure. The quantile regression analysis however indicates that with quantile economic growth, the influence of expenditure growth on economic growth varies across countries with low level of economic growth. However in countries with medium and high level of economic growth, the influence of health care expenditure growth on economic growth is positive.

Sadr (2012) employs VAR analysis to investigate the effect of e-health expenditure on economic growth of Iran in the 1970-2011 period. The analysis shows *inter alia* that e-health expenditure as percentage of GDP positively impacts the growth of Iran's economy.

Kurt (2015) tests the effects (direct and indirect effects) of health expenditure on economic growth in Turkey in the period 2006: M01 to 2013: M10, using the Feder-Ram Model. The study shows that the direct impact of government health expenditure on economic growth of Turkey is positive and significant, while the indirect impact is negative and significant.

Adelowokan (2012) employs a static regression model and the Engle-Granger two-step cointegration procedure to examine the growth effects of education and health expenditures in Nigeria in the period from 1970 to 2010. The cointegration analysis shows a long run relationship between expenditure in education and health, and economic growth. The estimated static model shows that public and private expenditure and investment in education and health positively affects economic growth in the country.

Onisanwa (2014) employs the methodology of cointegration and Granger causality techniques to analyse quarterly data spanning the period from 1995 to 2009 to iinvestigate the impact of health on economic growth in Nigeria. The study finds that the variables are cointegrated and that two-way causality (bi-causal relationship) exists between the variables. The long-run impact of total health expenditures on economic growth is observed to be positive and significant.

Ogungbele, Olawumi and Obasuyi (2013) estimates a vector autoregressive (VAR) model to examine the relationships among life expectancy, public health spending and economic growth in Nigeria in the period from 1978 to 2008. The analysis shows no causality between Life expectancy at birth and GDP and life expectancy at birth and public health spending. It however shows uni-directional causality between public health spending and GDP with causality running from public health spending to GDP.

Ayuba (2014) examines the causal relationship between public social expenditure (education and health) and economic growth in Nigeria in the period from 1990 to 2009 using a vector error correction (VEC)-based causality model. The study finds unidirectional causality between economic growth and health expenditure, with causality running from economic growth to health expenditure, upholding the Wagner's law.

Boache (2015) examines the growth effect of health in Ghana in the period 1982 to 2012 using the ARDL Bounds test approach to cointegration. Controlling for the effects of education, international trade, FDI, inflation and physical capital accumulation, the study finds that economic growth is significantly driven by health in both the long- and short-run, though the favourable growth effect in the short-run is lower, implying that improvement in the health status of Ghanaians raises the level of output in the economy.

Oni (2014) employs multiple regression analysis to evaluate the growth impact of health expenditure in the Nigeria in the period from 1970 to 2004. The study finds that total health expenditure as well as gross capital formation and labour force productivity are important factors explaining economic growth in the country.

However, Weil (2005) and Bloom and Canning (2008) (both cited in Georgiou, 2013) are of the view that health positively impacts economic growth only if health expenditure percentage of GDP exceeds a certain critical level. This suggests that there is threshold level for health expenditure percentage of GDP beyond which health can positively affect economic growth.

Boussalem, Bousalem and Taiba (2014) employs causality and cointegration analysis to investigate the relationships between public spending on health and economic growth in Algeria during the 1974-2014 period. The analysis indicates that long run causality runs from public spending on health to Algeria's economic growth, though no short run causality was observed to run from public spending on health to economic growth.

4. THEORETICAL FRAMEWORK, MODEL SPECIFICATION AND ESTIMATION METHODOLOGY

4.1. THEORETICAL FRAMEWORK

Keynesian expenditure theory considers government expenditure as a key growth stimulant particular during recession. The Keynesian view is upheld by Ram (1986) through the Ram's Growth Accounting Model, wherein it is shown that government expenditure positively affects growth. Considering that expenditure in health constitutes part of total expenditure, this paper investigates the effect of health expenditure component of total expenditure on economic growth of Nigeria.

