

## **BUDGETARY DEFICIT AND RICARDIAN EQUIVALENCE HYPOTHESIS IN NIGERIA**

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### **Abstract**

The validity of Ricardian Equivalence Hypothesis has been tested econometrically in Nigeria by using quarterly data from the period 1981Q1 to 2013Q4. Autoregressive Distributed Lag (ARDL) bound test as developed by Pesaran, Shin and Smith (2001) was employed to investigate the long-run relationship streaming from disposable income, government final consumption expenditure, government debt, government budget deficit to private consumption expenditure. More remarkably, increased government spending is instigated by the rapt choice of debt and tax. The result of the study demonstrated that, REH does not hold in Nigeria because debt is considered as net wealth and consumers neither live forever nor care about their generation as much as they care about themselves. Equally, REH proposition has been invalidated by the standard Wald test on the ground that, capital markets are imperfect with borrowing constraints; private and public sectors have different planning horizons and taxes are distortionary in Nigeria. Therefore, increase in government spending relies on the fiscal capacity of Nigeria and the political process. Results of this study however draw attention to the efficacies of fiscal policy in expanding private consumption, controlling budget deficit and macroeconomic stabilization in Nigeria.

**Keywords:** Ricardian equivalence hypothesis, budgetary deficit, ARDL model, bound testing, debt for tax swap.

### **1. Introduction**

Government deficit has received great attention both in developed and less developed countries in respect to its causes and effects (Ghatak & Ghatak, 1996). These have been observed in situations where government uses fiscal policy in order to raise revenue through taxation, debt and other means and deciding how the pattern and level of spending influences economic activities. This means that, fiscal policy incorporates the use of taxation, government bonds, public spending and other revenue sources aimed at stimulating economic activities for achieving desired macroeconomic objectives in an event of shortfall (Anyanwu, 1993).

The Keynesian school asserts that, fiscal policy is relevant if government fiscal decisions are directed towards changing household's consumption and savings behaviour meaningfully. If debts can be raised by giving bonds of discrete maturities and perfunctory rates, such bonds are considered as net wealth by households. Therefore, the bigger the stock of debt the wealthier consumers feel and the more prone they aspire to consume from their disposable income. In an event of tax cut, consumers increase consumption while private savings remain unchanged as consumers prefer present to future and thus do not consider the welfare of their progenies (Adji, 2009; Muhammed, Siong-Hook & Zaleha, 2013).

The theory of funding government deficit has been extensively argued within the Ricardian Equivalence Hypothesis framework as established by Ricardo two centuries ago which was later reformulated by Barro, (1974). The idea behind REH is connected to the fact that, households full of perfect foresight fail to consider government bonds as net wealth. For a given time path of government spending particularly of debt for tax swap will have no effect on private consumption since increased disposable income is always saved by households to take care of future tax liabilities (Saeed & Khan, 2012; Ghatak & Ghatak, 1996). Therefore, marginal propensity to consume, national savings and interest rate remain unaltered and thus, the expectations for crowding out effect will be a great illusion.

The thrust of Barro's argument supports Ricardian Equivalence, namely, that, taxation and public debt issue wield equivalent effects since consumers consider government debt as future tax liabilities in deficit financing. According to Afzal (2012), Ricardian Equivalence Hypothesis upheld that, it does not matter whether public deficit is financed by raising tax rates or by borrowing from the private sector. More borrowing now means higher rates of tax in the future for debt repayment. However, an increase in budget deficit due to rise in government spending must be off-set now or later with total present value of receipt firmly decided by the overall present value of spending. Such an equivalence emanates because economic agents are fully aware of the path of future fiscal policies and hence regards today's deficit spending as tomorrow's tax liabilities. For REH to hold, Barro (1974, 1978) asserts that, capital market should be made perfect with no borrowing constraints, private and public sectors have identical planning horizons and taxes are non-distortionary. Orji, Onyeze and Edeh, (2014) acclaimed that, for REH to hold such validations are required for policy implications of Nigeria's increasing debts and public deficit.

