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AN INVESTIGATION OF CAUSAL RELATIONSHIPS BETWEEN GOVERNMENT REVENUE AND EXPENDITURE IN NIGERIA, USING ENGLE COINTEGRATION APPROACH

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ABSTRACT
This paper investigated the direction of causal relation between Government Revenue and Expenditure in Nigeria using annual data from 1981 to 2020. To validate the existence of long-run and short-run relationships and short-run dynamics of the variables, an Engle Cointegration was employed to test for cointegration and estimate error correction. The hypotheses were examined using the Engle-Granger approach to cointegration. The models' empirical results show that there is bidirectional causality between government revenue and expenditures in Nigeria. This indicates that the government's revenue and expenditure decisions are decided jointly by the country's fiscal authorities. The findings point to the existence of a revenue-to-expenditure feedback system in Nigeria. In other words, both revenue and expenditure levels, affect each other in the Nigerian budgeting process. Therefore, greater tax levels are driven by higher spending levels, and vice versa. This paper recommends that Nigerian fiscal authorities with budget deficits should simultaneously increase revenues and cut expenditure in order to control their deficits.

Keywords: Data, long-run, short-run, variables, deficit

INTRODUCTION

Understanding the relationship between government expenditure and government revenue is critical from a policy stand point (Oguonu, 2012), particularly for African countries that have long-standing budget deficits. Long-term economic growth can be aided by government spending on various public projects through a well-established connection between government revenue and expenditure. However, the appropriate connection needed to realize this economic boom has not yet been established as it was cited by many literatures.
Abdulrasheed, (2017) examines the causal relationship between government spending and revenue in Nigeria from 1986 to 2015. As analysis tools, the paper used a co-integration statistical method and vector autoregressive method that included an Error Correction Model (ECM) and Augmented Dickey Fuller. The data revealed that Nigeria has a spend-revenue practice. This is consistent with Barro, (1989); Peacock & Wiseman, (1979) hypothesis, which states that changes in government expenditure cause changes in government revenue.
Mainoma & Aruwa (2015) used Vector Error Correction Model based causality test for the periods 1979 to 2008. Their findings showed that causality runs from revenue to public expenditure in Nigeria, their causality test and impulse response analysis confirm that government revenue has a significant impact on public expenditure in Nigeria. Nwosu & Okafor, (2014) examined the relationship between both total expenditure and total revenue in Nigeria using yearly data from 1970 to 2011. Their paper employed co-integration approach and Vector Autoregressive (VAR) models with an Error Correction term as the methods of analyses. The Cointegration tests showed the presence of long run equilibrium relationships between government revenue and expenditure variables. The VAR results also show that total government expenditure, capital and recurrent expenditures have long run unidirectional relationships with total revenue, as well as unidirectional hypothesis running from expenditure to revenue. The outcome aligned with the spend-tax hypothesis in Nigeria implying that changes in government expenditure bring about changes in government revenue.
Ogujiuba & Abraham, (2012) also examined the revenue-spending hypothesis for Nigeria using macro data from 1970 to 2011. Applying correlation analysis, granger causality test, regression analysis, lag regression model, vector error correction model and impulse response analysis, they report that revenue and expenditure are highly correlated and that causality runs from revenue to expenditure in Nigeria.
Obioma & Ozughalu, (2014) studied the relationship between government revenue and government expenditure in Nigeria using time series data from 1970 to 2007. They utilized the Engel Granger two-step co-integration method, the Johansen co-integration method and the Granger causality test within the Error Correction Modeling (ECM) framework and found a long-run relationship between the two variables and a unidirectional causality running from government revenue to government expenditure in Nigeria. Maynard & Guy, (2009). investigated the interrelationship between total government expenditure and total tax revenue in Barbados over the period of 1985 to 2008 applying Granger Causality on both bivariate and multivariate co-integrating models. The result of the multivariate error correction model suggests that a unidirectional causality exists from tax revenue to government expenditure.
Nwosu & Okafor, (2014) did the same paper in the same country for period of 1970–2011. The paper indicates long run unidirectional relationship running from expenditure to revenue variables. The findings support spend-and-revenue hypothesis in Nigeria indicating that changes in government expenditure instigate changes in government revenue.
Other parts of the world are equally affected by this problem. For instance, Owoye, & Onafowora,(2011) evaluate the relationship between tax revenue and government expenditure in twenty-two (22) Organization for Economic Co-operation and Development (OECD) over the period of 1971 to 2010. The paper employs the use of Autoregressive Distributed Lag (ARDL) bounds test and the Toda-Yamamoto Granger non-causality approach to test for causality. The paper shows evidence to confirm the tax-and-spend hypothesis in

