# PUBLIC HEALTH EXPENDITURE AND INCLUSIVE GROWTH IN NIGERIA

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***Abstract***
*Knowledge of public health expenditure in Nigeria is required to fashion outpolicies aimed at promoting inclusive growth. The objective of this paper is to examine the relationship between public health expenditure and inclusive growth in Nigeria. Studies done in this area did not used estimation techniques that have wide implications and the distributional effect of fiscal policy was also not considered. This current study departs from these by using error correction technique that shows how the disequilibria in the previous year is corrected for in the current year and enclosure of gini-difference variable into the analysis to capture the distributional effects of fiscal policy. Public health expenditure on health was used as a proxy for health expenditure, while inequality proxied by gini-difference was used as the dependent variables whileother variables were used to control for gini-difference. Stochastic properties of the time series data were carried out such as descriptive statistics, correlation matrix, stationarity test, lag length selection criteria to inform the econometrics technique and procedures. Error correction model was built and estimated to examine this relationship. To validate the model, diagnosed tests such as serial correlation - LM test, CUSUM test and CUSUM of Square tests and Wald test for coefficient diagnostic wasused. The result of the error correction term portrays that about 21.5% disequilibrium from the previous year's shock converges back to the long-run equilibrium in the current year. The government should improve on it health expenditure if inclusive growth from the point of view of health expenditure is to be achieved.*

***Keywords****:* Public Health Expenditure, Inequality, Inclusive growth, Error Correction Model and Diagnostic Test

## 1.0 Introduction

Interest has been vested in health expenditure at the country, region, continental and global levels. At any point in time the authorities wish to find out how much is being expended on health programs and interventions and at the same time interested in the outcomes of health expenditure. The outcome could be in terms of the extent to which health expenditure trickledown to the economy in general and to inclusive growth in particular. Health expenditure in this study implies recurrent and capital spending from government budgets, external borrowings and grants, while inclusive growth according to the World Bank refers to rapid pace of growth, which is broad-based across sectors and include a large part of a country's labour force (Ianchocvichina and Lundstrom, 2009). Expenditure has been incurred on health at the continental, regional and country levels. For instance, health expenditure public as % of gross

domestic product (GDP) on the average amounted to 2.48, 2.58 and 1.67 (1995-2014) for Africa, Sub-Saharan Africa (SSA) and Nigeria respectively. With regard to health expenditure public as % of total expenditure, it was on the average 43.48, 41.05 and 31.26 (1995-2014) for Africa, Sub-Saharan Africa and Nigeria respectively. A similar trend for health expenditure total as % of GDP on the average amounted to 5.69, 6.28 and 5.31 (1995-2014) for Africa, Sub-Saharan Africa and Nigeria respectively (African Development Indicator, 2016). The indicators suggest that Nigeria lags behind its peers and that not much trickledown effect to inclusive growth might has been achieved.

The expenditure on health in Nigeria comes from various sources: all tiers of government and agencies, loans and grants from the donor and partners, private sector contribution and out-of-pocket expenses (Agbatogun and Taiwo, 2011). Despite the little commitment in health expenditure, inclusive growth indicators do not seem impressive. The inclusive growth indicators for the country are not favourable indicating that the country has not trailed well on the path to inclusive growth. The poverty indicator shows that life expectancy between 1999-2010 was 54 years, child nutrition at 24%, basic literacy for the age group 15 – 24 amounted to 66 % and 55 % of the citizens had income below the poverty line. Public spending on health amounted to $29 per capita yet, 127 of every 10,000 children die before their fifth birthday. Other inclusive growth indicators for the period 1980-2016 are not also impressive and on the average amounted to: 45.240, 47.573, 2.333, 15.5, 0.419 and 54.0 for the gini_net, gini_market, gini_diff, poverty, HDI and unemployment rate respectively.

These poor inclusive growth indicators coupled with the fact that policies and health programs have been fragmentary and ad hoc, shows a clear neglect of public and private health care programs and interventions. There is also the inability to respond to the outbreaks and improve the health system due to macroeconomic challenges facing the country.

Public health expenditure in Nigeria has not significantly improved over the past decades, nor is the extent to which it has contributed to inclusive growth known. The significance and the extent are required in fashioning the direction and magnitude of policy aimed at promoting the economy in general and inclusive growth in particular. The theoretical reviews show that health expenditure and inclusive growth are rooted in Musgrave and Rostow; Lucas and Romer; and Schumpeterian theories that emphasized the link between health expenditure and growth. Empirical studies conducted in health expenditure and inclusive growth used Panel VAR and OLS regression whose results have limited policy implications. Again, the distributional effect of fiscal policy in terms of using gini-diff was not considered in (Hur, 2014). This current study departs from these and used an error correction model that reveals the speed of adjustment in the long run equilibrium relationship. Again, the present study draws inspiration from Hur (2014) by using gini_difference as against gini_net and gini_market which is hoped to capture the distributional effects of fiscal policy. The objective of this study therefore is to examine the impact of health expenditure on inclusive growth in Nigeria. The result has shown the extent to which public health expenditure can impact on inclusive growth in Nigeria.

The paper is organized as follow section 1, introduction; section 2, literature; section 3, methodology; section 4, results and discussions and section 5, summary, conclusion and policy recommendation.

