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Empirical Investigation of Government Expenditure and Revenue Nexus; Implication for Fiscal Sustainability in Nigeria

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Abstract
The study attempted to find out if a long-run relationship exists between government expenditure and revenue. It also explored the direction of causality between the government expenditure and revenue growth. These were with a view to examining the nexus between government expenditure and revenue growth in Nigeria between 1961-2010.
The study employed econometric techniques such as unit root tests, cointegration test, error correction mechanism and Granger causality tests. Times series data covering the period (1961-2010) on such variables as government expenditure, government revenue and real GDP were sourced from CBN Statistical Bulletin (2010) Edition, augmented with CBN Annual Report and Statement of Accounts (Various Years) and World Development Indicators (WDI) of the World Bank's CD-ROM.
The results from ADF and PP unit root tests show that both government expenditure and revenue are I(1) process. The two variables became I(0) after taking their first differences. Also, the results obtained from Engle-Granger and Johansen methods of cointegration tests indicate that there was no long-run relationship between government expenditure and revenue in Nigeria during the period under investigation. The result of the error correction model of government spending confirmed the non-existence of long-run relation between expenditure and revenue. The ECM coefficient is significant and positively signed showing that instead of convergence relationship, there was evidence of a divergence relationship (ECM coefficient=0.368; t=3.636; p<0.01). Similarly, the result of the error correction model of government revenue provided no evidence in support of long-run relationship between revenue and expenditure. The ECM coefficient is significant and positively signed showing that instead of a convergence relationship, there was evidence of a divergence relationship between government revenue and government expenditure (ECM coefficient=0.297; t=2.620; p<0.01). The study further conducted Granger causality tests, for the three lags used by this study, there was no causality, one-way or two-way between government expenditure and revenue invalidating spend-revenue as well as revenue-spend hypotheses. It rather provides evidence in support of institutional separation hypothesis. This implies that government decision to spend as well as government decision to raise revenue is independent of each other. The decisions on these two fiscal variables are made with no consideration for each other.
The finding of this study has a serious implication on fiscal sustainability in Nigeria. Government spending should be based on revenue yields to reduce large fiscal deficits that are unsustainable to economic growth in Nigeria. The study concluded that institutional separation hypothesis holds in Nigeria during the period under investigation.
Keywords: Fiscal sustainability, Cointegration, Convergence, Divergence, Long-run relation

1. Introduction

The question of whether government expenditure growth is a driving force to increased government revenue or otherwise has remained unresolved in the public finance literature. The fact remains that no concensus has been reached by scholars of different ages across the globe on the direction of causality between government expenditure and revenue. The findings of many empirical studies on this topical issue differ across countries and economies. While fiscal synchronization hypothesis holds in some economies, it fails to hold in other economies. Government decision on these two fiscal variables has an important timing consideration. Does government has to raise revenue first and then spend or spend first and then raise revenue to offset the fiscal imbalances initially created as a result of increased spending above the revenue generating capacity of the economy?. Is revenue decision of government independent of her spending decisions? Understanding the relationships between these two fiscal variables form an essential aspect of fiscal policy formulation and strategization. For instance, among countries who run huge fiscal imbalances such as Nigeria, it might contribute to the formulation of specific policies with regard to demand management. Theoretically, causality between government expenditure and revenue are associated with different schools of Thought. There is divergence of opinions as regard the direction of causality between the two fiscal variables.
To Keynes and the Keynesians, government should spend first and then raise revenue in order to balance what could be referred to as fiscal equation. This view is based on the theory of compensatory finance, where fiscal

deficits are created to boost economic growth. Subsequently, through an in-built mechanism, the multiplier effect of budget would eliminate any output gap and ensure a higher tax base, from which the extra tax revenue would be generated to pay off for the initially created fiscal deficit.

To the Classical economics, budget must always balance. Government expenditure must not exceed its revenue. This school of thought believes in what is known as fiscal neutrality. They are of the view that any mismatch between government expenditure and revenue could harm the workings of the economy. It could have distortionary effects on the smooth operation of the price system. Hence, fiscal neutrality in this context dictates a tax and then spend paradigm. It is clearly understood that this view stands an opposing end to that of the Keynesian. What mediates both of these extremes is the fiscal syncronisation hypothesis, a situation in which the motivation to raise revenue and to spend is determined simultaneously (see Brown and Jackson, 1991), Lindahl (1958) and Musgrave (1966).

Empirical studies exploring the direction of causality between government expenditure and revenue include Peacock and Wiseman (1979), Gounder et al., (2007), Bohn (1991), Mount and Sowell (1997), Garcia and Henin (1999), Hoover and Sheffrin (1992), Eita and Mbazima (2008) and Owoeye (1995). To the best of the author's knowledge, empirical studies on the relationship between government expenditure and revenue via the real output growth using error correction modelling technique within the time frame of 1961 to 2010 are scarce for Nigeria, hence the need for this study.