On account of the theoretical indeterminacy of previous results, empirical test on REH in developing countries and especially Nigeria become crucial. In this research, attempt has been made to test the validity of Ricardian Equivalence Hypothesis in Nigeria using quarterly data from 1981Q1 to 2013Q4. This paper will depart from few studies done in Nigeria by considering the influence swap in debt for tax has on private consumption using Autoregressive Distributed Lag (ARDL) Bound Test Approach developed by Pesaran, Shin and Smith, (2001). The remaining part of the study have been structured into Literature review, analytical framework and data description, econometric methodology, empirical findings and conclusion as part two, three, four, five, six and seventh respectively.

## 2. Literature Review

The theory of Ricardian equivalence hypothesis (REH) from an empirical front has increasingly been an important theme of economic research both theoretically and in application. In Pakistan, Ricardian Equivalence Hypothesis and Budgetary deficits was assessed by **Saeed and Khan (2012)** using annual time series dataset for the period 1972 to 2008. The estimated empirical results via cointegration analysis invalidated REH in Pakistan. Thus, Pakistan is a non-Ricardian economy facing budget and current account deficits. In a related study by **Afzal (2012)** from Pakistan, time series dataset was examined from 1960 to 2009 in order to ascertain the importance of Ricardian Equivalence Hypothesis. The estimation result from VAR confirmed a unidirectional causality running from real income to real consumption, real government expenditure and real government revenue and from real government expenditure to real government revenue. The impact of real government expenditure and real government revenue on consumption was outstanding and substantial and provides some support in favour of the REH in the short run.

Similarly, an investigation was made by **Muhammad and Moshood (2011)** aimed at unraveling whether REH holds in the case of Pakistan between 1973 and 2009. The Cointegrating results showed a long run relationship among the variables. Also, the Structural consumption function indicated no evidence in favor of REH in the case of Pakistan as restrictions are significantly rejected by the Wald test. The findings of the study to this effect validated the effectiveness of fiscal policy because consumers treat government debt as net wealth. **Sunge, Shylet, and Simion (2015)** tested whether Zimbabwe is a Ricardian economy from 1980 to 2013. The study employed bound test approach to cointegration and error correction model developed by Pesaran et al., (1995, 1999) to investigate whether a long-run equilibrium relationship exists between private consumption and gross domestic product, government expenditure, tax revenue, total public debt and interest payment. The findings confirm a strong evidence against REH Zimbabwe.

**Giorgioni and Holden (2001)** assessed whether Ricardian Equivalence Proposition (REP) holds across developing countries using data covering the period 1975-1999. The countries involved are Burundi, El Salvador, Ethiopia, Honduras, India, Morocco, Nigeria, Pakistan, Sri Lanka and Zimbabwe. The choice of these countries was informed by the availability of data which reflects the various circumstances of low-income countries. A standard model of private consumption was estimated using time series dataset and the results offered support in favor of REP in developing countries.

In Nigeria, scant researches have been conducted to check the validity of Ricardian Equivalence Hypothesis (REH). The most recent of which is the one conducted by **Likita (2014)** on the validity of REH using annual time series dataset in Nigeria within the period 1980 and 2010. The estimation results from Two stages Least Square (2SLS) affirmed that income and wealth have the theoretically expected positive value while other variables revealed a positively significant relationship which contradicts the hypothesis of the value being either zero and or negative for an absolute Ricardian Equivalence Hypothesis to hold. On the other hand **Orji, Onyeze, and Edeh (2014)** picked the challenge of their research from recent literature concerning the debate on Keynesian proposition and the Ricardian Equivalence. They appraised annual data sampled from the period 1970 to 2007 in Nigeria using VAR and VECM models. The study revealed consequently that, change in budget deficit which has no effect on the rate of interest supports the theoretical grounds of the REH. In essence, the overall empirics are in consonance with both the Keynesian proposition and the Ricardian Equivalence Hypothesis.

In the end, the empirical validity of Ricardian Equivalence Hypothesis in Nigeria was tested using Johansen and ECM from the periods 1981 to 2011 by **Oseni and Olomola (2013)**. While the existence of REH in Nigeria was supported by the results from the coefficient of government spending as well as the relationship between the sign and magnitude of government debt and total wealth, the signs and magnitude of taxes and personal income refuted the existence of REH. To this effect therefore, the validity of REH in Nigeria is a function of the variables used in the analysis.

### **3. Analytical framework and data description**

#### **3.1 Standard Reduced-form consumption function**

The empirical examination on REH is vast and structured to capture the effect swap of debt for tax has on either aggregate consumption or interest rates. Some studies estimated reduced-form consumption functions while others the Euler Equations Function (EEF).