## 2.0 Literature Review
## 2.1 Conceptual Review

There are difference ways of conceptualizing inclusive growth in the growth cum development literature and by different interest groups (Ianchocvichina and Lundstrom, 2009; Rauniyar and Kanbur, 2009; Anand, Tulin and Kumar 2014; Klasen, 2010; and Groepe, 2012). The different ways of conceptualizing inclusive growth makes it difficult to provide clarity as to what the concept is all about. To provide clarity and to overcome this problem the concept of inclusive growth is classified into three groups in this current study. (i) Growth is considered inclusive when it is broad-based across the sectors (Ianchocvichina and Lundstrom, 2009; Rodrigo and Garcia-Verdu, 2011and Groepe, 2012). However, it is possible that the poor may not be adequately represented in any of the sectors and if that happen growth may not be inclusive. (ii) The second category consider growth to be inclusive only if everyone participate and benefits from the growth dividends (Rauniyar and Kanbur, 2009; Anand, Tulin and Kumar 2014; and Klasen, 2010). This category can actually provide inclusive growth provided that the political and social mechanisms are conducive to ensure that all benefits from the growth process. The third category which is similar to the second emphasized that both poverty and inequality have to be reduced for growth to be pro-poor. The third category and the second are different sides of the same coin because if growth can reduce poverty and inequality then everyone can benefit from it. From the above categorization of the concept of inclusive growth it is clear that the working concept of inclusive growth for this study is the one that benefits everyone and can reduce inequality and poverty.

With regard to the concept of public health expenditure, it consists of recurrent and capital spending from government budgets, external borrowings and grants. This includes donations from international agencies and nongovernmental organizations, and social health insurance funds. Public expenditure on health refers to expenditure on health care incurred by the public. Public funds are state, regional and local Government bodies and social security schemes.

## 2.2 Theoretical Literature

There are different strands of contending theories explaining public health expenditure and inclusive growth. These theories can be grouped into three broad categories: the first category is the Keynes and Adolph Wagner theory; the second - Solow and the third - Musgrave and Rostow, Lucas and Rommer and the Schumpeterian theory. The first category starting with Keynes, he considers increase in government expenditure especially in government infrastructure to promote economic growth (Ebiringa and Charles-Anyaogu 2012) and via the multiplier interaction process (Maitra and Mukhopadhyay 2012). Adolph Wagner law of public expenditure is similar with Keynes theory, Wagner posits that when the per capita income of a country increases the government would also raises expenditure and this has the tendency of promoting growth. Thus, this implies that the GDP growth causes a rise in government expenditure (Maitra and Mukhopadhyay, 2012). He noted that there is a tendency for the state activities to increase intensively and extensively making it possible for a relationship to exist between state economic activities and the growth of the economy (Bakare and Sanmi 2011). This implies that the government sector grows faster that the economy. Wagner views were supported by Witti who posited that it was common for the government at all levels to increase government expenditure with the growth of the economy (Bakare and Sanmi 2011). The increase in expenditure prompted by the increase in the activities of the government beyond defense, justice, law and order and the

maintenance of state and social overheads, redistributing income, wealth and welfare. He further explain that as output increases in a community, expenditure also increases as well and therefore public sector expenditure is associated with output growth in developing countries (Adelowokan, 2012). The growth in public sector activities is as a result of industrialization and public sector activities such as administration and productive functions (Adelowokan, 2012). Also, the state role in maintaining law and order, economic activities, economic regulation, urbanization and industrialization increases (Adelowokan, 2012). These responsibilities should lead to spending since high income elasticity of demand for these services is expected to increases (Adelowokan 2012). This implies that as income per capita increase the demand for these services also increases and raises the share of government spending in GDP. More, he explains that technological change and the growing number of firms would create monopolies and government would be saddled with the responsibility of regulations thereby adding to government economic activities and subsequently increase in government expenditure (Adelowokan, 2012). This would again lead to increase in government expenditure which are mainly derive from increase state social and economic activities. The expansion in spending is connected with increasing social and economic progress and should expand quantitatively and qualitatively (Adelowokan, 2012).

The second group is the theory of Solow in 1956 that included capital and neglect human capital as an aspect of growth. He postulates that saving/ investment and population growth are major determinants of economic growth (Gisore, Kiprop, Kalio, Ochieng and Kibert, 2014). Thus, higher saving/investment lead to accumulation of more capital per head and therefore increase output per head (Gisore, Kiprop, Kalio, Ochieng and Kibert 2014). On the contrary higher population growth has a negative effect on economic growth because higher fraction of saving/investment has to keep capital-labour ratio constant (Gisore, Kiprop, Kalio, Ochieng and Kibert 2014). The theory assumes that technological progress which grows at a steady state is what determines output growth (Gisore, Kiprop, Kalio, Ochieng and Kibert, 2014). The Solow model also posits that the level of saving capital accumulation affects growth in the transitional period. The model however, neglects human capital which is a vital input in determining growth (Kurt, 2015). Even though the expanded version of it included human capital it still did not explain how the growth occurs within the context of human capital (Gisore, Kiprop, Kalio, Ochieng and Kibert 2014).

The third group of theories are Musgrave and Rostow; Lucas and Romer; and the Schumpeterian. The consensus in this group is that economic growth can be achieved via human capital investment: education and health and other forms of growth indices. However, the dimensions of growth differ from one theory to another within this group. Starting with Musgrave and Rostow they posit that provision of social and economic infrastructure tends to increase productivity which is necessary to take up the economy into middle stage of economic and social development (Gisore, Kiprop, Kalio, Ochieng and Kibert, 2014). The supply of these investments by the public sector is complemented for by the private sector investment. The control of these investments in the economy by the government leads to market failure and the government has to intervene to correct market failures (Gisore, Kiprop, Kalio, Ochieng and Kibert, 2014). Once the economy reaches maturity the expenditure shift from infrastructure to education, health and welfare services tends to promote growth (Gisore, Kiprop, Kalio, Ochieng and Kibert, 2014). The Lucas 1988 version; and Romer 1990) posit that expenditure on education and health have been justified in endogenous growth theory (Lucas 1988; and Romer 1990). In the endogenous model, technological progress, which increases productivity and