The rest of this paper is organized as follows: Section 2 discusses the theoretical and empirical literature regarding the causal link between government revenues and expenditures. Section 3 presents the data and the econometric methodology, Section 4 presents results and discussion while section 5 concludes.

2. Theoretical and empirical literature review

The causal relationship between government revenues and expenditures has motivated a vast literature both at the theoretical and empirical level. An understanding of this causal link might contribute to the formulation of specific policies with regard to deficits management and fiscal sustainability especially for countries running large fiscal imbalances. The theoretical underpinnings of the causal link between government revenues and expenditures are diverse as they are associated with different schools of economic thought.

Four main hypotheses have been advanced to characterize the causal relation between the two fiscal variables.

The first hypothesis is known as the *revenue-spend* hypothesis. It postulates a causal relation running from revenue to spending. This implies that spending adjust in response to changes in revenues. This hypothesis was initially formulated by Friedman (1978) and Buchanan and Wagner (1978), but these authors differed in their perspectives. While Friedman (1978) argues that the causal relationship works in a positive direction, Buchanan and Wagner (1978) postulate that the causal relationship is negative. According to Friedman, raising revenue will lead to more government spending and hence to fiscal imbalances. Cutting revenue is, therefore, the appropriate remedy to budget deficits.

On the contrary, Buchanan and Wagner (1978) propose an increase in revenue as remedy to deficit budgets. Their point of view is that with a cut in revenue, the public will perceive that the cost of government programmes has fallen. As a result they will demand for more programmes from the government which if undertaken will result in an increase in government spending. Higher budget deficits will then be realized since tax revenue will decline and government spending will increase.

The second view rests on the reverse causal relation, suggesting that government spend first and then increases tax revenues as necessary to finance expenditures. This view was supported by Peacock and Wiseman (1979). The *spend-revenue* hypothesis is valid when spending hikes created by some special events such as natural, economic or political crises compel governments to increase taxes. As higher spending now will lead to higher tax later, this hypothesis suggests that spending cuts are the desired solution to reducing budget deficits. This hypothesis is also consistent with Barro's (1979) view that today's deficit-financed spending means increased tax liabilities in the future, the gain today translates to pain tomorrow. This falls within the context of the Ricardian equivalence proposition.

The third hypothesis known as fiscal synchronization suggests bidirectional causation between revenues and spending (Musgrave, 1966; Meltzer and Richard, 1981). It postulates that governments take decisions about revenues and expenditure simultaneously by analyzing costs and benefits of alternative programmes.

The fourth hypothesis emphasizes the possibility of independent determination of revenue and expenditure due to institutional separation of allocation and taxation functions of government (Buchanan and Wagner, 1978; Hoover and Sheffrin, 1992). Therefore, this view precludes unidirectional causation from revenue to spending or from spending to revenue.

Many empirical studies have used Granger causality analysis to investigate the empirical validity of the above propositions. The empirical findings vary across countries. Evidence supporting the *revenue-spend* hypothesis has been found by Manage and Marlow (1986), Marlow and Manage (1987) and Bohn (1991) for the USA.

Empirical works supporting the revenue-spend hypothesis using sample from developing countries also include Owoye (1995), Ewing and Payne (1998), Park (1998), Chang et al. (2002), Chang and Ho (2002a), Fuess et al. (2003) and Baghestani and AbuAl-Foul (2004).

Studies providing support for *spend-revenue* hypothesis include Anderson et al. (1986), Von Furstenberg et al. (1986) and Ram (1988a) for the USA; Hondroyiannis and Papapetrou (1996) and Vamvoukas(1997) for Greece; and Dhanasekaran (2001) for India.

Evidence supporting the *fiscal synchronization hypothesis* was reported by Miller and Russek (1990) for the USA; Bath et al. (1993) for India; Hasan and Lincoln (1997) for the UK; Cheng (1999) for Chile, Panama, Brazil, and Peru. Li (2001) and Chang and Ho (2002b) for China. Ram (1988b) provides empirical evidence in support of *institutional separation hypothesis* for India, Panama, Paraguay, and Sri Lanka. Hoover and Sheffrin (1992) find evidence which is consistent with this hypothesis for the US economy. Baghestani and McNown (1994) conclude that neither the *revenue-spend* nor the *spend-revenue* hypothesis accounts for budgetary expansion in the United States. Instead, they show that both the expansion in revenue and spending is determined by the long-run economic growth. On nine Asian countries, Narayan (2005) concludes in favour of the institutional separation hypothesis for India, Malaysia, Pakistan, Thailand and Philippines. On the basis of both Johansen procedure and Pesaran *et al*. bounds test, Yaya Keho (2009) found a positive long-run unidirectional causality running from revenue to expenditure for Cote D'ivoire. This lack of consensus in the findings of the empirical studies has motivated the author to re-examine this issue using error correction modelling technique, a multivariate specification on Nigeria data.