eight of the twenty-two countries; with the evidence is more prevalent within the EU countries, where tax burdens are much higher, than in the non-EU OECD countries. Also, Ghartey, (2010) examines the causal relationship between government expenditure and revenue in four Caribbean countries. The paper employs the short- and long-term granger causality test in the form of the Auto regressive Distributive Lag test and discovers that taxes cause spending for only Belize, and independent for the rest of the countries. Estimates of the error correction model show long-run bi-directional causation in The Bahamas, Barbados and Belize.

The degree to which macroeconomic variables encourage economic growth has sparked discussion, particularly in underdeveloped countries. Therefore, this paper aimed at investigating and establishing the direction of the causal relationships between Nigeria's government revenue and expenditure. The precise goals are as follows:

i, determine whether or not government revenue and expenditure in Nigeria are cointegrated.

ii, determine whether or not government revenue granger-cause expenditure in Nigeria and vice versa.

The government of Nigeria will gain insight into how to manage its money earned and minimize expenditures by using the conservative estimations of this research endeavor. The paper would also help the government to estimate and forecast the country's economic growth, as well as GDP per capita income, based on revenue earned by taxes (excluding grants. This would enable them to make better strategies and increase economic development, such as health, education, and infrastructure, hence promoting Nigeria's economic growth and development, as well as the betterment of citizens' lives. The empirical findings of this paper would assist in determining appropriate policy measures to address some of the fiscal challenges facing Nigeria.

MATERIALS AND METHODS

This section examines the presence of interdependence between government real revenue and real expenditure in Nigeria. In this section, we test for the direction of causality between government oil revenue, Nonoil revenue and recurrent expenditure in the case of Nigeria. This examination is also based on time series data from 1981 to 2020 from the Central bank of Nigeria (CBN) Statistical bulletin 2021. (CBN, 2021). The existing empirical work on the direction of causality between government real revenue and real expenditure uses standard Granger-causality-type tests which is applied in this paper too. In order to examine the relationship between government oil revenue, nonoil revenue and recurrent expenditure in Nigeria, a two-step procedure is adopted. The first step investigates the existence of a long-run relationship between the variables through a cointegration analysis. The second step explores the causal relationship between the series. If the series are non-stationary and the linear combination of them are non-stationary, then standard Granger's causality test should be employed. But, if the series are non-stationary and the linear combination of them is stationary, Error Correction Method (ECM) should be adopted. For this reason, testing for cointegration is a necessary prerequisite to implement the causality test.

We perform our analysis in two steps. First, we test for unit roots vs. stationarity. Then we test for no cointegration. The objective of the unit root test is to empirically examine whether a series contains a unit root. Since many macroeconomic series are non-stationary (Nelson &Plosser, 1982), unit root tests are useful to determine the order of integration of the variables and, therefore, to provide the time-series properties of data. If the series contains a unit root, this means that the series are non-stationary. Otherwise, the series will be categorized as stationary. In order to implement a more rigorous test to verify the presence of a unit root in the series, an Augmented Dickey-Fuller (ADF) is employed. These procedures were discussed in the subsequent subunits of this section.