account for the pace of growth, can be determined within the model through the formation of human capital (Maitra and Mukhopadhyay, 2012). Expenditure on education and health help promote efficiency, knowledge and inventions which contribute to economic growth in an economy (Maitra and Mukhopadhyay, 2012). Therefore in Lucas and Romer's model capital is not limited to physical capital but knowledge, skill and experiences owned by the labour input (Maitra and Mukhopadhyay, 2012). Growth is therefore considered as a function of human capital. The components of human capital are knowledge, skills, abilities and experiences acquired via good health and education (Maitra and Mukhopadhyay, 2012). Therefore expenditure on education and health increases human capital and impact on growth (Maitra and Mukhopadhyay, 2012). In this third group the Schumpeterian theory also identifies the channels through which health status may affect long-run growth (Maitra and Mukhopadhyay, 2012). Health is treated in Schumpeterian theory as a component of human capital. Therefore, it contributes to relative productivity and per capital GDP. These are via efficiency, skill accumulation, research efficiency and intensity (Onisanwa, 2014). From the review it is clear that since this study is on health expenditure and inclusive growth the suitable theories are the third category: Musgrave and Rostow; Lucas and Romer; and the Schumpeterian. They emphasize the link between health expenditure and growth.

**2.3 Empirical literature**

Few empirical works have been identified that links public health expenditure and inclusive growth: Asif and Sultan (2013) for India; Alami (2014) for Middle East and North Africa (MENA); Estrada, Lee and Park (2014) for AfDB and (Hur 2014) for Asia Development Bank (ADB) Members. The studies are categorized into two broad groups: (i) Asif and Sultan (2013) for India is a case country study and Alami (2014) for; Estrada, Lee and Park (2014) and (Hur 2014) for AfDB members are cross country studies. Starting with the first group Asif and Sultan (2013) investigates the impact of inclusive growth on per capita income for India. The data was first tested for unit root before cointegartion test. The results show that there was no cointegration among the variables. For the second group of studies starting with Alami (2014) conducted a study on the impact health expenditure and social policy and inclusive growth for MENA countries. He uses descriptive statistics for health care outcome indicators and different definition of health expenditure. The descriptive statistics show that health care outcome indicators are below average as compared with other regions of the world and health care expenditures are also below average. A similar study in this category is by Estrada, Lee and Park (2014) for AfDB members and examines the impact of government spending on inclusive growth including health expenditure. Using descriptive statistics government expenditure including expenditure on health care were examined vis-à-vis health care outcome measures such as under 5 mortality rate per 1,000 live birth and birth attended by skilled health personnel. Implicitly, it was deduced that health care spending has an impact on inclusive growth in the region. In this category Hur (2014) also assess the effect of fiscal policy on both equity and growth for 33 out of 48 AfDB members and 34 OECD members. He uses dependent variables such as Gini_net, Gini_market and real GDP as dependent variables government final consumption expenditure, gross capital formation, military expenditure social transfers and subsidy, spending on health, spending on education and other control variables. Descriptive statistics as well as panel vector auto regression techniques were used to realize the objectives of the study. The result reveals that public spending on health and education alleviate inequality in AfDB members and thus fiscal expansion may contribute more to growth. From the review it is very clear that the second category are cross country study and the assumption is that the

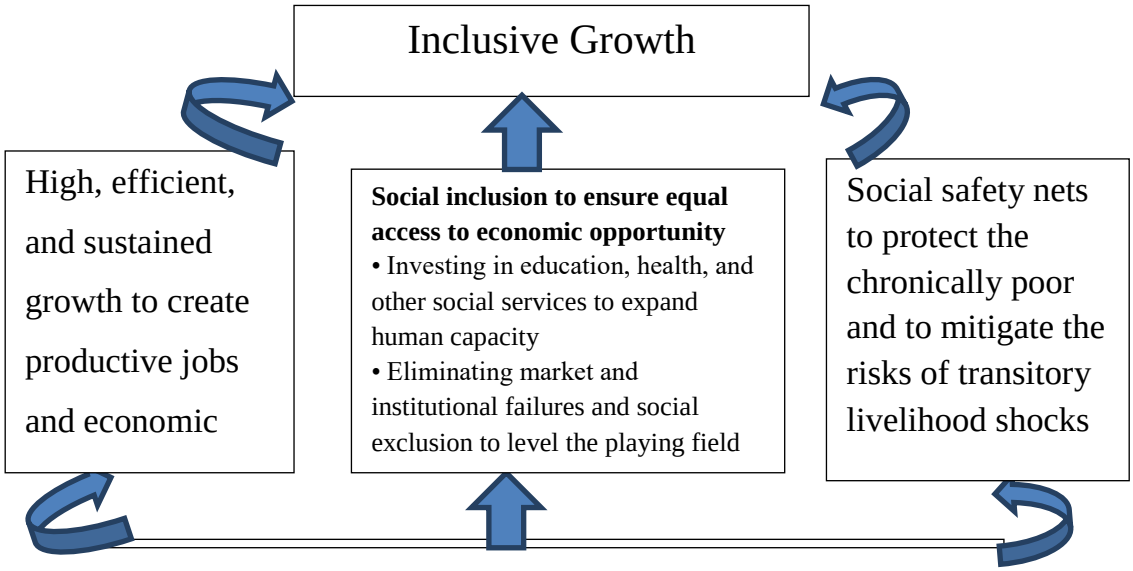
economic condition in these countries are same which may not necessary be the case. Therefore, the results may not be ideal for individual countries. Given this limitation this current study on Nigeria intends to examine the impact of inclusive growth and the results could be relevant for Nigeria. Even though Asif and Sultan (2013) conducted for a specific country (India) the health expenditure for Nigeria and India are not comparable and therefore the result may not be applicable for Nigeria. India allocates a greater chug of the national budget on health expenditure than in Nigeria. More importantly Hur (2014) used Gini_net and Gini_markets as the proxies of inclusive growth. This current study departs from previous by using Gini-diff which is the difference between Gini_market and Gini_net and draws inspiration from Hur (2014) which is hoped to capture the distributional effects of fiscal policy.