3. Data and Methodology

The study begins by specifying a model showing a functional relationship between government expenditure on one hand and government revenue as well as real gdp on the other hand. This implies that changes in government spending might be as a result of changes in revenue as well as real gdp. This model captures the effect of changes in government revenue on government spending via the output changes in the economy.

$$GE = f(GR, \text{Rgdp}) \quad (1)$$

Similarly, we specified a model showing a functional relationship between government revenue on one hand and government expenditure as well as real gdp on the other hand. This implies that changes in government revenue might be as a result of changes in government expenditure as well as real gdp. This model on its own captures the effect of changes in government expenditure on government revenue via the output changes in the economy.

$$GR = f(GE, \text{Rgdp}) \quad (2)$$

The notion that there is a long-run tendency for the public sector to grow relative to national income or vice-versa has been an issue in economics that is rarely questioned. Thus, if the variables GE_t and GR_t are considered as stochastic trends and if they follow a common long-run equilibrium, then these variables should be cointegrated. According to Engle and Granger (1987), cointegrated variables must have an ECM representation. The main reason for the popularity of cointegration analysis is that it provides a formal background for testing and estimating short-run and long run relationships among economic variables. Furthermore, the ECM strategy provides an answer to the problem of spurious correlation. If GE_t and GR_t are cointegrated, an ECM representation could have the following form:

$$\Delta GE_t = \alpha_0 + \alpha_1 {ecm^1}_{t-1} + \alpha_2 \Delta GR_t + u_{1t} \quad (3)$$

$$\Delta GR_t = \beta_0 + \beta_1 {ecm^2}_{t-1} + \beta_2 \Delta GE_t + u_{2t} \quad (4)$$

where Δ is the first difference operator, and ${ecm^1}_{t-1}$, ${ecm^2}_{t-1}$ are error-correction terms lagged one period. The error correction term ${ecm^1}_{t-1}$ in (3) is the lagged value of the residuals from the OLS regression of ΔGE_t on GR_t and the term ${ecm^2}_{t-1}$ in (4) corresponds to the lagged value of the residuals from the OLS regression of GR_t on GE_t. If ΔGE_t, ΔGR_t, u_{1t} and u_{2t} in (3) and (4), are stationary, then it indicates that their right-hand side must also be stationary. It is obvious that (3) and (4) is made up of a bivariate VAR in first differences augmented by the error-correction terms ${ecm^1}_{t-1}$ and ${ecm^2}_{t-1}$, indicating that ECM model and cointegration are of the same representations.

However, it is possible that the relationship between GE_t and GR_t estimated from the ECM formulation (3) and (4) could have been influenced by a third variable. The possibility of this may be explored within a multivariate framework through the inclusion of other important variables, such as real GDP growth rate (Rgdp) or inflation rates (CPI), which represent considerable determinants of government expenditure as well as government revenue. Thus, the relationship between GE_t and GR_t can be examined within the following ECM representation:

$$\Delta GE_t = \lambda_0 + \lambda_1 {ecm^3}_{t-1} + \lambda_2 \Delta GR_t + \lambda_3 \Delta K_t + u_{3t} \quad (5)$$

$$\Delta GR_t = \varphi_0 + \varphi_1 {ecm^4}_{t-1} + \varphi_2 \Delta GE_t + \varphi_3 \Delta K_t + u_{4t} \quad (6)$$

where K_t could be the macroeconomic state of the economy as regards $Rgdp_t$, or inflation rates (CPI_t) as 'third' variable, the system captures the response of GE_t and GR_t to changes in $Rgdp_t$, or CPI_t. The difference between the ECM models (3) and (4) as well as (5) and (6) is the introduction of $Rgdp_t$, or CPI_t which alter the nature of

the model from the simple bivariate system to a multivariate system.
The study used annual data covering 1961-2010 on such variables as aggregate government expenditure, aggregate government revenue and real GDP which were sourced from the CBN Statistical Bulletin, 2010 Edition augmented with CBN Annual Report and Statement of Accounts(Various Years) and World Development Indicators (WDI) of the World Bank's CD-ROM. Data were analyzed using descriptive and econometric techniques.