However, this study used the reduced consumption function put forward by Perelman and Pestieau (1993) with little modification to affirm whether Ricardian Equivalence Hypothesis holds in Nigeria. The proposed consumption function is as established below:

$$C_t = \delta_0 + \delta_1(Y_t - Tx_t) + \delta_2 Gx_t + \delta_3 Bd_t + \delta_4 W_t + \delta_5 GB_t + \mu_t \text{ ----- (3.1)}$$

From equation 3.1 above, an explicit function estimable can be specified after taking the natural logarithm of both sides as:

$$\ln C_t = \delta_0 + \delta_1 \ln Yd_t + \delta_2 \ln Gx_t + \delta_3 \ln Bd_t + \delta_4 \ln W_t + \delta_5 \ln GB_t + \mu_t \text{ ----- (3.2)}$$

From equation 3.2,  $\delta_0$  is the constant or intercept, While  $\delta_{1-5}$  are the elasticity coefficients of the parameter estimates. Where  $C_t$  depicts household consumption expenditure at time t,  $Yd_t$  represents disposable income at time t,  $Gx_t$  as the general government final consumption expenditure at time t,  $W_t$  points out the total private owned wealth at t,  $GB_t$  describes government debt at time t,  $\ln$  as natural logarithm operator and  $u_t$  as the white noise error term.

### 3.2 Data Description

From equation 3.2,  $C_t$  denotes private household consumption expenditure appraised by the market value of all goods and service purchase by the households at time t,  $Yd_t$  designates disposable income left to the households after tax might have been deducted at time t,  $Gx_t$  shows the general government final consumption expenditure including current purchases of goods and services at time t,  $W_t$  indicates the total private wealth defined as the money and bonds holding at time t,  $GB_t$  illustrate government debt at time t and  $u_t$  as the white noise error term. The study used time series quarterly data from 1981Q1 to 2013Q4 sourced from Central Bank of Nigeria (CBN, 2014) statistical bulletins and statement of accounts and World Bank Development Indicators (WDI, 2015). These data can be estimated using autoregressive distributed bound test approach developed by Pesaran et al., (2001) econometric approach as demonstrated in the next section.

### 4. Econometric methodology

To analyze if long-run and short-run relationships among the variables in equation 3.2 exist, the study employed the most recent and advanced approach of bound testing or autoregressive distributed lag (ARDL) cointegration technique established by Pesaran et al, (2001). This approach is chosen because of some peculiar advantages it exhibits over other symmetric cointegration test which includes: first, it can be used on variables of different order of integration being I(0) or I(1) process (Pesaran & Pesaran, 1997). The ARDL method is more efficient when applied on small or limited sample size. Third, the short and long run parameters are estimated simultaneously and fourth, it uses time series data flexible enough to accommodate structural breaks (Pesaran, et al, 2001). According to Quattara (2004), in the presence of I (2) variables the computed F-statistics provided by Pesaran et al. (2001) are not valid since bound tests are based on the assumption that the variables are I(1) or I(0) process.

To this effect, the study shall take on Autoregressive Distributed Lag (ARDL) Bound Test approach developed by Pesaran et al. (2001) from equation 3.2 to determine whether REH holds in Nigeria. It is a dynamic unrestricted error correction model (UECM) that can be explicitly

driven from the ARDL bounds test by way of a simple linear conversion of short-run and long-run dynamic equilibrium created without losing any relevant long-run information expressed

$$\left[ \begin{aligned} \ln Pc_t = & \alpha + \theta_1 \ln Pc_{t-1} + \theta_2 Yd_{t-1} + \theta_3 Gx_{t-1} + \theta_4 Bd_{t-1} + \theta_5 Gb_{t-1} + \sum_{i=1}^p \delta_i \Delta \ln Pc_{t-i} + \sum_{j=1}^p \delta_j \Delta \ln Yd_{t-j} \\ & + \sum_{m=1}^p \delta_{m=1} \Delta \ln Gx_{t-m} + \sum_{n=1}^p \delta_{n=1} \Delta \ln Bd_{t-n} + \sum_{q=1}^p \delta_{q=1} \Delta \ln Gb_{t-q} + \mu_t \text{-----} \end{aligned} \right] \quad (3.3)$$

Where  $\alpha$  denotes the intercept,  $\theta_{=1-5}$  refers to long-run parameters and  $\delta =_{i,j,m,n,q}$  describes the short-run parameters. While  $\Delta$  is the first difference operator,  $p$  is the optimal lag length to be decided by Schwarz Bayesian Information Criterion (SBC) and  $Pc$  represents private consumption while other variables retained their meanings as previously explained. If government expenditure is held constant, disposable income and budget deficit can be aggregated to give rise to the effect of tax-for deficit swap on current consumption.

