Examining the Ricardian Equivalence Hypothesis in Nigeria using an ARDL bound testing approach

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Abstract

This study examined the Ricardian equivalence hypothesis (REH) in Nigerian using data for the periods of 1986 to 2015. The study employed a bound testing approach to cointegration and error correction model within the context of the Auto-Regressive-Distributed-Lag (ARDL) framework developed by Pesaran and Shin (1995, 1999). The study examined whether a long-run equilibrium relationship exists between Private Consumption and Gross Domestic Product (GDP), Government expenditure, Tax Revenue, Total Public Debt and Interest Payments. The results show that there is long run association running from Gross Domestic Product (GDP), Government Expenditure, Tax Revenue, Total Public Debt and Interest Payments to Private Consumption. More importantly, the study found strong evidence against the Ricardian Equivalence in Nigeria and support for Keynesian debt non-neutrality. The findings therefore imply that fiscal policy has a role in macroeconomic stabilization in Nigeria.

Keywords: REH, ARDL, GDP, Private Consumption, Government Expenditure, Tax Revenue

1. Introduction

Ricardian equivalence is an economic theory which suggests that when a government tries to stimulate an economy by increasing debt-financed government spending, demand remains unchanged. This is due to the fact that the public saves its excess money to pay for expected future tax increases that will be used to pay off the debt. This theory was developed by David Ricardoin the 19th century but was revised by Harvard professor Robert Barro into a more elaborate version of the same concept (Barro, 1989). Ricardian equivalence, also known as the Barro-Ricardo equivalence proposition, stipulates that a person's consumption is determined by the lifetime present value of his after-tax income. Therefore, the Ricardian equivalence says that government cannot stimulate spending since people assume that whatever is gained now will be offset by higher taxes in the future. Thus, the underlying idea behind Ricardo's theory is that no matter how a government chooses to increase spending, whether with debt financing or tax financing, the outcome is the same and demand remains unchanged (Bittante, 2013).

The Ricardian equivalence is an economic hypothesis which asserts that consumers are speculative and so internalize the government's budget constraint when making their consumption decisions. This leads to the result that, for a given pattern of government spending, the method of financing that spending does not affect agents' consumption decisions, and thus, it does not change aggregate demand (Brittle, 2009). Ricardian equivalence is a theoretical concept that has been used to argue that fiscal policy is not effective. The argument is that increased government spending implies higher future taxes, so households will increase savings to cancel out the increase in government spending. The fiscal policy may be used with a stabilizing role if the government finance decisions are able to influence private consumption (i.e., aggregate demand) and saving. This influence depends on the degree to which consumers treat government debt as net wealth (Rohn, 2010).

According to the Keynesian consensus, consumers treat government debt as net wealth. Therefore, a substitution of debt for taxes has a positive influence on private consumption and aggregate demand. However, the consequent decrease in private and national saving implies an increase in the

real interest rate, which crowds out private investment. The reduction in the capital accumulation then leads to a reduction of the long-term growth prospects of the economy. This negative long-run effect offsets some of the positive short-term effects of the government deficit (Brunila, 1997).

The Ricardian thesis has a complete opposite view. It states that, for a given expenditure path, substitution of debt for taxes has no effect on aggregate demand nor in interest rates. The government's inter-temporal budget constraint implies that, for an unaltered level of government outlays, a tax cut now implies a tax increase in the future. As borrowing only postpone taxes for the future, consumers, who are simultaneously taxpayers, anticipating the increase in future taxes, do not consider the current tax cut and the consequent increase in disposable income as being permanent. Their inter-temporal budget restriction is left unaltered. Therefore, consumption is also unaffected. The increased disposable income is entirely saved (Ricciuti, 2003)
By implication, Nigerian consumers behave in Ricardian or Keynesian modelto be fiscally effective (Adji, 2007). Thus, if Nigerian consumers are Ricardian, government debt is not considered as net wealth and fiscal policy becomes ineffective in macroeconomic stabilization. The connection between budget deficit and interest rate can be linked to Mundell- Flemming model which hypothesizes that a rise in interest rate and exchange rate as well as capital inflows is deduced by an increase in budget deficit (Somadina and Kalu, 2012).