4. Empirical Analysis
To test formally for the presence of a unit root for each variable in the model, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests of the type given by regression equations (7) and (8) were conducted. The ADF test was conducted using the regression equation of the form:

$$\triangle h_t = \phi_0 + \phi_{1t} + \rho h_{t-1} + \sum_{i=1}^{k} \Omega_i \triangle h_{t-i} + u_{5t} \quad \ldots (7)$$

Where $\triangle h_t$ are the first differences of the series h_t, k represents the lag order and t stands for time. Equation (7) is specified with intercept term and time trend.
Phillips-Perron (PP) tests involve computing the following OLS regression:

$$h_t = \psi_0 + \psi_1 h_{t-1} + \psi_2 [t - \frac{T}{2}] + u_{6t} \quad \ldots (8)$$

where ψ_0, ψ_1, ψ_2 are the conventional least-squares regression coefficients. The hypotheses of unit-root to be tested are $H_0: \psi_1 = 1$ and $H_0: \psi_1 = 1, \psi_2 = 0$.
Akaike's Information Criterion (AIC) is used to determine the lag order of each variable under study. Mackinnon's (1991) tables provide the cumulative distribution of the ADF and PP test statistics.
Tests for stationarity as revealed in Table 1 indicate that the null hypothesis of a unit root cannot be rejected for the levels of the variables. Using differenced data, the computed ADF and PP tests suggested that the null hypothesis could be rejected for the individual series, at the one or five percent significance level, and the variables GR_t, GE_t, and $Rgdp_t$ are integrated of order one, I(1).

Table 1 Result of Unit Root Tests

Variable	**ADF Statistic At Level**	**Mackinnon Critical Value (5%)**	**ADF Statistic At First Difference**	**Mackinnon Critical Value (5%)**	**Order of Integration**
GE	-2.5962*	-2.9399	-4.5286	-2.9422	I(1)
GR	-0.2353*	-2.9399	-4.5049	-2.9422	I(1)
Rgdp	-0.7684*	-2.9399	-3.6099	-2.9422	I(1)
Variable	**PP Statistic At Level**	**Mackinnon Critical Value (5%)**	**PP Statistic At First Difference**	**Mackinnon Critical Value (5%)**	**Order of Integration**
GE	-1.2070*	-2.9399	-6.1968	-2.9422	I(1)
GR	-2.1596*	-2.9399	-6.2848	-2.9422	I(1)
Rgdp	-2.5221*	-2.9399	-5.2864	-2.9422	I(1)

(*) denotes rejection of the hypothesis of no unit root at the level of the variables at 5% significance level.

Results of the cointegration tests on the study variables
Having determined that the variables are stationary at first differences, the study proceeds to examine whether the variables in question have common trends or move together over time. The employed both Engle-Granger and Johansen cointegration techniques. Engle and Granger (1987) show that if there is a cointegrating vector, a simple two-step residual-based testing procedure can be employed to test for cointegration. In this case, a long-run equilibrium relationship between components of $\mathbf{Y}_t$ can be estimated by running a regression equation of the form:

$Y_{1,t} = \beta Y_{2,t} + u_t$ ……………………………………………………………………………(9)

where $\mathbf{Y_{2,t}} = (Y_{2,t,\ldots,} Y_{k,t}')$ is a (k – 1) x 1 vector. To test the null hypothesis that $\mathbf{Y_t}$ is not cointegrated, we should test whether the residual $\hat{u}_t \sim I(1)$ against the alternatives $\hat{u}_t \sim I(0)$. This can be done by any of the tests for unit roots. The most commonly used is the Augmented Dickey-Fuller test with the constant term but with no time trend. Critical values for this test are tabulated in Phillips and Ouliaris (1990) or Mackinnon (2010). The study first conducted OLS-based regressions at the level of the variables. The result obtained is shown in Table (4a) and Table (4b). The residuals obtained from these regressions were subjected to a unit root test. The ADF unit root test confirmed that the residuals obtained from these regressions are non-stationary at level. The results of the ADF unit root test on the residuals obtained from both regressions as shown in Table (4a) and Table (4b) indicate that there exists no long-run relationship between government revenue and expenditure since Mackinnon critical value at 5% is greater than the ADF statistics for both residuals as revealed in the result presented in Table 4c.