To investigate if long-run relationships exist among the variables in equation 3.3 given the decided lag length requires the use of Wald test (F-test). This is undertaken using the OLS technique on the collective significance of the coefficients of the lagged variables with the F-statistics computed under the null hypothesis. For Ricardian Equivalence Hypothesis to hold in Nigeria, the following restrictions must be met;

$\theta_2 + \theta_4 = 0$ ,  $\theta_5 = 0$ , and  $\theta_3 < 0$ . This means that, for REH to hold, Government consumption expenditure ( $\theta_3$ ) has to be less than zero indicating government final consumption expenditure has a negative effect on private final consumption of goods and services while the swap in the use of debt for tax spending leaves private consumption unchanged (i.e  $\theta_2 = \theta_5 = 0$ ). Due to the restraints posed on these variables the seeming collinearity with debt as one of its proxy, wealth has been dropped as a variable since it has no significant effect on the model.

More importantly, the rejection of the null hypothesis is based on the asymptotic distribution of the F-statistic that is non-standard irrespective of whether the variables are I(0) or I(1) that suggests the Cointegrating relationship. In the critical bounds tabulated by Pesaran et al. (2001) with two sets of appropriate critical values. One set assumes all variables are I(1) and the other as I(0). If the F-calculated statistic lies above the upper bound I(1), the null is rejected and draws the conclusion that cointegration exists. On the other hand, if the F-statistic is below the lower bound, it indicates no cointegration. Consequently, it is indeterminate if the F-statistic falls in between the lower and upper critical bounds.

If a long-run and stable relationship is supported by equation 3.3, then the Augmented ARDL(s, n, b, v, p) model will be established using:

$$\ln Pc_t = \alpha + \sum_{i=1}^s \psi_{1i} \ln Pc_{t-i} + \sum_{i=1}^n \psi_{2i} \ln Yd_{t-i} + \sum_{i=1}^b \psi_{3i} \ln Gx_{t-i} + \sum_{i=1}^v \psi_{4i} \ln Bd_{t-i} + \sum_{i=1}^p \psi_{5i} \ln GB_{t-i} + \varepsilon_t \text{.....} \quad (3.4)$$

Once estimation of the related long-run multipliers are accomplished, the short-run dynamic coefficients are investigated using error correction model (ECM) of ARDL as expressed below in equation 3.5 as:

$$\ln \Delta Pc_t = \theta + \sum_{i=1}^s \delta_i \Delta \ln Pc_{t-i} + \sum_{j=1}^n \omega_j \Delta \ln Yd_{t-j} + \sum_{m=1}^b \varphi_m \Delta \ln Gx_{t-m} + \sum_{n=1}^v \delta_n \Delta \ln Bd_{t-n} + \sum_{q=1}^p \delta_q \Delta \ln GB_{t-q} + \delta ECM_{t-1} + \varepsilon_t \text{-----} (3.5)$$

From equation 3.5,  $ECM_{t-1}$  represents the error correction term towards long-run equilibrium after short-run shock and while  $\delta$  illustrates the speed by which the parameters converge to equilibrium. The coefficient of the error term must be negative and significant to ensure convergence of the long-run dynamics towards equilibrium. The value of  $\delta$  varies between -1 and 0. When the coefficient is -1, there is a sudden and complete convergence while 0 implies no meeting after experiencing the shock. The goodness of fit of the model can be checked through post-diagnostic test like serial correlation, functional form, normality test, heteroscedasticity and stability test such as Cumulative sum of Recursive Residuals (CUSUM) and Cumulative Sum of squares of Recursive Residuals (CUSUMSQ).