The predominant concern of Nigeria, as a country usually faced with the problem of high debt servicing due to mismanagement and misappropriation of borrowed fund is to ensure and maintain recurrent economic performance which will trigger economic stability. External debt is acquired in order to finance budget deficit and speed up economic activities; hence, external debt should result to economic growth of Nigeria (Umaru, 2013). Using borrowed fund for current consumption will automatically bring about debt overhang and intergenerational debt transfer which will in turn increase debt servicing cost on the future generation in Nigeria. Meanwhile, if borrowed fund is centered toward capital investment whose expected return is greater than the borrowed fund then paying off the borrowed fund will not be a problem as it will steer the opportunity of borrowing more due to prompt repayment, hence stimulate economic performance in Nigeria. (Shabbir, 2009).

2. Literature Review

Ricardian Equivalence is a theoretical concept that has been used to argue that fiscal policy is not effective. The argument is that increased government spending implies higher future taxes, so households will increase savings to cancel out the increase in government spending. In theoretical models, the relationship between fiscal policy and private consumption depends largely on whether Ricardian equivalence is assumed. This equivalence theorem states that for a given path of government expenditures, the timing of taxes should not affect the consumption decision made by individuals paying the taxes. The simple idea behind the theorem is that rational agents realize that substituting taxes today for taxes plus interest tomorrow via government debt financing is the same (Barro, 1974). Therefore, the financing of government spending via debt or taxes should not affect the current account either. However, Keynesian economic models assume that a shift from tax to debt financing increases private consumption. In many Keynesian models, private consumption

depends on disposable income (i.e. income minus taxes). Therefore, fiscal deficits (and lower taxes) increase private consumption and the current account deficit (Leban, 1998).

The Keynesian Proposition which is the standard theory of budget deficit or the conventional view posits that households respond to an increase in current disposable income which is equal to the tax cut partly with higher desired private savings and partly with higher consumer demand and because of this increase in desired national savings declines. National saving is the sum total of private saving and public saving (Morgan, 2012). This theory further suggests that a decision to finance government spending by budget deficit as a result of tax cut instead of current taxes reduces national saving and that the reduction in national savings is partly reflected in lower domestic investment and partly increases borrowing from abroad, both of which reduces future national income and future domestic production. The reduction in domestic investment is as a result of increases in interest rate, thereby, establishing a connection between budget deficit and interest rate. A tax cut financed by government borrowing would have many to stimulate consumer spending (Marcuna, 2015).

Bernheim (1987) and Seater (1993) demonstrated the ineffectiveness of the fiscal policies based on a stimulus over AD curve through governmental debts or through raising taxes, but Elmendorf and Mankiw (1999) stated that the result of the above mentioned authors were not relevant. Ricciuti (2003) highlights that certain conditions underlying econometric models that studied the Barro-Ricardo equivalence are much too restrictive, being for us very difficult to understand if there is, or not, an approximation of the reality. The main regression models which might be considered as being the most influential ones in testing the Ricardian equivalence (RE) are: Feldstein (1982), Kormendi (1983), Seater and Mariano (1985) and Modigliani et al. (1985).

Recent authors who debated this model were Bittante (2013) and Norman(2014). The debate remains still open while there is no consensus between the two parties: the ones who have confirmed the existence of the RE and the ones who vehemently contested the model. The general conditions of RE model, as Barro (1974) describes them, are the following: a) Consumers have finite lives and they do care about the welfare of the next generation, having an altruistic attitude regarding their descendants. b) Nevertheless, they are acting as having infinite lives and they assume that the government cannot postpone forever the repayment of the debt (bonds issued) and the amount that has to be repaid and its interest are equal with the bond's principal and the taxes charged, in order to pay the interest. c) The decrease of government savings is compensated by the increase of private savings. By following the above conditions, according to Barro, government bonds are not net wealth. This, actually, defies Keynes' economy, by violating a classic principle of economics – this science is based on rarity and trade-offs – there is no such thing as a freedinner – in order to gain something, it is always needed to give up another.

2.1 Empirical Literature

Muhamm and Masood (2011) checked the Ricardian Equivalence Hypothesis in case of Pakistan by using annual data for the period of 1973-2009. Government expenditure, private consumption expenditure, tax revenue, government debt, disposable income, government budget deficit and wealth are the variables which are used for analysis. Cointegration results showed a long run relationship among the variables. Results of structural form consumption function invalidate the Ricardian Equivalence Hypothesis in case of Pakistan. These results drew attention towards the

significance of fiscal policies in boosting private consumption and controlling budget deficits, which were the prime goals of stabilization policies in Pakistan.