## 3.0 Methodology

### 3.1 Conceptual Framework

The conceptual framework for inclusive growth is depicted in figure 3.1,as shown in fig.3.1 government and its institution enhance the economy in three ways. (i) Ensure efficiency and sustain growth to create jobs and economic opportunities. (ii) Promote investment in health and education and other social services to expand human capacity. To eliminates market and institutional failures and avoid social exclusion. (iii) Provide social and safety nets and to protect the poor from livelihood shocks. All the (i)-(iii) could help promote inclusive growth as depicted in fig.3.1. The framework suggests that inclusiveness can be attained among other variables via health expenditure.

**Fig. 3.1: Conceptual framework for inclusive growth:Adapted from Zhuang (2010) cited in ADB (2011)**




### 3.2 Time Series Properties of the Data

The time series properties of the data were examined. The descriptive statistics, correlation matrix, lag length selection criteria, and the unit root test. According to Liew (2004) the lag length selection criteria are AIC, SIC, HQ and the final prediction error. The lag length that minimizes the information criteria is the best (Gutierrez, Souza and Guillen, 2007). The diagnostics test are also conducted to validate the model: the coefficient diagnostic using the Wald Test, the residual diagnostics for serial correlation and the LM test and the stability

diagnostics – recursive estimate for the CUSUM and CUSUM of squared test. The unit root is necessary because there is need to avoid a spurious regression that may give a good fit and predict a statistical significance via the 't' values and the "f" statistics relationship between variables where none really exist (Mahadeva and Robinso, 2014). Given the limitations of the PPT and KPSS, the ADF test would be used for this paper because of its lags augmentation of the dependent variable which is motivated by the need to generate residuals which are free of` serial correlation or to get rid of the residual of serial correlation (Castro, Rodrigues and Taylor 2013; and Mahadeva and Robinso, 2014). Again, the ADF test is suitable for few samples and given that time frame for the study comprises 1980-2014 years it is actually suitable for this study.

**3.3 Empirical Framework**

The inspiration for the specification is drawn from Hur (2014).

$$Gini_{diff} = f(PESCS, PEEDU, PEHT, PETF) - - - - - - - - - - - - - - - - - - - 3.1$$

And is expressed econometric form as:

$$\Delta Gini_{Net_t} = \beta_0 + \beta 1 \Delta PESCS_{t-i} + \beta 2 \Delta PEEDU_{t-i} + \beta 3 \Delta PEHT_{t-i} + \beta 4 \Delta PETF_{t-i} + \emptyset_{t-1} + e_t - - - - - 3.2$$

The variables are as defined in table 3.2, while $\beta_0$ - $\beta 4$ are the parameters to be estimated, $\emptyset_{t-1} and\ e_t$ are the error correction terms and error terms respectively.

**3.3 Estimation Techniques**

Prior to the estimation technique descriptive statistics, correlation analysis, unit root tests were conducted to understand the time series properties of the data. The diagnostic tests were conducted in order to validate the model. The AIC and the SIC criteria were conducted to select the best optimal lag with the least AIC and SIC. The extent to which changes in health expenditure makes the system to readjust is determined by using error correction model (ECM).

**3.2 Data Description and Sources**

| **Data Definition** | **Data Description** | **Data Source** |
|---|---|---|
| GINI_DIFF | Inequality measure (Difference between Gini_market and Gini_net | Standardized World Income Inequality Database Soff, F. (2014) |
| PEEDU | Public Expenditure on Education | CBN Statistical Bulletin 2016** |
| PESCS | Public Expenditure on Social and Community Services | CBN Statistical Bulletin 2016** |
| PEHT | Public Expenditure on health | CBN Statistical Bulletin 2016** |
| PETF | Public Expenditure on Transfers | CBN Statistical Bulletin 2016** |

WDI*: World Bank Development Indicators 2016
CBN**: Central Bank of Nigeria Statistical Bulletin 2016

The inequality variables used is Gini_diff (the difference between Gini_market and Gini_net), the health expenditure variables used is public health expenditure (PEHT), while the control

variables are public expenditure on social and community services (PESCS), public expenditure on education (PEEDU), public and expenditure on transfers (PETF). The data used is for the period 1980-2014.

## 4.0 Results and Discussions

### 4.1 Descriptive Statistics

The descriptive statistics is presented (see table 5.1), with the hope of understand the properties of the data.

**Table 4.1: Descriptive Statistics for the Variables used in the Model**

| Statistics | GINI_DIFF | PEEDU | PEHT | PESCS | PETF |
|---|---|---|---|---|---|
| Mean | 2.332506 | 75.70076 | 42.29813 | 160.4283 | 311.8615 |
| Median | 3.30118 | 13.58949 | 3.891099 | 21.44143 | 83.74725 |
| Maximum | 4.33447 | 390.4248 | 231.8 | 844.0674 | 1441.955 |
| Minimum | -0.32043 | 0.162154 | 0.041315 | 0.288914 | 3.392902 |
| Std. Dev. | 1.842044 | 111.8812 | 65.77236 | 252.6261 | 391.634 |
| Skewness | -0.523862 | 1.644784 | 1.669579 | 1.680581 | 1.188901 |
| Kurtosis | 1.479181 | 4.579785 | 4.630259 | 4.517608 | 3.436262 |
| Jarque-Bera | 4.973815 | 19.4206 | 20.13627 | 19.83413 | 8.522888 |
| Probability | 0.083167 | 0.000061 | 0.000042 | 0.000049 | 0.014102 |
| Sum | 81.6377 | 2649.527 | 1480.434 | 5614.992 | 10915.15 |
| Sum Sq.Dev. | 115.3663 | 425591.5 | 147084.1 | 2169879 | 5214824 |
| **Observations** | 35 | 35 | 35 | 35 | 35 |

The Jarque–Bera test shows that the series have the skewness and kurtosis matching a normal distribution at the 5% significance level except the Gini_diff variable and suggests that the series are not normally distributed. The standard deviations for the variables are high suggesting variation or dispersion of the series from their mean. These underscored the need for a unit root test in order to avoid a spurious regression and misguided results.