The Neoclassical growth models attribute economic growth to capital, labour and technical knowledge. The Augmented Solow Growth Model identifies human capital (education and health) as important factors determining the growth of an economy. Thus the model is also referred to as the Human Capital Augmented Solow Growth Model. Mushkin's (1962) health-led growth hypothesis considers health as a form of capital and sees health expenditure as an investment which can engender increase in income. We build on the Augmented Solow Growth model also referred to as the Human capital augmented growth model. This model shall be modified to capture the effect of health expenditure component of human capital investment to test the validity of Mushkin's hypothesis for Nigeria. The augmented Solow model and Mushkin hypothesis predict positive relationship between human capital and economic growth, thus underscoring the importance of human capital investment of which health expenditure is a part in the development of all economies.

4.2. METHODOLOGY, MODEL SPECIFICATION AND DATA

The method of analysis adopted for this study is The ARDL based Bounds test approach to cointegration and error correction modeling. The choice of this methodology is informed by the need to investigate the long run and short run relationships between the explanatory variables and the dependent variable. This method of error correction modeling has three distinct advantages over other error correction models. First it is applicable to modeling involving data that are of mixed order of integration; second, it is relatively more efficient in cases of small and finite data sizes and third, it yields unbiased estimates of the long-run model. (Harris and Sollis, 2003).This method involves unit root test for variables using one or more of the unit root test methods (Augmented Dickey Fuller test, Phillips-Perron test, etc), the cointegration test which is conducted to test the possibility of existence of level relationship or long run (equilibrium) relationship between the variables (dependent and explanatory variables) and, if the variables are found to be cointegrated, that is if the cointegration test indicates existence of level relationship between the variables, then an error correction model shall be

estimated, as cointegration is a condition for error correction representation according to the *Granger Representation Theory*.
The ADF test adopted to test for unit root entails estimating the regression equation (Gujarati, 2004):

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m}(\alpha_i \Delta Y_{t-i}) + \varepsilon_t \quad (1)$$

(Y represents each variable series, t represents the time or trend variable and ε_t is a white noise error term. $\Delta Y_t = Y_t - Y_{t-1}$, $\Delta Y_{t-1} = Y_{t-1} - Y_{t-2}$, etc), and using the critical tau (τ) value to test the null hypothesis that $\delta = 0$ (i.e. there is unit root in the series or, the series is non stationary), against the alternative hypothesis that $\delta < 0$ (i.e. absence of unit root in the series or the series is stationary). Rejecting the null hypothesis implies that the series is stationary.

The Bounds test approach to cointegration involves specifying a unrestricted error correction model (UECM) of interest in the form:

$$\Delta LRGDP_t = a_0 + \lambda_1 LRGDP_{t-1} + \lambda_2 Lhegdp_{t-1} + \lambda_3 Lgcfgdp_{t-1} + \lambda_4 Lnetfdi_{t-1} + \lambda_5 Lexrt_{t-1} + \lambda_6 Linf_{t-1} + \sum_{j=0}^{n_1}(\Phi_j \Delta Lgcfgdp_{t-j}) + \sum_{i=0}^{m}(\theta_i \Delta Lhegdp_{t-i}) + \sum_{x=0}^{p_1}(Ч_x \Delta Lnetfdi_{t-x}) + \sum_{r=0}^{q_1}(\delta_r \Delta Lexrt_{t-r}) + \sum_{w=0}^{v_1}(\Pi_w \Delta Linf_{t-w}) + \Phi g + e \quad (2)$$

Where G is the error correction term, and $\boldsymbol{e}$ is white noise error term. The model is estimated with the OLS estimation technique so as to test for the joint significance of the coefficients of the lagged levels of variables using the F-statistic test. Thus the null hypothesis: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6$ is tested against the alternative hypothesis: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6$
The computed F-statistic is compared with two critical values (lower bound and upper bound critical values) at a chosen level of statistical significance. If the F-statistic is greater than the upper bound critical value at a chosen significance level, then it can be inferred that a level relationship exists between the dependent variable and the explanatory variables; this is to say they are cointegrated.
The model is specified in its functional form as:

$$RGDP = f(hegdp, gcfgdp, netfdi, exrt, \text{ inf}) \quad (3)$$

Where:

- RGDPG = Real GDP growth (proxy for economic growth);
- *hegdp* = Health expenditure percentage of GDP;
- *hegdp* = Health expenditure percentage of GDP;
- *gcfgdp* = Gross capital formation as percentage of GDP;
- *netfdi* = Net foreign direct investment inflows as percentage of GDP;
- *exrt* = Exchange rate;

- *inf* = Inflation rate:

The long-run (static) equation is specified as:

$$LRGDPG = \beta_0 + \beta_1 Lhegdp + \beta_2 Lgcfgdp + \beta_3 Lnetfdi + \beta_4 Lexrt + \beta_5 inf \quad (4)$$

The *a priori* expectations are $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 < 0$
The error correction model to be estimated is specified as:

$$\Delta LRGDP_t = a_0 + a_1 \Delta LRGDP_{t-1} + \sum_{i=0}^{m}(\theta_i \, \Delta Lhegdp_{t-i}) + \sum_{j=0}^{n}(\Phi_j \Delta \, Lgcfgdp_{t-j}) + \sum_{x=0}^{p}(Ч_x \Delta Lnetfdi_{t-x}) + \sum_{r=0}^{q}(\partial_r \Delta Lexrt_{t-r}) + \sum_{w=0}^{v}(\Pi_w \Delta Linf_{t-w}) + \Omega ECT_{t-1} + \xi_t \quad (5)$$

The *a priori* sign with respect to each explanatory variable is same as in equation (2). The coefficient of the error correction term is expected to be negatively signed and statistically significant to play the role of error correction in the model.

Data for the analysis were sourced from the World Bank's World Development Indicators of 2014. The data spans the period from 1995-2013, as data for total health expenditure as percentage of GDP starts from 1995. All estimations shall be performed with the aid of EVIEWS 9 computer software.

4.3. THEORETICAL JUSTIFICATION OF INCLUDED EXPLANATORY VARIABLES

Health Expenditure

The augmented Solow model (also referred to as the human capital augmented Solow model) and the neoclassical models identify human capital as a critical factor of economic growth. Investment (expenditure) in human capital development comprising expenditure in education and health are posited to be positively related to economic growth.

Gross Capital Formation

Various growth theories such as the Neoclassical models (e.g. Solow Growth model, the Cobb-Douglas production function), the endogenous growth model, etc. identify capital as a major determinants of economic growth. They posit that capital is positively related to economic growth. Increase in capital stock engenders increase in employment and output. Capital is proxied in our model with gross capital formation as percentage of GDP.

Net Foreign Direct Investment

Net FDI is measured as FDI inflows minus FDI outflows. The inflow of foreign direct investment to an economy is expected to raise the level of capital therein. On the other hand, outflow of FDI reduces the amount of capital in the economy. FDI inflows positively affect economic growth, while FDI outflow adversely affects economic growth. All things being equal, if FDI is complimentary to domestic capital stock, the effect of net FDI on the growth of the economy could be positive. If the adverse effect of FDI outflows on economic growth dominates the positive effect of FDI inflows on economic growth, the effect of net FDI on economic growth could be negative. However, if the positive effect of FDI inflows dominates the adverse effect of FDI outflows on economic growth, net FDI inflows could positively affect economic growth.

Exchange Rate

International trade theories posit that currency depreciation boosts export and enhances its competitiveness in foreign markets as it reduces the price of exportable items in the foreign markets, and curbs import as the domestic currency price of imports increases. Consequently, export volume and earnings will increase, while import volume and payment for imports (import bills) will decrease. The resulting effect is an increase in the real GDP. However, in reality, the effect of currency depreciation on exports and imports depends on the elasticity of demand for the traded items. Currency depreciation would be favourable if the demand for a country's export items in foreign markets is inelastic. If the demand is elastic, currency depreciation may not have positive effect on exports as there may be competing substitutes.