Sumaira and Khan (2012) argued that during the last few decades, the Ricardian equivalence hypothesis (REH) has been an important theme of economic research both theoretical and applied. However, to test the validity and consistency of REH, there is very limited work that has been done in the developing countries. Since the REH requires a number of assumptions that might not appear to be satisfied in developing countries, it seems that the REH should not hold. Their study empirically test the validity of Ricardian equivalence hypothesis for Pakistan using annual time series data for the period 1972 to 2008 using cointegration analysis and found that REH was invalidated in Pakistan. So Pakistan is a non Ricardian economy facing budget and current account deficits.

Kostas (2001) explored the long-run relationship between government domestic borrowing and private savings for a small EU country and assessed the relevance of Ricardian Equivalence in Greece. His empirical findings were in accordance to the Ricardian Equivalence theorem prediction, government borrowing in Greece led to an increase in household savings. However, the increased private savings do not completely offset increased government debt. In other words, contrary to the Ricardian Equivalence theorem, households to some extent perceived government bonds as net wealth and consequently increased their consumption. This behaviour can be thought as being the result of liquidity constraints faced by households and also myopic behaviour due to uncertainty regarding the future path of taxes.

Olasunkanmi and Akanni (2013) tested the empirical validity of Ricardian Equivalence Hypothesis (REH) using Nigerian data from 1981 to 2011. They followed the work of Irving Fisher (1907) and Ramsey (1928) and Park (1997) and their model was built basing on Permanent Income Hypothesis (PIH) to test the validity of Ricardian Equivalence Hypothesis. They employed the Johansen Cointegration and the Error Correction Mechanism to test the validity of REH in Nigeria and found a mixed result with the set of variables used. The empirical findings indicated that increases in government debt are associated with increase in private consumption and the coefficient of government spending as well as the relationship between the sign and magnitude of government debt and total wealth supported the existence of REH while the signs and magnitude of taxes and personal income rejected the existence of REH. They therefore concluded that the REH in Nigeria is dependent upon the variables used in analyzing its validity.

Abada (2016) applied quarterly data to test the validity of Ricardian equivalence hypothesis (REH) in Nigeria. The study was motivated basically by the need to examine the short and long run dynamics between the variables streaming from exchange and interest rates to government budget deficit and government debt using Autoregressive Distributed Lag (ARDL) bounds technique developed by Pesaran, Shin and Smith. The estimated results from Wald-test confirmed that, government budget deficit and government debt are not equal to zero. Therefore, the null hypothesis of REH holding in Nigerian has been refuted in order to uphold the efficacies of fiscal policy in macroeconomic stabilization. To this effect, it become obvious that Nigerian consumers respect the performance of fiscal policy and treat government debt as net wealth by increasing their consumption once there is a rise in income either via debt or tax cut.

Cletus (2005) tests the Ricardian Equivalence concept by constructing “Ricardian” time series for the incomes of Nigeria. “Ricardian” income is taken to be standard disposable income minus the

net increment to state debt plus the Nigeria's apportioned share of Federal Debt. Regressions are then run using "Ricardian" and, alternatively, "standard" concepts of disposable income to explain residential electricity consumption in each state. The simplest tests used just real income and relative price as regressors. Later tests added weather and natural-gas-price variables. The "standard" concepts prove preferable, at high levels of significance in all the tests performed.

3. Research Methodology

This study adopted the ARDL bound testing approach developed by Pesarem and Shin (1995, 1999) to estimate the long run equilibrium and to establish the direction of causation between variables. This methodology became necessary because the variables were identified to be integrated of I(0) and I(1) and the model is a single equation. The advantages of using this approach is that while the conventional cointegration method estimates the long-run relationships within a context of a system of equations, the ARDL method employs only a single reduced form equation(Pesaran & Shin, 1995). In addition, different optimal lags can be used for the different variables, which is not applicable in the standard cointegration test.

3.1 Econometric Models

This research work was guided by the autoregressive distributed lag (ARDL) model. Specifically, a consolidated approach to aggregate consumption will be adopted.