Table (4a) Result of the OLS-based regressions at the level of the variables with government expenditure as dependent variables

Dependent Variable: LOG(GE)
Method: Least Squares
Date: 08/17/12 Time: 19:08
Sample: 1961 2010
Included observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(RGDP)	0.278382	0.056259	4.948253	0.0000
LOG(GR)	0.799280	0.034977	22.85175	0.0000
C	-1.405500	0.334536	-4.201346	0.0001
R-squared	0.988954	Mean dependent var		10.12331
Adjusted R-squared	0.988484	S.D. dependent var		3.145961
S.E. of regression	0.337596	Akaike info criterion		0.724190
Sum squared resid	5.356635	Schwarz criterion		0.838911
Log likelihood	-15.10475	F-statistic		2104.044
Durbin-Watson stat	0.845628	Prob(F-statistic)		0.000000

Table (4b) Result of the OLS-based regressions at the level of the variables with government revenue as dependent variable

Dependent Variable: LOG(GR)
Method: Least Squares
Date: 08/17/12 Time: 19:15
Sample: 1961 2010
Included observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(RGDP)	-0.199164	0.077905	-2.556508	0.0139
LOG(GE)	1.147819	0.050229	22.85175	0.0000
C	1.143803	0.439590	2.601979	0.0124
R-squared	0.985251	Mean dependent var		10.54593
Adjusted R-squared	0.984623	S.D. dependent var		3.262530
S.E. of regression	0.404561	Akaike info criterion		1.086098
Sum squared resid	7.692489	Schwarz criterion		1.200820
Log likelihood	-24.15246	F-statistic		1569.832
Durbin-Watson stat	0.799666	Prob(F-statistic)		0.000000

Table (4c) Result of the ADF unit root tests on the residuals of the OLS-based regressions at the level of the variables

Variable	ADF Statistic At Level	Mackinnon Critical Value (5%)	Order of Integration
ECM^3	-2.803540	-2.9228	I(1)
ECM^4	-2.712019	-2.9228	I(1)

(*) denotes non-rejection of the hypothesis of no unit root at level at 5% significance level

Potential problem with Engle-Granger approach is that the cointegrating vector will not involve $Y_{1,t}$ component. In this case the cointegrating vector will not be consistently estimated from the OLS regression leading to spurious results. Also if there is more than one cointegrating relation, the Engle-Granger approach can not detect all of them. Empirical literature has it that one major weakness of Engle-Granger approach is that it can only confirm the existence of cointegration but can not provide information on the number of cointegrating vectors in the VAR. Hence this study proceeded by testing for cointegrating relationship using Johansen cointegration approach. The results of the Johansen cointegration test as shown in Table 5 revealed that there is no long-run relation between government expenditure and revenue.

Table 5: Results of Johansen Cointegration Test
Date: 08/17/12 Time: 19:21
Sample: 1961 2010
Included observations: 48
Test assumption: Linear
deterministic trend in the data

Series: LOG(GE) LOG(GR) LOG(RGDP)

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.237273	17.68001	29.68	35.65	None
0.073518	4.678934	15.41	20.04	At most 1
0.020896	1.013631	3.76	6.65	At most 2

LR reject any cointegration at 5%(1%) critical level

The ECM results presented in Table 6a and 6b provided no evidence in support of long-run relation between government expenditure and government revenue. The ECM coefficient as shown in Table 6a is significant and positively signed showing that instead of a convergence relationship, there was evidence of a divergence relationship between government expenditure and government revenue (ECM coefficient=0.368; t=3.636; p<0.01). Similarly, the ECM coefficient shown in Table 6b is significant and positively signed showing that instead of a convergence relationship, there was evidence of a divergence relationship between government revenue and government expenditure (ECM coefficient=0.297; t=2.620; p<0.01).

Table 6a: Result of the error correction model of government spending
Dependent Variable: D(LOG(GE(-1)))
Method: Least Squares
Date: 08/17/12 Time: 20:33
Sample(adjusted): 1963 2010
Included observations: 48 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(GR(-1)))	0.404580	0.101432	3.988680	0.0002
D(LOG(RGDP(-1)))	0.040526	0.105593	0.383794	0.7030
$ECM^3(-1)$	0.367510	0.101063	3.636443	0.0007
C	0.102992	0.040228	2.560213	0.0140
R-squared	0.374181	Mean dependent var		0.190679
Adjusted R-squared	0.331512	S.D. dependent var		0.282833
S.E. of regression	0.231248	Akaike info criterion		-0.010999
Sum squared resid	2.352923	Schwarz criterion		0.144934
Log likelihood	4.263978	F-statistic		8.769305
Durbin-Watson stat	2.093513	Prob(F-statistic)		0.000113