**5. Empirical Findings**

**5.1 Unit Root Test**

In order to get rid of spurious regression results, unit root tests were conducted on all the variables to ascertain their stationarity using the standard Augmented Dickey Fuller (ADF) test. The study used Schwarz Bayesian Information Criterion (SBC) at 5% level of significance since it performs better than other information criteria because it uses the smaller lag length and hence produces the most parsimonious model. The unit root test is applied on the variables to ensure that none of the series is I (2) or integrated of higher order. The ADF-unit root test used maximum lag length 2 determined by SBC as seen from the appendix.

**Table 5.1 ADF Unit Root Results**

Variable	Log-levels			First difference			Deterministic	Order of integ. I(d)
	ADF-t stat.	Critical Val.(5%)	P-Val.	ADF-t stat.	Critical Val.(5%)	P-Val.		
LnPc	-3.1435	-3.4458	0.1009	-3.9709	-2.8844	0.0022	Intercept	I(1)
Lnyd	-2.3582	-2.8844	0.558	-3.4920	-3.4483	0.0448	Intercept & trend	I(1)
LnGx	-1.9353	-3.4444	0.6303	-10.5828	-0.28837	0.0000	Intercept	I(1)
LnDd	-1.7594	-2.8844	0.3991	-3.5910	-2.8844	0.0072	Intercept	I(1)
Bd	-1.7334	-3.4458	0.7306	-3.8632	-2.8844	0.0031	Intercept	I(1)

**Source: Author’s own computation from Eviews 9, 2015.**

**Note: All variables are in log form except Government budget deficit due to negative numbers in the series.**

From the ADF unit root test in table 5.1 above, all the variables became stationary after the first difference. This implies that, Private final consumption expenditure, Disposable income,

Government final consumption expenditure, Government debt and Government budget deficit are integrated of order one (i.e I(1)) at 5% level of significance. The unit root results fulfilled the underlying assumptions that necessitates the use of ARDL-bound test to affirm if long-run associations exist among the variables in Nigeria as extracted from Pesaran et al. (2001) procedure. The results of the ARDL bounds testing are as shown in table 5.2:

**5.2 ARDL bound test for cointegration**

**Table 5.2 ARDL-bound test for cointegration**

T-statistic	Value	K	Level of sig.	Bound critical value	
				I(0)	I(1)
F-Statistic.	4.3200	4	10%	2.45	3.52
	4.3200	4	5%	2.86	4.01
	4.3200	4	1%	3.74	5.06

**Source: Author’s computation from Eviews 9, 2015.**

The result of the bound test generated from the Cointegrating relationship is compared with the critical bound values determined by Pesaran et al. (2001) at 5% significance level. The computed F-statistics is 4.3200 while the lower and upper bounds are **2.86** and **4.01** respectively. Thus, it can be surmised by this demonstration that, since the F-statistic calculated is greater than the upper bound of the critical value at 5% (**4.32/ > /4.01/**), the null hypothesis of no cointegration streaming from **lnYd, lnGx, lnDb** and **Bd** to **lnPc** should be rejected. From the empirical findings, inference can be drawn that long-run relationship exists which call for the investigation of the long-run marginal influence of the independent variables on the dependent variable in Nigeria over the period 1981Q1 to 2013Q4. Since the ARDL technique assumes that the Cointegrating space is unity, it become pertinent to ascertain if the regressors from I(1) are long-run enforcing.

The next stage is to estimate the coefficients of the long-run relations and the accompanying error correction model (ECM) using ARDL procedure. The optimal lags on the variables as chosen by SBC gave rise to the model ARDL(2, 1, 1, 0, 2). The estimated coefficients of the long-run association are as shown in Table 5.4:

**Table 5.4 Estimated long-run coefficients based on ARDL (2, 1, 1, 0, 2) decided by SBC with lnPc as the dependent variable**

Variable	Coefficient	t-statistic	P-Value
C	4.746431	46.15543	0.0000
lnYd	0.187578	3.815589	0.0002
lnGx	0.073566	2.084525	0.0391
lnDb	0.130574	2.499960	0.0137
Bd	-2.480070	-3.027856	0.0030

**Source: Author’s Compilation from Eviews 9, 2015.**

The long-run coefficients from table 5.4 can be expressed using equation:

$$lnPc = 4.746431 + 0.187578*lnYd + 0.073566*lnGx - 0.130574*lnDb - 2.480070*Bd$$