Unit Root Test

In order to model the variable in a manner that captures the inherent characteristics of its time-series, we use the Akaike information criterion (AIC) to determine the lag structure of the series. This test represents a wider version of the standard Dickey& Fuller, (1979) test. Given a simple AR (1) process:

$$y_t = \rho y_{t-1} + x'_t\delta + e_t \quad (1)$$

where y_t is a time series (in this case, RREV and REXP)), x_t represents optional exogenous regressors (e.g. a constant or a constant and a trend), ρ and δ are parameter to be estimated and e_t is a white noise error component, the standard DF is implemented through the Ordinary Least Squares (OLS) estimation of the above AR(1) process after subtracting the term y_{t-1} from both sides of the equation. This leads to the following first difference equation:

$$\Delta y_t = \alpha y_{t-1} + x'_t\delta + e_t \quad (2)$$

Δ is the first difference operator, $\alpha = \rho - 1$, and e_t is the error term with zero mean and constant variance. Now, adopting a simple t-test, if $\alpha = 0$ (i.e. if $\rho = 1$), then y is a non-stationary series and its variance increases with time. Under such cases, the series is said to be I(1), requiring to be differenced once to achieve stationarity. However, if the series is correlated at higher order lags, the assumption of white noise error is violated. In such circumstance, the ADF test represents a possible solution to this problem: it permits to correct for higher order correlation employing lagged differences of the series y_t among the regressors. In other words, the ADF test "augments" the traditional DF test assuming that the y series is an AR(p) process and, therefore, adding p lagged difference terms of the dependent variable to the right-hand side of the first difference equation given above. This gives the following equation:

$$\Delta y_t = \alpha y_{t-1} + x'_t\delta + \sum_{i=1}^{p} \phi_t \Delta y_{t-1} + \mu_t \quad (3)$$

In both the cases, a constant and a linear trend were included since this represents the most general specification. Finally, the choice of the number of lags actually employed was assigned to the Akaike Information Criterion (AIC).

Cointegration Test

In order to test for causality between the series RREV and REXP through the ECM, it is necessary to verify if the two series are cointegrated. Two or more variables are said to be cointegrated if they share a common trend. In other words, the series are linked by some long-run equilibrium relationship from which they can deviate in the short-run but they must return to in the long-run, i.e. they exhibit the same stochastic trend (Stock & Watson, 1988). Cointegration can be considered as an exception to the general rule which establishes that, if two series are both I(1), then any linear combination of them will yield a series which is also I(1). The exception is when a linear combination of two or more series is integrated of a lower order: in this case, in fact, the common stochastic trend is cancelled out, leading to something that is not spurious but that has some significance in economic terms. The existence of a cointegration relationship between the series NOREV, OREV and REXP was verified implementing a unit root ADF test on the residuals from the following two long-run regressions between the level variables, estimated through the OLS method:

$$\ln ORREV_t = {}^{a}{}_{o} + {}^{a}{}_{1}\ln REXP_t + {}^{a}{}_{2}\ln NOREV_t + \mu_t \quad (4)$$

$$\ln REXP_t = {}^{a}{}_{o} + {}^{b}{}_{1}\ln ORREV_t + {}^{b}{}_{2}\ln NOREV_t + \eta_t \quad (5)$$

$$\ln NOREV_t = {}^{a}{}_{o} + c_1\ln ORREV_t + c_2\ln REXP_t + \Upsilon_t \quad (6)$$

In the language of cointegration theory, regression such as equation (4 and (5) are known as cointegrating regressions and the slope parameters ${}^{a}{}_{1}$ and ${}^{b}{}_{1}$are known as the cointegrating parameter (Gujarati, 2007).