The correlation matrix (see table 4.2) suggest that the strength and direction of linear associations between variables (Gini_diff, PESCS, PEEDU, PEHT and PETF) are very strong.

**Table 4.2: Correlation matrix of the variables used for the regression model**

| | GINI_DIFF | PEEDU | PEHT | PESCS | PETF |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **GINI_DIFF** | 1 | 0.546087 | 0.532245 | 0.522193 | 0.609579 |
| **PEEDU** | 0.546087 | 1 | 0.984377 | 0.986612 | 0.945661 |
| **PEHT** | 0.532245 | 0.984377 | 1 | 0.978139 | 0.916243 |
| **PESCS** | 0.522193 | 0.986612 | 0.978139 | 1 | 0.940163 |
| **PETF** | 0.609579 | 0.945661 | 0.916243 | 0.940163 | 1 |

The strong strength of the linear associations among the variables stresses the need to embark on an econometrics analysis to further interrogate the relationships for better policy implications.

### 4.2 Unit Test Results

Due to the high standard deviation and the non-normal distribution of the series the unit root is warranted (see table 4.3). The results show that Gini_diff and PETF are I(1), while PESCS, PEEDU and PEHT are I(0). The results are conducted at the 5% significance level and suggest that the bound testing technique, or ARDL technique is required since the unit root test revealed a mixture of I(0)'s and I(1)'s (see table 4.3). The result also implies that conducting any econometric technique at the level of the series could have led to misguided policy decisions. This underscored the need to always determine the stochastic properties of the data prior to any econometrics technique.

**Table 4.3: Sationarity Test Result for the Variables used for Estimation**

| s/n | **Variable** | **ADF at Levels** | **ADF at 1st Difference** | **Critical Value at 5%** | **Level of Integration** |
|---|---|---|---|---|---|
| 1 | Gini_diff | -1.715468 | -4.120754 | -3.552973 | I(1) |
| 2 | PESCS | 4.918268 | - | -3.595026 | I(0) |
| 3 | PEEDU | 4.474753 | - | -3.568379 | I(0) |
| 4 | PEHT | 4.373329 | - | -3.595026 | I(0) |
| 5 | PETF | -0.151396 | -5.798798 | -3.580623 | I(1) |

Source: Extracted from the ADF test results estimated using e-views version 8

### 4.3 The lag Length Criteria Results

The bound testing procedure requires that the lag length for the variables are known. The lag length results are presented in table 4.4. The maximum of 3 lags were chosen out of which the optimal lag was selected based on Akaike Information Criteria (AIC) and Schwarz Information Criteria (SIC). The maximum lag of 3 could not be exceeded because of the fewness of observation as it could affect the degree of freedom. The lag length of 2 was selected based on the least Akaike Information criteria (1.805418) - see table 4.4.

**Table 4.4: Lag Length Selection Criteria**

| **Lag Length** | **AIC** | **SIC** | **Remark** |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Lag1 | 1.846116 | 2.344952 | |
| Lag2 | 1.805418 | 2.538268 | |

Source: Extracted from Length Selection Results that was computed using e-views 8

To be certain that the model that produce the optimal lag length is valid, the model was diagnosed for serial correlation using the LM test (see table 4.5) and parameter constancy using the stability test (see figs 4.1a and 4.1b). The results for the LM test failed to reject the null hypothesis since the observed R-squared (Obs* R-squared) is >0.05 (0.7510) implying that there is no serial correlation in the estimated model. The stability test results for the parameter constancy shows the plot of the CUSUM and CUSUM of squares and indicates the stability of the coefficients since the plot of the CUSUM and CUSUMSQ statistics is confined within the 5% critical bounds of parameter stability.

**Table 4.5: Serial Correlation – LM Test**

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|---|---|---|---|
| F-statistic | 0.127576 | Prob. F(2,14) | 0.8812 |
| Obs*R-squared | 0.572766 | Prob. Chi-Square(2) | 0.7510 |