Table 6b: Result of the error correction model of government revenue
Dependent Variable: D(LOG(GR(-1)))
Method: Least Squares
Date: 10/20/12 Time: 19:52
Sample(adjusted): 1963 2010
Included observations: 48 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.070705	0.053471	1.322303	0.1929
D(LOG(GE(-1)))	0.652841	0.161943	4.031305	0.0002
D(LOG(RGDP(-1)))	0.087960	0.133268	0.660022	0.5127
$ECM^4(-1)$	0.297449	0.113513	2.620395	0.0120
R-squared	0.299389	Mean dependent var		0.203149
Adjusted R-squared	0.251620	S.D. dependent var		0.338154
S.E. of regression	0.292533	Akaike info criterion		0.459178
Sum squared resid	3.765329	Schwarz criterion		0.615112
Log likelihood	-7.020274	F-statistic		6.267428
Durbin-Watson stat	1.949016	Prob(F-statistic)		0.001231

The study further conducted Granger causality tests, for the three lags used by this study, there was no causality, one-way or two-way between government expenditure and revenue invalidating spend-revenue as well as revenue-spend hypotheses. It rather provides evidence in support of institutional separation hypothesis. This implies that government decision to spend is independent of her decision to raise revenue during the period under study.

Table 6: Results of the Granger causality test between government expenditure and revenue

Null hypothesis	No of Obs	No of lags	F-Value	Prob.	Decision Rule
D(LOG(GR(-1))) does not Granger Cause D(LOG(GE(-1)))		1	1.97527	0.16691	Do not reject
D(LOG(GE(-1))) does not Granger Cause D(LOG(GR(-1)))	47	1	0.11389	0.73736	Do not reject
D(LOG(GR(-1))) does not Granger Cause D(LOG(GE(-1)))	46	2	1.30496	0.28221	Do not reject
D(LOG(GE(-1))) does not Granger Cause D(LOG(GR(-1)))		2	1.15177	0.32609	Do not reject
D(LOG(GR(-1))) does not Granger Cause D(LOG(GE(-1)))	45	3	0.94276	0.42958	Do not reject
D(LOG(GE(-1))) does not Granger Cause D(LOG(GR(-1)))		3	0.76619	0.52010	Do not reject

5. Summary, Recommendations and Conclusion

The study attempted to find out if a long-run relationship exists between government expenditure and revenue in Nigeria. It also investigated the direction of causality between government expenditure and revenue growth. These were with a view to examining the nexus between government expenditure and revenue growth in Nigeria between 1961 and 2010.

The study employed econometric techniques such as unit root tests, cointegration test, error correction mechanism and Granger causality tests. Times series data covering the period (1961-2010) on such variables as government expenditure, government revenue and real GDP were sourced from CBN Statistical Bulletin (2010) Edition, augmented with CBN Annual Report and Statement of Accounts (Various Years) and World Development Indicators (WDI) of the World Bank's CD-ROM.

The results from ADF and PP unit root tests showed that both government expenditure and revenue are I(1) process. The two variables became I(0) after taking their first differences. Also, the results obtained from Engle-Granger and Johansen methods of cointegration tests indicate that there was no long-run relationship between government expenditure and revenue in Nigeria during the period under investigation. This result agrees with that obtained from the error correction models which provided no evidence in support of long-run relation between expenditure and revenue. Also, the study found no causal evidence one-way or two-way between government expenditure and revenue. These results imply that government decision to spend as well as government decision to raise revenue is independent of each other. The decisions on these two fiscal variables are made with no consideration for each other, hence the two variables failed to converge to a common equilibrium. The finding of this study has a serious implication on fiscal sustainability in Nigeria. In an economy characterized by high level of corruption and ineptitude, fiscal sustainability is under a serious threat. Government spending should be based on revenue yields to reduce large fiscal deficits that are unsustainable to long-run economic growth.

The study concluded that institutional separation hypothesis holds in Nigeria during the period under investigation.