Inflation

High rates of inflation imply increase in production costs. This also translates into increase in consumption cost, engendering decrease in aggregate demand and decrease in domestic investment which invariably implies reduction in the real GDP. The decrease in output resulting from increase in inflation engenders increase in imports, giving rise to huge import bills and depletion of foreign exchange reserves. Increase in domestic inflation rate also affects a country's exports competitiveness, resulting in reduced export earnings and reduced foreign exchange earnings. Therefore, all things being equal, inflation adversely affects economic growth.

5. ESTIMATION RESULTS AND DISCUSSION

5.1. UNIT ROOT AND COINTEGRATION TESTS

The summary of the unit root tests for the variables involving the augmented Dickey-Fuller (ADF) test is presented in Table 1.

Table 1. *Summary of Unit Root Test for Variables (ADF Tests)*

Variables	**Levels**			**First Difference**			**Order of Integration**
	ADF test stat	Test Critical Value (5%)	Inference	ADF test stat	Test Critical Value (5%)	Inference	
LRGDP	-1.9832	-3.6908	NS	-3.5351	-3.0522	S	I(1)
LHEGDP	-3.2593	-3.6908	NS	-6.5009	-3.0522	S	I(1)
LGCFGDP	-2.1388	-3.6908	NS	-4.5618	-3.0656	S	I(1)
LNETFDI	-2.1575	-3.6908	NS	-6.0126	-3.0522	S	I(1)
LEXRT	-1.5528	-3.6908	NS	-4.0250	-3.0522	S	I(1)
LINF	-3.9857	-3.6908	S	-	-	-	I(0)

NS = Non stationary; S = Stationary

The unit root test results show that the logs of all the variables except inflation are integrated of order 1, that is they are non-stationary at levels, but stationary at first difference. Inflation variable is stationary at levels, thus it is integrated of zero-order. However, though most of the variables are individually non stationary, it is possible that a linear combination of the variables will be stationary. Thus there is the tendency for the variable to move closely together over time and converge in the long-run. In other words, there is the possibility for a long run (equilibrium) relationship to exist between them. The test for cointegration enables us to test existence of such long-run relationship. Considering that the variables are of mixed order of integration, the appropriate method to use to test for cointegration in this regard is the ARDL based Bounds test approach to cointegration. The result of the cointegration test is presented in Table 2.

Table 2. *ARDL Bounds Test for Cointegration*

Sample: 1996 – 2013		
Included Observations:18		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	15.9042	5
Critical Value Bounds		
Significance	Lower Bound	Upper Bound
10%	2.08	3.00
5%	2.39	3.38
2.5%	2.70	3.73

The Bounds test for cointegration shows that the F-statistic is greater than both the lower and upper bounds even at the 1% level of significance. Thus it could be inferred that a level relationship exists between the dependent variable and the explanatory variables. Hence they are cointegrated.

Since a long-run (equilibrium) relationship exists between real GDP and the explanatory variables, the short-run dynamic relationship between them can be represented with an error correction model (ECM).

5.2. ERROR CORRECTION MODEL AND LONG-RUN COEFFICIENTS

The estimated ECM and the related long-run model, based on an estimated ARDL model (shown in the Appendix) are presented in Table 3.

Table 3. *Estimated Error Correction Model and Long Run Coefficients*

Dependent variable: Log(RGDP)			
Selected Model: ARDL (1,1,1,0,1,1)			
Sample: 1995 to 2013			
Included Observations: 18			
Cointegrating Form			
Variable	Coefficient	t-stat.	Prob
DLOG(HEGDP)	0.3200	9.1323	0.000
DLOG(GCFGDP)	0.1136	3.5304	0.0096
DLOG(NETFDI)	-0.0395	-2.3702	0.0496
DLOG(EXRT)	-0.0383	-2.3263	0.0529
D(INF)	-0.0007	-1.5359	0.1684
CointEq(-1)	-0.3731	-14.0245	0.0000
Long Run Coefficients			
LOG(HEGDP)	1.6720	7.2962	0.0002
LOG(GCFGDP)	0.5264	4.6809	0.0023
LOG(NETFDI)	-0.0907	-0.9835	0.3581
LOG(EXRT)	0.1920	4.3848	0.0032
INF	0.0938	1.5644	0.1617
C	21.2001	61.8621	0.000