**Fig. 4.1a: CUSUM**

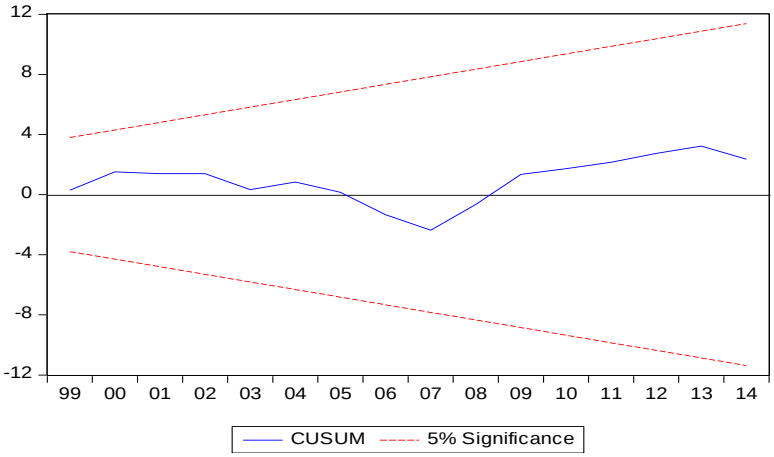
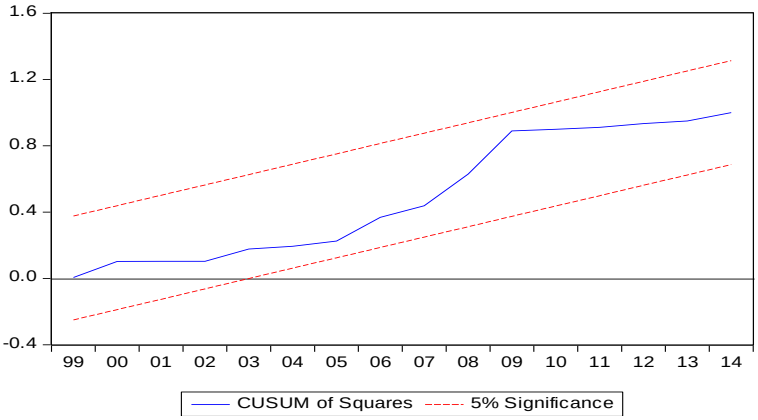



**Fig. 4.1b: CUSUM OF Square Test**




After diagnosing the model that produced the optimal lag length of 2 and found to be valid the next step was to test whether these is a long-run association among Gini_diff, PESCS, PEEDU, PEHT and PETF. The long-run association was conducted with the use of Wald test (see results in table 4.6).

**Table 4.6: Long run Association ship**

Wald Test:
Equation: Untitled

| Test Statistic | Value | Df | Probability |
|---|---|---|---|
| F-statistic | 3.143673 | (5, 16) | 0.0364 |
| Chi-square | 15.71836 | 5 | 0.0077 |

Null Hypothesis: C(12)=C(13)=C(14)=C(15)=C(16)=0
Null Hypothesis Summary:

| Normalized Restriction (= 0) | Value | Std. Err. |
|---|---|---|
| C(12) | -0.383530 | 0.100323 |
| C(13) | 0.005017 | 0.009646 |
| C(14) | 0.066015 | 0.024819 |
| C(15) | -0.143296 | 0.062082 |
| C(16) | 0.002606 | 0.001689 |

Restrictions are linear in coefficients.

The results of the Wald test show that the null hypothesis of no long-run association is rejected since Probability F. Statistic is <0.05(0.0364). The conclusion is that there is a long-run association between these variables.

Since the long-run association exist among the variables, the speed of adjustment in the long-run equilibrium relation was then established with the use of error correction test (see table 4.7).

**Table 4.7: Error Correction Test Results**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| **C** | -0.095518 | 0.130052 | -0.734462 | 0.4712 |
| **D(GINI_DIFF(-1))** | 0.534124 | 0.191148 | 2.794291** | 0.0112 |
| **D(GINI_DIFF(-2))** | 0.064749 | 0.201874 | 0.320739 | 0.7517 |
| **D(PESCS(-1))** | 0.003599 | 0.004852 | 0.741747 | 0.4669 |
| **D(PESCS(-2))** | -0.004123 | 0.007264 | -0.56764 | 0.5766 |
| **D(PEEDU(-1))** | -0.003282 | 0.009193 | -0.357027 | 0.7248 |
| **D(PEEDU(-2))** | 0.005584 | 0.014044 | 0.397617 | 0.6951 |
| **D(PEHT(-1))** | 0.004351 | 0.01086 | 0.400645 | 0.6929 |
| **D(PEHT(-2))** | 0.002225 | 0.011389 | 0.1954 | 0.8471 |
| **D(PETF(-1))** | -0.000465 | 0.001476 | -0.315258 | 0.7558 |
| **D(PETF(-2))** | 0.000691 | 0.001325 | 0.521177 | 0.608 |
| **ECT(-1)** | -0.215133 | 0.090992 | -2.364317** | 0.0283 |
| | | | | |
| **R-squared** | 0.454999 | | | |
| **F-statistic** | 1.517923 | | | |
| **Durbin-Watson stat** | 1.862183 | | | |

**Note: ** indicates significant at the 5%**

The error correction term portrays that about 21.5% disequilibrium from the previous year's shock converges back to the long-run equilibrium in the current year. This means that the speed at which the system reverts back to equilibrium from a state of disequilibria caused by changes in public health expenditure is slow. As expected the "t" statistics of the error correction term is significant at the 5% level. The result is in consonant with Egbetunde and Fasanya (2013) who found that the speed of adjustment to be -0.297 as against -0.21 in the current study. The discrepancy may be accounted for by the fact that they used aggregate public expenditure and GDP and since these are aggregate the error correction term is expected to be high than in the current study. The results are validated by the diagnostic test of the serial correlation LM test and the (CUSUM) and the CUSUM of square (CUSUMSQ) for the model that produced the error correction results.