Consolidated Approach to Aggregate Consumption:

$$C_t=\alpha_0 + \alpha_1 Y_t + \alpha_2 Y_{t-1} + \alpha_3 GS_t + \alpha_4 W_t + \alpha_5 TR_t + \alpha_6 TX_t + \alpha_7 RE_t + \alpha_8 GINT_t + \alpha_9 GD_t + \varepsilon_{t\ldots\ldots 1}$$

Where *Ct* is household final consumption expenditure as measured by the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by household attime *t, Yt* is Gross Domestic Product at current market prices at time *t, GSt* is general government final consumption expenditure including all government current expenditures for purchases of goods and services attime *t, Wt* is privately owned wealth at time *t, TRt* is government transfer payments at time *t, TXRt* is government tax revenue at time *t, REt* is Corporateretained income at time *t, GINTt* is Government interest payment on outstanding debt at time *t, GDt* is Government Debt at time *t* α1 to α2 are estimation parameters εt is the error term.

In this specification, the RE holds under the following conditions; $\alpha_3 < 0$ $\alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = 0$. It holds that when $\alpha_3 < 0$ because government consumption has a negative effect on current consumption, but the choice of debt/tax financing leaves private consumption unchanged such that $\alpha_6 = 0$. Individuals' ownership in firms is rewarded as retained earnings which are saved for future tax payment implying that $\alpha_7 = 0$. Debt neutrality implies that $\alpha_9 = 0$ and because the government interest payment on its stock of outstanding debt are anticipated $\alpha_8 = 0$. Finally, since the value of private wealth include government debt, the Ricardian view implies that a separate debt variable i.e $\alpha_4 = -\alpha_8$ (Ricciuti, 2003).

Due to data constraints, we were forced to drop the variables transfer payments (TR), retained earnings (RE) and wealth (W) but managed to retain the key RE variables and estimated the following model:

$$\ln CONS_t = \alpha_0 + \sum_{k=1}^{n} \alpha_{1k} \ln CONS_{t-k} + \sum_{k=1}^{n} \alpha_{2k} \ln \mathrm{GDP}_{t-k} + \sum_{k=1}^{n} \alpha_{3k} \ln GVEX_{t-k} + \sum_{k=1}^{n} \alpha_{4k} \ln \mathrm{TXR}_{t-k} + \sum_{k=1}^{n} \alpha_{5k} \ln \mathrm{TDEBT}_{t-k} + \sum_{k=1}^{n} \alpha_{6k} \ln \mathrm{INT}_{t-k} + \varepsilon_t \ldots\ldots\ldots\ldots (2)$$

where *CONSt* is household final consumption expenditure as measured by the market value of all goods and services, *GDPt* is Gross Domestic Product at current market prices at time *t, GVEXt* is government expenditure attime t, *TXRt* is government tax revenue at time *t, TDEBTt* is total government debt at time *t, INTt* are government interest payments on outstanding debt at time *t*. Following the consolidated consumption function estimation by Kormendi (1983), in our model the RE holds when$\alpha_3 < 0$ $\alpha_4 = \alpha_5 = \alpha_6 = 0$.

Transforming equation (2) above to an Autoregressive Distributed Lag-Error Correction Model (ARDL-ECM) framework yields equation (3) below:

$$\Delta \ln CONS_t = \alpha_0 + \sum_{k=1}^{n} \alpha_{1k} \Delta \ln CONS_{t-k} + \sum_{k=1}^{n} \alpha_{2k} \Delta \ln \mathrm{GDP}_{t-k} + \sum_{k=1}^{n} \alpha_{3k} \Delta \ln GVEX_{t-k} + \sum_{k=1}^{n} \alpha_{4k} \Delta \ln \mathrm{TXR}_{t-k} + \sum_{k=1}^{n} \alpha_{5k} \Delta \ln \mathrm{TDEBT}_{t-k} + \sum_{k=1}^{n} \alpha_{6k} \Delta \ln \mathrm{INT}_{t-k} + \sum_{k=1}^{n} \alpha_{7k} \Delta \ln \mathrm{INT} * \ln \mathrm{TDEBT}_{t-k} + \beta_1 \ln CONS_{t-1} + \beta_2 \ln \mathrm{GDP}_{t-1} + \beta_3 \ln GVEX_{t-1} + \beta_4 \ln \mathrm{TXR}_{t-1} + \beta_7 \ln \mathrm{INT} * \ln \mathrm{TDEBT}_{t-1} + \delta ECM_{t-1} + U_t \ldots\ldots\ldots\ldots (3)$$

where α_0 is the drift term, the coefficient of ECM_{t-1}, δ, is the error correction term that measures the speed of adjustment between the long-run and short-run dynamics of the model, and U_t is the white noise error term.