The estimated error correction model reveals that health expenditure (as percentage of GDP) positively affects real GDP. The effect is highly statistically significant even at the 1% level of significance. The positive sign conforms to *a priori* expectations. The coefficient of the variable indicates that a 10% increase in the share of health expenditure in GDP is associated with 3.2% increase real GDP. The finding is in sync with empirical previous studies (Adelowokan, 2012; Oni, 2014) and underscores the importance of increased budgetary allocation to the health sector to the growth of Nigeria's economy.

The effect of gross fixed capital formation (as percentage of GDP) on real GDP in the period covered by the study is positive (in conformity with theoretical predictions) and highly statistically significant even at the 1% level. The coefficient of this variable implies that a 10% increase in gross capital formation is associated with 1.1% increase in real GDP. This observation points out the importance of increased investment in capital formation by both public and private sectors on the growth of Nigeria's economy.

Net foreign direct investment inflow (as percentage of GDP) is observed to have had negative effect on the real GDP in the period under review. The adverse effect is significant at the 5% level. This runs contrary to theoretical prediction of positive growth effect of foreign direct investment. Several reasons could be adduced for this observation. First is that the adverse effect of FDI outflows in the country (as seen in the works of Umoru, 2013 and Olugbenga and Alamu, 2013) may have dominated the positive effect of FDI inflows (as seen in the works of Umoh, Jacob and Chuku, 2012; Chinaemerem and Chidiebere, 2013), thus giving an adverse net effect of FDI on the real GDP. Second is that that FDI in the country may not have been complimentary to domestic investment in some of the growth-driving sectors. Third is the uneven distribution of FDI in the various sectors of Nigeria's economy, as FDI in the country appears to have been concentrated in a few sectors (particularly the oil and gas and telecommunication) with very little going to other growth-driving sectors as manufacturing, agriculture, etc.

The observed negative coefficient of the exchange rate variable (which is significant at the 6% level implies that currency depreciation (increase in the exchange rate) adversely affected Nigeria's economic growth in the sample period. This may not be unconnected with the high import dependence of the country's economy on imports which has tended to escalate her import bills, induced inflation and reduce are reserve of foreign exchange.

The effect of inflation on the real GDP in the period under consideration is negative, though negligible and statistically not significant, implying that inflation in Nigeria was not a critical factor affecting the growth of Nigeria's economy.

The coefficient of the error correction term (CointEq(-1)) has the expected negative sign and is highly statistically significant even at the 1% level as indicated by the p-value of 0.0000 ($p = 0.0000$). This further confirms cointegration of the dependent variable and the explanatory variables. The absolute value of the coefficient implies that 37.3% of the short-run deviation of real GDP from

equilibrium is off-set annually to maintain equilibrium. This indicates low speed of adjustment to equilibrium in the event of short run deviations there from.

The long-run form of the model indicates as in the error correction model that health expenditure and gross capital formation positively affect real GDP. A 10% sustained increase in health expenditure (percentage of GDP) is associated with 16.7% increase the real GDP, while a 10% sustained increase in gross capital formation (as percentage of GDP) is associated with 5.3% increase in real GDP. The effect of net FDI on real GDP is also negative as in the cointegrated form (error correction model), but statistically not significant.

The long-run effect of exchange rate depreciation on economic growth is positive and statistically significant. A 10% permanent (sustained) increase in the naira-dollar exchange rate is associated with approximately 2% increase in real GDP. The long run effect of inflation on real GDP is also not statistically significant, as in the error correction model.

5.3. MODEL STABILITY TEST

Stability of the structural parameters of a model enhances its reliability for policy. The stability of the model was tested with plots of cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) proposed by Brown Durbin and Evan (1975). The plots are presented in Figure 3a and Figure 3b respectively.