The results for the LM test failed to reject the null hypothesis because the observed R-squared is >0.05 (0.2292) implying that there is no serial correlation in the estimated model. The cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests of the Pesaran (1997) are applied to assess the parameter constancy. Figures. 4.2a and 4.2b shows the plot of the CUSUM and CUSUM of squares and the diagnostic test clearly indicate the stability of the coefficients because the plot of the CUSUM and CUSUMSQ statistics are restricted within the 5% critical bounds of parameter stability. The other diagnostics test: the $R^2$(approximately 50%) and the DW (neighbourhood of 2) are within the tolerance range thereby reinforcing the validity of the model (see table 4.7)

**Table 4.8: Serial Correlation – LM Test**

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|---|---|---|---|
| F-statistic | 0.912596 | Prob. F(2,18) | 0.4193 |
| Obs*R-squared | 2.946056 | Prob. Chi-Square(2) | 0.2292 |

**Fig. 4.2a: CUSUM**

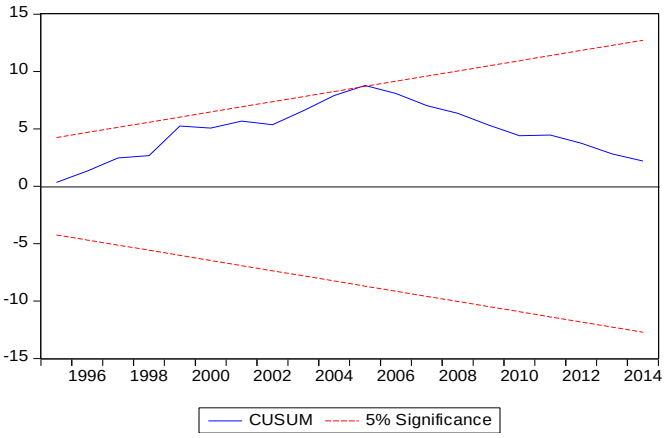
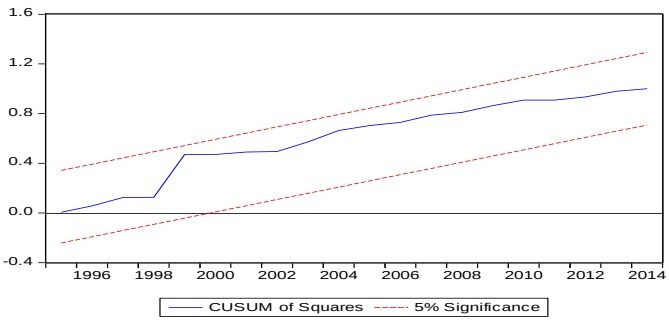



**Fig. 4.2b: CUSUM OF Square Test**




## 5.0 Summary, Conclusion and Policy Recommendation

To achieve the objective of the paper, preliminary tests on the data such as descriptive statistics, correlation analysis, lag length selection criteria and unit root tests were conducted. Next, the model that produced the optimal lag length was diagnosed for serial correlation and parameter constancy and was found to be valid thus robustness of the model. The long-run relationships among the variables Gini_diff, PESCS, PEEDU, PEHT and PETF were found to exist. The error correction test shows that the speed of adjustment was 21.5% and was considered to be very slow. The policy implication emanating from the results is that the Nigeria government should improve on it health expenditure on a large scale if inclusive growth from the point of view of health expenditure is to be realized.

## References

Adelowokan, O. A. (2012). Growth effect of Education and Health Expenditure in Nigeria (1970-2010). *African Journal of Scientific Research* Vol. 10, No. 1 (2012). Retrieved May 20-30, 2016. From: *www.journalsbank.com/ajsr_10_1.pdf*

African Development Bank Group Working Paper Series No 211– December 2014

Agbatogun K. K. and Taiwo, A. S (2011), "Government expenditure In Nigeria: A Sine Qua Non for Economic Growth and Development," *Journal of Research in National Development (JORIND)*, 9(2), 155-162. Retrieved May 20-30, 2016. From:*www.transcampus.org/.../Jorind%20Vol9%20No2%20Dec%20Chapter23.pdf*

Alami R., (2014). Health, Social Policy and Inclusive Growth in MENA. Department of Economic School of Oriental and African Studies London. Working Paper Series. Retrieved May 20-30, 2016. From:*https://www.soas.ac.uk/economics/research/workingpapers/file92588.pdf*

Anand R., Tulin V. and Kumar N (2014). India: Defining and Explaining Inclusive Growth and Poverty Reduction. Asia and Pacific Department. IMF Working Paper WP/14/63

Asif M. and Sultan A. Z. (2013). Health Care Expenditure and Inclusive Growth in India: A Cointegration Approach. International Interdisciplinary Journal, Voliume III Issue V September –October 2013. Retrieved May 20-30, 2016. From *www.academia.edu/.../Health_Care_Expenditure_and_Inclusive_Growth_In_India_A*

Bakare A.S and Sanmi O. (2011). Health Care Expenditure and Economic Growth in Nigeria: An Empirical Study. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)* 2 (2): 83-87. Retrieved May 20-30, 2016. From:*jetems.scholarlinkresearch.com/.../Health%20Care%20Expenditure%20and%20Econo*

Bastagli F., Coady D., and Gupta S. (2012). Income Inequality and Fiscal Policy. IMF Retrieved May 20-30, 2016. From: *https://www.imf.org/external/pubs/ft/sdn/2012/sdn1208.pdf*

Castro B., T., Rodrigues M.,M.,P. and Taylor A.M. R.(2013). On the Behaviour of Phillips Perron Tests in the Presence of Persistent Cycles. CEFAGE-UE Working Paper 2013/11

Central Bank of Nigeria (2016). The Central Bank of Nigeria. Retrieved on 10th July, 2016 from: https://www.cbn.gov.ng/documents/Statbulletin.asp

Claus I., Martinez-Vazquez J., and Vulovic V. (2014) Coping with Rising Inequality in Asia: How Effective Are Fiscal Policies. Retrieved May 20-30, 2016. From:https://www.semanticscholar.org/paper/Coping-with-Rising-Inequality-in-Asia-How-Claus-Martinez Vazquez/5a29301bd713d1d2aec8ad5d7f36cd537d7543ca

Ebiringa, O.and Charles-Anyaogu N. B. (2012). Impact of Government Sectorial Expenditure on the Economic Growth of Nigeria. *J. Eco. Res*., 2012, v3i6, 82 - 92