The computed coefficients of the long-run relationship using equation 3.4 shows that, disposable income proxied by the difference between national output and tax ( $Y-T_x$ ) has a positive and significant relationship with private final consumption expenditure. By implication, any 1 percent increase in disposable income leads to an 18 percent rise in private consumption contravening the proposition laid in REH framework. This describes Nigerian consumers operating in an imperfect capital market conforming to the result of Oseni and Olomola (2013). Regarding the relationship between government final consumption expenditure and private consumption, government final consumption expenditure (0.073566) has a positively significant association with private consumption. This means that, holding other variables constant, any 1 percent point rise in government final consumption expenditure lead to a 7 percent increase in private consumption. The positive relationship contravened the validity of REH and supported the efficacy of fiscal policy in Nigeria as corroborated by the study of Oseni and Olomola (2013); Likita, (2014); Sunge, Shylet and Simion (2015).

On the other hand, government debt has a positive and significant impact on private consumption expenditure. By implication, when there is an increase in government debt by 1 percent, private consumption increases by 13 percent. This means that, increase in government bonds is perhaps treated as net wealth by Nigerian consumers. Thus, money realized from the bonds are not saved against the anticipated tax that shall be used in servicing the borrowed funds. Ricardian Equivalence

Hypothesis to this end is vehemently refuted and fiscal policy supported. And government budget deficit negatively and significantly influenced private consumption expenditure in Nigeria. The estimated results exhibit that, a 1 percent fall or rise in government budget deficit leads to a 25 percent rise or fall in private consumption expenditure.

The impact government budget deficit has on private household consumption is dominant in the long-run explaining Nigeria's gross mismanagement and misappropriation of public funds, weak sectoral linkages and lack of harmonized and well-coordinated fiscal and monetary policies (Ogbole, Amadi & Essi, 2011). Keeping in line with these results, increase in deficit is not fully put up by private savings for specific spending, thus, REH as well as Keynesian propositions failed to hold in Nigeria. As a result, increase in budget deficit stimulates the need for external financing which invariably drives the twin deficit phenomenon in Nigeria. These results conform to the conclusion reached by Kazmi (1991, 1992); Saeed and Khan (2011) rejecting REH in Pakistan.

### **5.3 Dynamics of short-run Error correction results.**

Since all the variables are cointegrated after the first difference, there is need to restore any seeming deviation that may affect the model in its drive to equilibrium in order to test the joint significance of the variables. In selecting the short-run dynamics of the ARDL error correction model, the lag structure using SBC model criterion have been used during the Ordinary Least Square (OLS) estimation of the bounds tests. The results are as shown in table 5.5.



**Table 5.5 Error Correction Representation for ARDL (2, 1, 1, 0, 2) model with lnPc as dependent variable.**

Variable	Coefficient	t-statistic	P-value
D(lnPc(-1))	0.472139	6.221772	0.00000
D(lnYd)	-0.164403	-2.489104	0.0142
D(lnGx)	-0.047402	-2.793323	0.0061
D(lnDb)	0.008764	0.765838	0.4453
D(Bd)	-0.000001	-6.509101	0.0000
D(Bd(-1))	0.0000000	4.510705	0.0000
ECM(-1)	-0.044231	-2.373667	0.0192

*Ecm = lnPc + 0.0132\*lnYd + 0.0224\*lnGx + 0.1982\*lnDb - 0.0000\*Bd + 4.4985\*c*

<b>R<sup>2</sup>=0.9905</b>	<b>Durbin-Watson = 2.0066</b>
<b>R<sup>2</sup>=0.9897</b>	<b>F-statistic =1251.223</b>
	<b>Prob. (F-stat) =0.000000</b>

*Source: Researcher’s compilation from Eviews 9, 2015.*

Table 5.5 depicts the short-run adjustment process appraised by the error correction model by demonstrating how swiftly variables respond to a shock and reverts to equilibrium. The coefficient estimate for the  $ECM_{t-1}$  (-0.044231) is negative and statistically significant (-2.373667) indicating that, deviations from private consumption expenditure are restored by 4% over the next quarter in Nigeria. The statistical significance of the error correction term reaffirms the presence of long-run association between private consumption and disposable income, government final consumption expenditure, government debt and government budget deficit. This result submits that, the speed of adjustment to long-run shocks is significant but relatively weak. The coefficient of determination  $R^2$  (0.9905) explains the joint influence of the explanatory variables in accounting for the change in the dependent variable (private consumption expenditure). Thus, 99 percent change in private consumption is as deduced by the variation in the explanatory variables. The F-statistic (1251.223) is greater than 5% and whose probability (0.000000) is significant and robust in explaining the reliability of the model. More remarkably, the Durbin-Watson statistic (2.0066) is greater than the coefficient of determination  $R^2$  (0.9905) indicating that, there is no serial correlation in the chosen model.