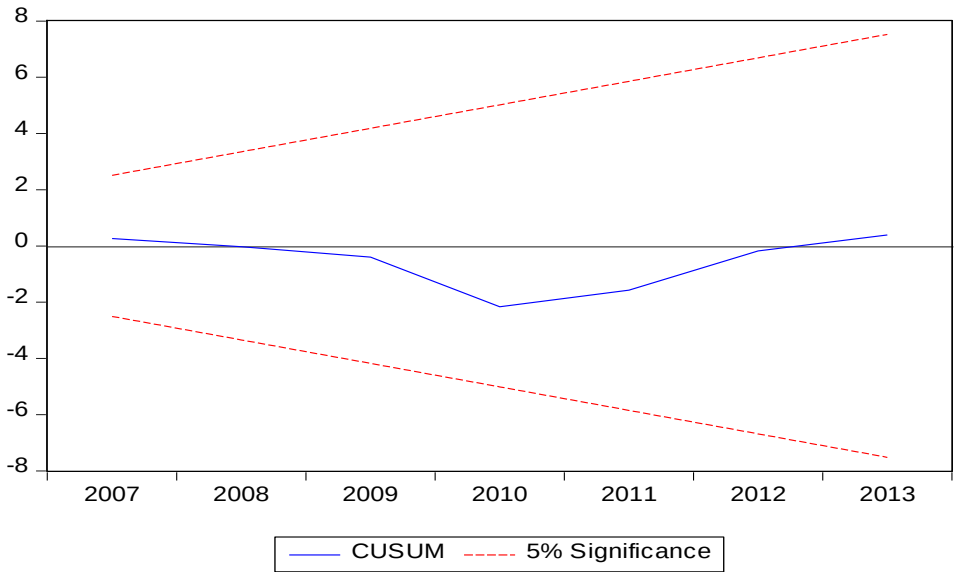

Figure 3a. *Plot of Cumulative Sum of Recursive Residual*

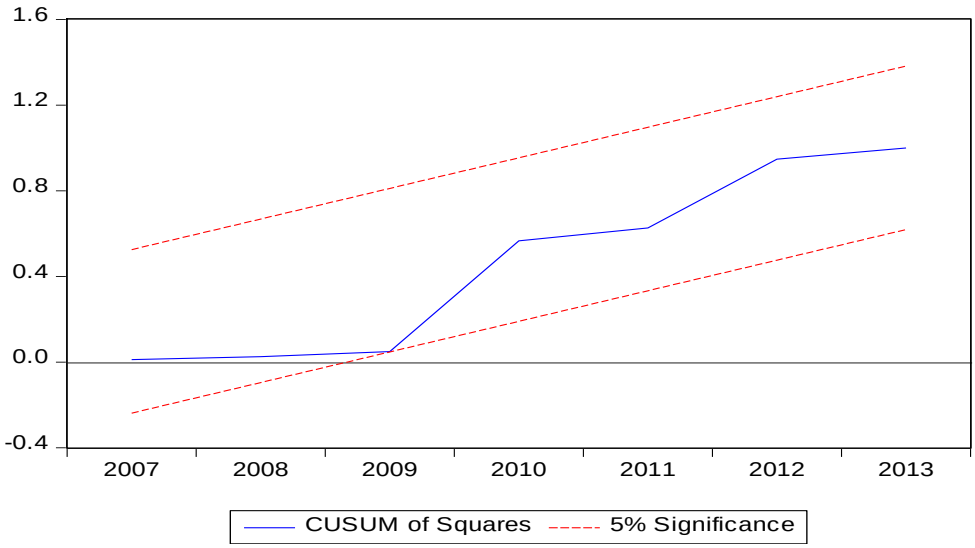

Figure 3b. *Plot of Cumulative Sum of Squares of Recursive Residual*

The plots of CUSUM and CUSUMSQ both lie between the 5% critical bounds. These are indications that the model is structural stable, and could be relied upon for policy.