3.2 Estimation Procedure

Unit root tests were conducted on all the variables to ascertain their stationarity using the Augmented Dick Fuller (ADF) test after which the ARDL Bound Testing was conducted to determine the existence of cointegration among the variables. We then estimated the Error Correction Model on the consolidated consumption function to analyse the long run association between the explanatory variables and the dependent variable. Finally, we ran an OLS on equation 2 to test the RE.

4. Empirical Results

4.1 Unit Root Tests Results

Unit Root Tests results are shown in table 1 below.

Table 1 *Unit Root Tests*

Variables	T Statistic	5% Critical Value	Probability	Order of Integration	Decision
dlogCONS	-2.987	-2.986	0.0499*	I(1)	Stationary
dlogGDP	-3.471	-2.992	0.0182**	I(1)	Stationary
dlogGVEX	-7.302	-2.972	0.0000**	I(1)	Stationary
dlogTXR	-7.045	-2.972	0.0000**	I(1)	Stationary
logTDEBT	-4.086	-2.972	0.0038*	I(1)	Stationary
dlogINT	-3.819	-2.968	0.0071**	I(0)	Stationary

*, **, *** implies that the variable is stationary at 1%, 5% and 10% significance level respectively.

Interest Payments was found to be stationary in levels thus it is integrated of order zero, I(0).Consumption, GDP, Government Expenditure and Tax Revenue became stationary after first difference and are therefore integrated of order 1, I(1).These results necessitated testing for cointegration among the variables. Instead of using the conventional Johansen Cointegration method, we used Bound Testing for cointegration under the framework of the ARDL Model. Arguments for using ARDL in this study are well documented.

According to Pesaran and Shin (1995), unlike the conventional method which uses multiple equations system, ARDL uses reduced form equation and is therefore parsimonious. More importantly, Duasa (2007), points that ARDL is applicable irrespective of whether the regressors are purely I(0), purely I(1) or a mixture of both and this makes Johansen Cointegration unsuitable for our case in which the order of integration of our variables ismixed. The existence or absence of cointegration is tested using the Wald F Statistic against Pesaran and Shin (1995) lower and upper bound critical values. Prior to the test, Optimum Lag Selection for the ARDL Model was carried out using the Akai and Schwaz Criteria and produced the following output.

4.2 ARDL Lag Selection

Table 2 *ARDL Lag Selection*

Lag	Akaike	Schwaz
0	44.61411	44.84086
1	43.88587	44.38972
2	43.76870	44.55508
3	42.33145*	43.45241*

** indicates the chosen lag order under each criteria. All the criteria unanimously choose a maximum lag of 3.*Table 2 shows results of the lag selection. Both criteria chose lag 3 and this was used in Bound Testing and Error Correction estimation.

4.3 Bound Test for Cointegration

Table 3 *Bound Test for Cointegration*

				Bound Critical Values	
Test Statistic	**Value**	**K**	**Level of Significance**	**I(0)**	**I(1)**
F Statistic	10.16823	5	1%	1.81	2.93
	10.16823	5	5%	2.14	3.34
	10.16823	5	10%	2.82	4.21

The Wald Test calculated F Statistic is compared against the Pesaran and Shin (1995) lower bound [I(0)] and upper bound [I(1)] critical values at 1%, 5% and 10% level of significance. At all levels of significance, the FStatistic of 10.16823 is greater than the corresponding upper bounds critical values. This implies that the nullhypothesis of no cointegration cannot be accepted at all levels therefore signifying that there exists a long run equilibrium association running from Gross Domestic Product, Government Expenditure, Tax Revenue, Total Public Debt and Interest Payments to Private Consumption. The nature of the long run association was established by estimating the error correction of the ARDL model. Specifically we did this to determine the speed of convergence of the system back to equilibrium.