To reaffirm further whether REH holds in Nigeria, the restrictions  $\theta_2 + \theta_4 = 0$ ,  $\theta_5 = 0$ , and  $\theta_3 < 0$  from equation 3.3 have to be tested using the Wald standard test as seen below.

**Table 5.6 Wald coefficient Standard test result**

Test statistic	Nullhypothesis			Pesaran F-stat. C1(iii)	
	$\theta_2 + \theta_4 = 0, \theta_5 = 0, \theta_3 < 0$			Lower Bounds	Upper Bounds
	Value	Df	Probability		
F-stat.	2.48725	(4, 119)	0.0000	2.86	4.01
X <sup>2</sup> -stat.	69.94903	4	0.0000		

*Source: Author’s computation from Eviews 9, 2015.*

The result of the F-calculated (2.48725) appraised by the Wald-litmus test fall below the lower bounds (2.86)as decided by Pesaran et al. (2001) critical table C1(iii). Hence, the null

hypothesis of disposable income plus government budget deficit being equal to zero, government debt equal to zero, government consumption expenditure equal to zero should not be rejected. By inference, the concerned variables in the restriction are all I (0) process which counteracted the validity of REH in Nigeria using high frequency data from 1981Q1 to 2013Q4.

**Table 5.7 Post-diagnostic test from equation 3.5**

LM t-statistic	Chi Stat. $X^2$	Probability
Serial correlation (*)	1.274005	0.5289
Heteroscedasticity (**)	13.15370	0.7145
Functional Form (***)	F-stat. (1, 118) 0.33799	0.5621

*Note: where (\*), (\*\*) and (\*\*\*) describes Breusch-Godfrey LM test for serial correlation, Breusch-Pagan Godfrey heteroscedasticity test and Ramsey RESET test for omitted variables.*

**Source: Author's owned compilation using Eviews 9, 2015.**

The Lagrange Multiplier (LM) test for serial correlation, heteroscedasticity and Ramsey Regression Specification Error Test (RESET) as represented in table 5.7 submits that the short-run model scaled through the post-diagnostic tests. It can be evident from the probability of their respective Chi-statistics( $X^2$ ) and F-statistic which are greater than 5%. To this effect therefore, the null hypothesis of no serial correlation and no heteroscedasticity should not be rejected while the postulate that the model is not correctly specified be rejected. Therefore, it can be inferred that there is no evidence of serial correlation, heteroscedasticity and wrong specification of the model in this study.

Also, the residuals of the model are normally distributed which makes the functional form of the model appear well specified as seen in appendix 4. The Cumulative sum of the recursive residuals

(CUSUM) and cumulative sum of Squares of the recursive residuals (CUSUMSQ) stability tests as shown in appendix 3 show that, the estimated coefficients of the model are stable over the study period (1981Q1 to 2013Q4) as they fall within the critical limits or bounds.

## 6. Conclusion

This research has provided a reliable evidence on testing if Ricardian Equivalence Hypothesis holds in Nigeria. The standard reduced-consumption function of Perelman and Pestieau (1993) was estimated using Autoregressive Distributed lag (ARDL) bound test developed by Pesaran et al (2001) with little modification in assessing how consumers treat government debt in terms of net wealth over the period 1981Q1 to 2013Q4. The study concluded that, REH does not hold in Nigeria because debt is considered as net wealth and consumers neither live forever nor care about their generation as much as they care about themselves. Equally, REH proposition has been invalidated by the standard Wald test that, capital markets are imperfect with borrowing constraints, private and public sectors have different planning horizons and taxes are distortionary in Nigeria. To this effect, the study recommends Government to embark on a more prudent approach that can retain a certain proportion of the revenue via fiscal policy rule. Fiscal policy rule can make sense in Nigeria due to complete absence of the tradition of fiscal discipline that commits government to a certain level of conduct in fiscal and budgetary management. It will help begin to build

government credibility in fiscal management and over time, promote strong fiscal discipline across all tiers of government.

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