6. CONCLUSION AND RECOMMENDATIONS

The paper investigated the effect of total health expenditure (comprising both public and private expenditure in health) on economic growth in Nigeria in the period from 1995 to 2013 using the ARDL-based Bounds test approach to cointegration and error correction. The study finds that total health expenditure positively and significantly affected economic growth in the short- and long-run. It also found positive and significant short- and long- run effects of gross capital formation on economic growth. The short-run effect of net FDI inflows on real GDP was found to be negative and significant, while the long-run effect was also negative but statistically not significant. The negative effect was attributed to the probable dominance of the adverse effect of FDI outflows on economic growth. Further evidence from the study were that exchange rate depreciation adversely affected real GDP in the short-run, but the long-run effect was positive. The long-run and short-run effects of inflation on real GDP in the period covered by the study were not statistically significant.

In light of the empirical evidence, the following are recommended for policy consideration:

I. There is need to increase budgetary allocation to the health sector. This is in consideration of the observed positive and statistically significant impact of (increase in) health expenditure on the real GDP.

II. Considering that gross capital formation (or domestic investment) positively affected real GDP in both (short-run and long-run) models, there is need for the government through its institutions and agencies to put measures on ground to encourage and boost domestic investment in the country. These measures include infrastructural development, improving the security condition, favourable tax regimes, setting the interest rate at levels favourable to domestic investment, and general reduction in the cost of doing business in the country.

III. The observed negative effect of net FDI inflows on real GDP suggests that the adverse effect of FDI outflows dominates the positive effect. There is there need to reduce the incidence of FDI outflows and enhance its inflows. Measures to achieve these are similar to some of the measures to raise the level of domestic investment discussed above. Foreigner's cost of doing business in the country must be reduced, multiple taxation avoided, the security situation must be improved. In addition, legislation could be used to reduce the chances of capital outflows from the country.

IV. Considering that exchange rate depreciation adversely affects real GDP in the short-run, but positively affects it in the long-run, there is need for the monetary authority to ensure favourable exchange rate for the naira (through occasional sterilized intervention in the foreign exchange market to achieve favourable exchange rate for the country's currency so that it supports economic growth.

REFERENCES

Adelowokan, O.A. (2012). Growth effect of education and health expenditure in Nigeria. *African Journal of Scientific Research, 10*(1), 509-528.

Ayuba, A.J. (2014). The relationship between public social expenditure and economic growth in Nigeria: An empirical analysis. *International Journal of Finance and Accounting, 3*(3), 185-191.

Bakare, A.S. & Olubokun, S. (2011). Health care expenditure and economic growth in Nigeria: An empirical study. *Journal of Emerging Trends in Economics and Management Sciences, 2*(2), 83-87.

Bloom, D.E. & Canning, D. (2008). *Population health and economic growth*. World Bank Working Paper, No. 24.

Boache, M.K. (2015). *Effect of health on economic growth in Ghana: An application of ARDL bounds test to cointegration*. MPRA Paper No. 67201.

Boussalem, F., Bousalem, Z., & Taiba, A. (2014). The relationship between public spending on health and economic growth in Algeria: Testing for co-integration and causality. *International Journal of Business Management, II*(3), 25-39.

Chinaemerem, O.C. & Chidiebere, A.B.A. (2013). Effect of foreign investment on the economic growth of Nigeria. *Information and Knowledge Management, 3*(1), 43-48.

Brown, R.L., Durbin, J & Evans, J.M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society. Series B (Methodological), 37*(2), 149-192

Elmi, Z.M. & Sadeghi, S. (2012). Health care expenditures and economic growth in developing countries: Panel cointegration and causality. *Middle-East Journal of Scientific Research, 12*(1), 88-91.

Georgiou, M.N. (2013). *Health expenditure and economic growth: A worldwide panel data analysis*. Available at SSRN: http://ssrn.com/abstract=2250761.

Kurt, S (2015). Government health expenditures and economic growth: A Feder-Ram approach for the case of Turkey. *International Journal of Economics and Financial Issues, 5*(2),441-447.