4.4 Error Correction Model Results

Table 4 *Error Correction Model Results*
Dependant Variable: D CONS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CONS(-1))	2.513917	1.08771	2.311201	0.0434
D(CONS(-2))	1.219062	0.586666	2.077949	0.0644
D(CONS(-3))	-1.26921	0.550924	-2.303785	0.044
D(GDP(-1))	-0.788137	0.606756	-1.298936	0.2231
D(GDP(-2))	-1.230532	0.525094	-2.343453	0.0411
D(GDP(-3))	1.342622	0.567522	2.365764	0.0396
D(GVEX(-1))	3.141087	1.244344	2.524292	0.0302
D(GVEX(-2))	1.733532	0.681245	2.544655	0.0291
D(GVEX(-3))	0.058471	0.537316	0.10882	0.9155
D(TXR(-1))	-3.316316	1.349327	-2.457755	0.0338
D(TXR(-2))	-1.386416	0.714106	-1.941472	0.0809
D(TXR(-3))	-2.045538	0.802685	-2.548371	0.0289
D(DEBT(-1))	-0.032003	0.080353	-0.398282	0.6988
D(DEBT(-2))	0.022786	0.117191	0.194439	0.8497
D(DEBT(-3))	-0.366146	0.179085	-2.044534	0.0681
D(INT(-1))	0.649311	1.725742	0.37625	0.7146
D(INT(-2))	8.636396	3.140901	2.749655	0.0205
D(INT(-3))	6.572101	2.684448	2.448213	0.0344
ECT(-1)	**-2.081196**	**0.890344**	**-2.337518**	**0.0415**

R^2	0.867231
Adjusted R^2	0.6284245
D.W Test	1.42124

The table above shows the error correction model results. The long run dynamics in the model is shown by the error correction term ECT (-1), which measures the convergence of the model to equilibrium. The error correction term is negative (-2.081196) and statistically significant, t statistic (-2.337518) and p value (0.0415),and this shows evidence of long run causality from the explanatory variables to the dependent variable. The coefficient of -2.081196 shows very high levels of convergence to equilibrium. If consumption is in disequilibrium, the system converges back to equilibrium at a speed of 208%. Short run dynamics are shown by first differences of lag 1, lag 2 and lag 3 of the variables. Negative and statistically significant lags of variables show short

run causality running from the independent variable to consumption. We then carried out further diagnostic tests on the error correction model to detect serial correlation and stability problems and these we did using the Breusch-Godfrey Serial Correlation Test and the Recursive (CUSUM) Estimates respectively**.**

4.5 Breusch-Godfrey Serial Correlation Test

Table 5 *Breusch-Godfrey Serial Correlation Test*
Dependant Variable: Residuals

Breusch-Godfrey Serial Correlation Test			
Test Statistic	**Value**	**Probability**	**Decision**
F Statistic	0.296866	0.8268	Do not reject H_O

The probability value of 0.8268 is greater than 0.05 hence we cannot reject H_0 that there is no serial correlation on the error correction model. Therefore the model is free of serial correlation. The CUSUM Estimates line is between the 5% Significance Level implying that the error correction model is stable. After establishing that long run association do exists among the variables in the model and determining the speed of adjustment to equilibrium, we then proceeded to run the OLS of the model to inquire on the RE and obtained the following results.

4.6 OLS Long Run Model Results

Table 5 *OLS Long Run Model Results*
Dependent Variable: dlogCONS

Variable	**Coefficient**	**St Error**	**t statistic**	**p>t**
DlogGDP	1.312617	0.144744	9.068525	0.000
DlogGVEX	-0.196375	0.050842	-3.862443	0.001
DlogTXR	0.039055	0.043688	0.893952	0.508
LogDEBT	-0.081821	0.030679	-2.666993	0.014
DlogINT	-0.006320	0.030679	-0.208380	0.823
Constant	0.8000709	0.299177	2.676372	0.013
R^2	0.801382			
Adjusted R^2	0.764601			
F(6, 26)	21.78788			
Prob > F	0.000000			

Estimated Equation

dlogCONS = 0.8000709+ 1.312617dlogGDP – 0.196375 dlogGVEX + 0.039055dlogTXR – 0.081821logDEBT –0.006320dlogINT + 0.18678

4.7 Results Interpretation

$\mathbf{R^2}$measures the model's goodness of fit and at 0.8013820 implies that all the explanatory variables combined account for approximately 80% variations in private consumption in Nigeria from 1986 to 2015.The F statistic is the yardstick for overall significance of the explanatory variables. The F Statistic (21.78788) is greater than 5 and the F probability of 0.000000 means that collectively, the explanatory variables have been statistically significant in explaining the trend in private consumption over the period of study.