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Appendix A

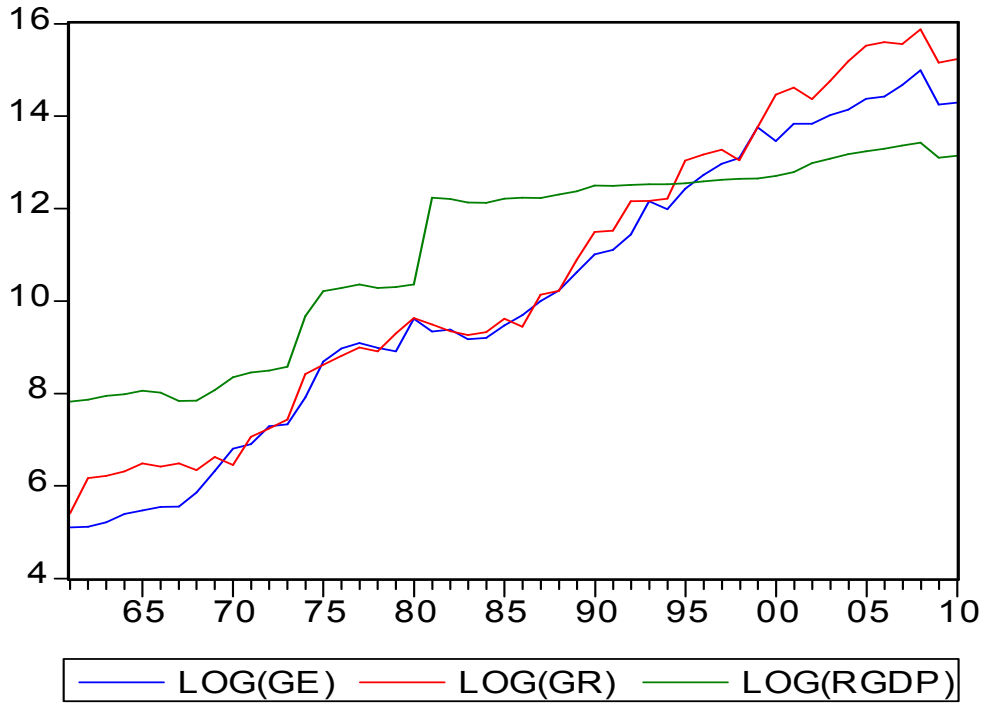


Figure 1: Graphical Presentation of Variables in their Level form

Appendix B

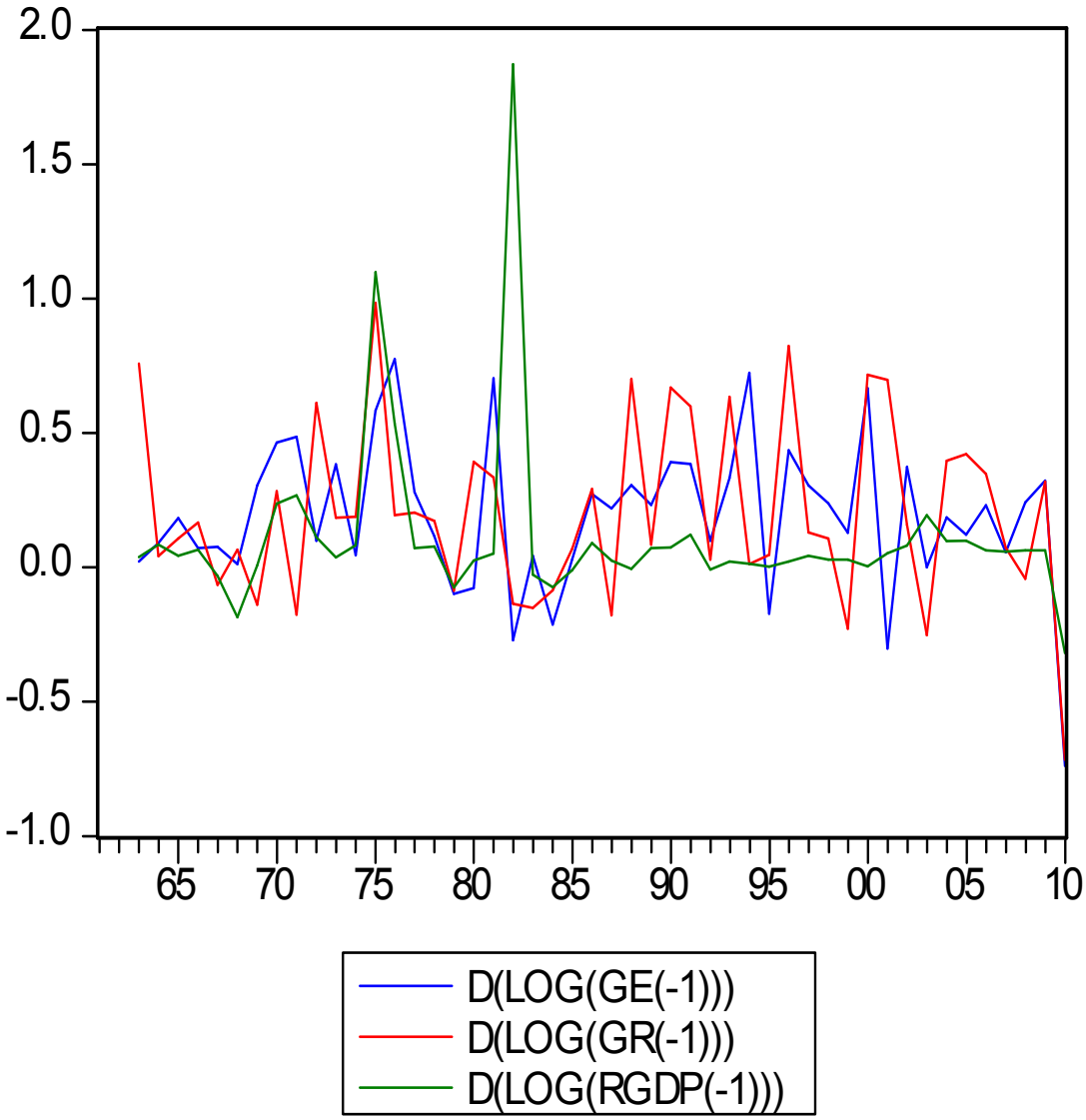