Mehrara, M., Fazaeli, A.A., Fazaeli, A.A. & Fazaeli, A.R. (2012). The relationship between health expenditure and economic growth in the middle East and North Africa (MENA) Countries. *International Journal of Business Management and Economic Research, 3*(1), 425-428.

Mushkin, S. J. (1962). Health as an investment. *Journal of Political Economy, 70*(5), 129-157.

Nasiru, I. & Usman, H. M. (2012). Health expenditure and economic growth nexus: An ARDL approach for the case of Nigeria. *Journal of Research in National Development, 10*(3), 95-100.

Ogungbele, S., Olawumi, O.R. & Obasuyi, F.O.T. (2013). Life expectancy, public health spending and economic growth in Nigeria: A vector autoregressive (VAR) model. *European Scientific Journal, 9*(19), 210-235.

Olugbenga, A.A. & Alamu, O.A. (2013). Does capital flight have a force to bear on Nigerian economic growth? *International Journal of Developing Societies, 2*(2), 80-86.

Oni, L.B. (2014). Analysis of the growth impact of health expenditure in Nigeria. *IOSR Journal of Economics and Finance, 3*(1), 77-84.

Onisanwa, I.D. (2014). The impact of health on economic growth in Nigeria. *Journal of Economics and Sustainable Development, 5*(19), 159-166.

Ram, R. (1986). Government size and economic growth: A new framework and some empirical evidence from cross-section and time series data. *American Economic Review, 76*, 191-203.

Sadr, S. M. H. (2012). Consideration of the Effect of E-Health Expenditure on Economic Growth with VAR Approach. *Asian Journal of Business and Management Sciences, 2*(3), 35-42.

Umoh, O.J., Jacob, A.O. & Chuku, A.C. (2012). Foreign Direct Investment and economic growth in Nigeria: An analysis of the endogenous effect. *Current Research Journal of Economic Theory, 4*(3), 53-66.

Umoru, D. (2013). Capital flight and the Nigerian Economy. *European Journal of Business and Management, 5*(4), 40-50.

Wang, K. (2011). Health care expenditure and economic growth: Quantile panel-type analysis. *Economic Modeling, 28*(4), 1536-1549.

Weil, D.N. (2005). *Accounting for the effect of health on economic growth*. NBER Working Paper 11455, July.

APPENDIX

Autoregressive Distributed Lag Model

Dependent Variable: LOG(RGDP)
Method: ARDL

Sample (adjusted): 1996 2013
Included observations: 18 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): LOG(HEGDP) LOG(GCFGDP) LOG(NETFDI) LOG(EXRT) LOG(INF)
Fixed regressors: C
Number of models evalulated: 32
Selected Model: ARDL(1, 1, 1, 0, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(RGDP(-1))	0.621240	0.070159	8.854796	0.0000
LOG(HEGDP)	0.322751	0.058776	5.491177	0.0009
LOG(HEGDP(-1))	0.310535	0.075803	4.096586	0.0046
LOG(GCFGDP)	0.116339	0.051857	2.243445	0.0598
LOG(GCFGDP(-1))	0.083030	0.052629	1.577632	0.1587
LOG(NETFDI)	-0.034335	0.032278	-1.063739	0.3228
LOG(EXRT)	-0.041128	0.027233	-1.510215	0.1747
LOG(EXRT(-1))	0.113843	0.028749	3.959868	0.0055
LOG(INF)	-0.016047	0.023271	-0.689544	0.5127
LOG(INF(-1))	0.051584	0.017208	2.997706	0.0200
C	8.029773	1.499394	5.355348	0.0011

R-squared	0.997702	Mean dependent var	25.35030
Adjusted R-squared	0.994418	S.D. dependent var	0.405171
S.E. of regression	0.030270	Akaike info criterion	-3.879529
Sum squared resid	0.006414	Schwarz criterion	-3.335412
Log likelihood	45.91576	Hannan-Quinn criter.	-3.804502
F-statistic	303.8705	Durbin-Watson stat	2.617918
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.