The results show that GDP had a statistically significant positive impact on private consumption. A coefficient of 1.312617 implies that other explanatory variables constant, a 1% increase in GDP led to a 1.3%increase in private consumption. This is in line with the conventional link in which an increase in GDP increases disposal income and therefore consumption. The negative coefficient of government expenditure (-0.196375)implies that, ceteris paribus, a 1% increase in government expenditure was responsible for approximately 0.2%fall in consumption. This is in line with both the Keynesian conventional theory and the RE. However, the results on other RE variables show that$\alpha_3 \neq \alpha_4 \neq \alpha_5 \neq 0$.

The results therefore find strong evidence against the Ricardian Equivalence in Nigeria. The findings concurs with the majority of previous studies which found no evidence of the RE in developing and transitional countries, Muhamm and Masood (2011) and Sumaira and Khan (2012) for Pakistan, Kostas (2001) in Greece.

Debt was found to have a negative significant impact on private consumption thereby refuting the Ricardian Equivalence Hypothesis. The coefficient of -0.081821 means that a 1% increase in public debt, ceteris paribus, accounted for about 0.08% decrease in private consumption during the period under study. This is in line with the Keynesian crowding out effect. The Ricardian Equivalence Hypothesis rejection is cemented by the positive impact of tax revenue on consumption. Interest payments were found to affect private consumption negatively but its impact is not significant. A coefficient of -0.006320 implies that for every dollar used to pay for outstanding debts, household consumption fell by $0.006 Though statistically insignificant, a coefficient of 0.039055 shows that a 1%rise in tax revenue caused a 0.039055% increase in consumption. These findings are largely in line with the conventional Keynesian economics; hence we conclude that Nigeria is a non-Ricardian economy.

Tax revenue was found to have a positive insignificant impact on private consumption. The coefficient of 0.039055means that a 1% increases in tax revenue, ceteris paribus, accounts for about 0.04% increase in private consumption during the period under review. This finding refutes the RE in Nigeria during the study period. This study is in line with the findings of Rohn (2010), Muhamm and Masood (2011) who found that Ricardian Equivalence Hypothesis in case of Pakistan is refuted between the period of 1973 and 2009 since government expenditure, private consumption expenditure, tax revenue, government debt, disposable income, government budget deficit and wealth showed that the consumption function invalidates the Hypothesis.

This finding is also in tandem with the findings of Abada (2016) who tried to validity the Ricardian Equivalence Hypothesis (REH) in Nigeria but found that the Hypothesisis rejected in Nigeria's case since Nigerian consumers respect the performance of fiscal policy and treat government debt as net wealth by increasing their consumption once there is a rise in income either via debt or tax cut.

The findings of this study is also in line with the works of Olasunkanmi and Akanni (2013) who found that Ricardian Equivalence Hypothesis (REH) in Nigeria refuted since the signs and magnitude of taxes and personal income rejected the existence of REH.

5. Conclusion

The major objective of this study was to econometrically examine the Ricardian Equivalence Hypothesis in Nigeria. Using Bound Testing approach to Cointegration and Error Correction Model developed within the context of the Auto-Regressive-Distributed-Lag (ARDL) framework developed by Pesaran and Shin (1995, 1999) , we investigated whether a long-run equilibrium relationship exists between Private Consumption and Gross Domestic Product, Government expenditure, Tax Revenue, Total Public Debt and Interest Payments. We then run the OLS regression on the reduced form consumption function, derived from Kormendi's Consolidated Consumption function to test the RE in Nigeria. The results show that there islong run association running from Gross Domestic Product (GDP), Government Expenditure, Tax Revenue, Total Public Debt and Interest Payments to Private Consumption. More importantly we found strong evidence against the RE in Nigeria and support for Keynesian debt non-neutrality.

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