Egbetunde T. and Fasanya O. I. (2013). Public Expenditure and Economic Growth in Nigeria: Evidence from Auto-Regressive Distributed Lag Specification. *Zagreb International Review of Economics & Business*, Vol. 16, No. 1, pp. 79-92, 2013

Estrada G., Hyop L., and Park D. (2014). Fiscal Policy and Inclusive Growth: An Overview. ADB Economic Working Paper Series December 2014 No. 423. Retrieved May 20-30, 2016. From: *www.adb.org/sites/default/files/publication/150415/ewp-423.pdf*

George J. (2011) Growth and Development ….. Inclusive Growth: What went wrong with Development? MPRA Minich Personal RePEc Archive. Retrieved May 20-30, 2016. From: http://mpra.ub.uni muenchen.de/33182/MPRAPpaerN0.33182 posted6. September 2011 08:40 UTC

Gisore N., Symon Kiprop S., Kalio A., and Ochieng J. (2014). Effect of Government Expenditure on Economic Growth in East Africa: A Disaggregated Model. *European Journal of Business and Social Sciences*, Vol. 3, No. 8, November 2014. Retrieved May 20-30, 2016. From: *www.ejbss.com/.../vol3no8november2014/ejbss-1488-14-effectofgovernmentexpendi*

Groepe F. (2012). Monetary Policy and Inclusive Growth. Deputy Governor of the South African Reserve Bank, at the 3rd UBS Economic Conference. Cape Town, 12 October 2012.

Gutierrez E. C. C., Souza C. R. and Guillen T. de C. O. (2007). Selection of Optimal Lag Length in Cointegration VAR Model with Weak Form of Common Cyclical Features. Working Paper Series 139 Banco Central Brasil https://www.bcb.gov.br/pec/wps/ingl/wps139.pdf

Hur SK. (2014). Government Spending and inclusive Growth in Developing ASIA. ADB economics working paper series No. 415 | 2014. Retrieved May 20-30, 2016. From: *www.adb.org/sites/default/files/publication/149219/ewp-415.pdf*

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*, 2015, 5(2), 441-447.

Ianchovichina E. and Lundstorm S., (2009) Inclusive Growth Analytics Framework and Application. Policy Research Working Paper 4851. The World Bank, Economic Policy and Debt Department, Economic Policy Division March 2009

Ishioro O. B. (2013). Monetary Transmission Mechanism in Nigeria: A Causality Test. *Mediterranean Journal of Social Sciences* VOL4 No 13, November 2013. 2039-2117,

Klasen (2010) "Measuring and Monitoring Inclusive Growth: Multiple Definitions, Open Questions and some Constructive Proposals". Sustainable Development Working Paper Series, Asian Development Bank, Manila

Liew,V. K−S., (2004) "Which Lag Length Selection Criteria Should We Employ?." *Economics Bulletin*, Vol. 3, No. 33 pp. 1−9. http://www.economicsbulletin.com/2004/volume3/EB−04C20021A.pdf

MahadevaL. & Robinson P. (2004). Unit Root Testing to help Model Building. Handbooks in Central Banking No. 22. Series editors: Andrew Blake & Gill Hammond Issued by the Centre for Central Banking Studies, Bank of England, London.http://www.bankofengland.co.uk/education/Documents/ccbs/handbooks/pdf/ccbshb22.pdf

Maitra B. and Mukhopadhyay K. C (2012). Public Spending on Education, Health Care and Economic Growth in Selected Countries of Asia and the Pacific. *Asia-Pacific Development Journal* Vol. 19, No. 2, December 2012. Retrieved May 20-30, 2016. From:www.unescap.org/sites/default/files/chap-2-Maitra.pdf

Maku A. O. and Adelowokan O. A. (2013). Dynamics of Inflation in Nigeria: An Autoregressive Approach. *European Journal of Humanities and Social Sciences*Vol. 22, No.1, 2013. www.journalsbank.com/ejhss_22_4.pdf

Oladapo F and Oloyede A. J. (2014). Foreign Exchange Management and the Nigerian Economic Growth (1960 – 2012). *European Journal of Business and Innovation Research.* Vol.2, No.2, pp.19-31, May 2014. Published by European Centre for Research Training and Development UK (www.ea-journals.org). www.eajournals.org/.../Foreign-Exchange-Management-and-the-Nigerian-Economic

Onisanwa D. I. (2014). The Impact of Health on Economic Growth in Nigeria. *Journal of Economics and Sustainable Development. Vol.5, No.19, 2014.* Retrieved May 20-30, 2016. From: www.iiste.org/Journals/index.php/JEDS/article/viewFile/16114/16445

Oyedele T. (2016). Economic and fiscal implications of Nigeria's rebased GDP http://www.pwc.com/ng/en/publications/gross-domestic-product-does-size-really-matter.html International PWC Site

Pesaran, M. H (1997) *Microfit 4.0: Interactive Econometric Analysis*, Oxford: Oxford University Press.

Ramos A. R, Ranieri R. and Lammens J-W (2013).Mapping Inclusive Growth. Working Paper number 105 March, 2013. International Policy Centre for Inclusive Growth (IPC-IG)

Rauniyar G. and Kanbur R, (2009). Inclusive Growth and Inclusive Development: A Review and Synthesis of Asian Development Bank Literature. Independent Evaluation Department. Asian Development Bank. Occasional Paper No. 8. Retrieved May 20-30, 2016. From: www.adb.org/sites/default/.../op8-inclusive-growth-development.pdf

World Development Indicators from (2016). The World Bank. Retrieved on 10th July, 2016 from: data.worldbank.org/products/wdi