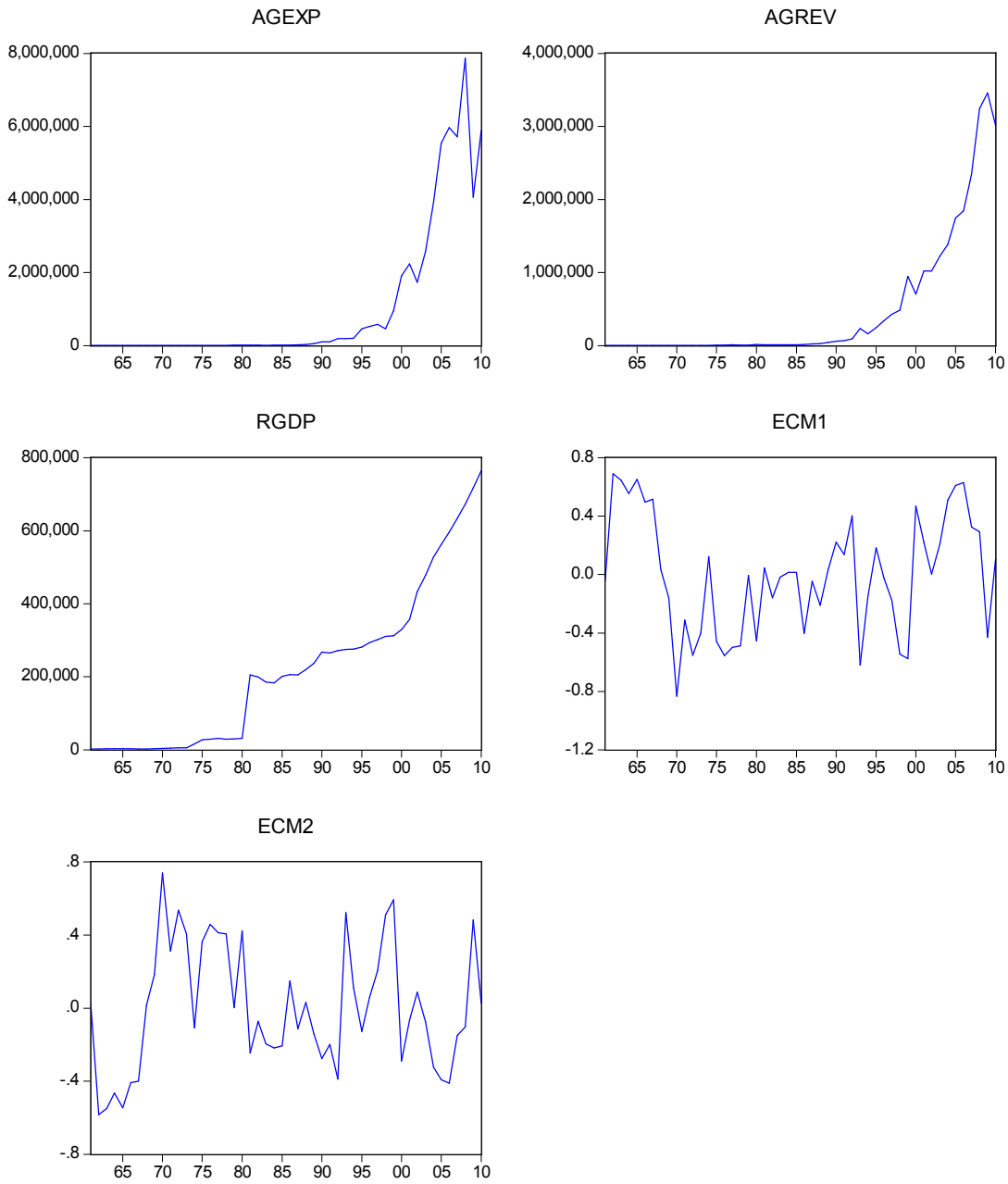


Figure 2: Graphical Presentation of Variables at First Differences

Appendix C

Figure 3: Graphs of Data Residual Series



Note: ECM1 = ECM[3] ECM2 = ECM[4] as shown in the figure