Causality Test

Given the results from cointegration test, the causality relationship between OREV, NOREV and REXP should be tested through the implementation of an Error correction model (ECM). Before proceeding with it, the standard Granger causality test is implemented here. Following Engle &Granger, (1987), the concept of "causality" assumes a different meaning with respect to the more common use of the term. The statement "OREV Granger causes REXP" (or vice versa), "NOREV Granger causes REXP" (or vice versa) and "OREV Granger causes

NOREV" (or vice versa), in fact, does not imply that REXP, OREV and NOREV is the effect or the result of REXP, OREV and NOREV, but represents how much of the current REXP, OREV and NOREV can be explained by the past values of REXP, OREV and NOREV and whether adding lagged values of OREV, NOREV and REXP can improve the explanation. For this reason, the causality relationship can be evaluated by estimating the following three regressions:

$$\Delta lnREXP_t=\alpha_1+\sum_{i=1}^{m}\gamma_{1i}\Delta lnOREV_{t\text{-}i}+\sum_{i=1}^{m}\beta_{1i}\Delta lnREXP_{t\text{-}i}$$

$$+\sum_{i=1}^{m}\gamma_{1i}\Delta lnNOREV_{t\text{-}i}+\varepsilon_t \qquad (7)$$

$$\Delta lnNOREV_t=\alpha_2+\sum_{i=1}^{m}\gamma_{2i}\Delta lnREXP_{t\text{-}i}+\sum_{i=1}^{m}\beta_{2i}\Delta lnOREV_{t\text{-}I}+\sum_{i=1}^{m}\gamma_{2i}\Delta lnNOREV_{t\text{-}i}+\varepsilon_t \qquad (8)$$

$$\Delta lnOREV_t=\alpha_3+\sum_{i=1}^{m}\gamma_{3i}\Delta lnREXP_{t\text{-}i}+\sum_{i=1}^{m}\beta_{3i}\Delta lnOREV_{t\text{-}I}+\sum_{i=1}^{m}\gamma_{3i}\Delta lnNOREV_{t\text{-}i}+\varepsilon_t \qquad (9)$$

Where m represents the lag length and should be set equal to the longest time over which one series could reasonably help to predict the other. Following this approach, the null hypothesis that REXP does not Granger cause NOREV in regression (8) and that REXP does not Granger cause RREV in regression (7) can be tested through the implementation of a simple F-test for the joint significance of respective parameters β_{1i} and β_{2i}. Following the equations (8) and (7) were estimated using four lags of each variable which should represent and adequate lag-length over which one series could help to predict the other.

Error Correction Model

An error-correction model is a dynamic model in which "the movement of the variables in any periods is related to the previous period's gap from long-run equilibrium". It is a neat way of combining the long run, cointegrating relationship between the level variables and the short run relationship between the first differences of the variables. It also has the advantage that all the variables in the estimated equation are stationary; hence there is no problem with spurious correlation. According to the error correction approach, the causality relationship can be evaluated by estimating regressions (7), (8) and (9) after having added up the error correction term represented by the residuals from regressions (4), (5) and (6) respectively. In other words, the causality can be tested by estimating the following regressions:

$$\Delta lnOREV_t=\alpha_1+\sum_{i=1}^{m}\gamma_{1i}\Delta lnOREV_{t\text{-}i}+\sum_{i=1}^{m}\beta_{1i}\Delta lnNOREV_{t\text{-}i}+\sum_{i=1}^{m}\beta_{1i}\Delta lnREXP_{t\text{-}i}+\zeta_{1i}\mu_{t\text{-}i}+\varepsilon_{1i} \qquad (10)$$

$$\Delta lnREXP_t=\alpha_2+\sum_{i=1}^{m}\gamma_{2i}\Delta lnREXP_{t\text{-}i}+\sum_{i=1}^{m}\beta_{2i}\Delta lnOREV_{t\text{-}i}+\sum_{i=1}^{m}\beta_{1i}\Delta lnNOREV_{t\text{-}i}+\zeta_{1i}\mu_{t\text{-}i}+\varepsilon_{2i} \qquad (11)$$

$$\Delta lnNOREV_t=\alpha_3+\sum_{i=1}^{m}\gamma_{3i}\Delta lnNOREV_{t\text{-}I}+\sum_{i=1}^{m}\beta_{3i}\Delta lnREXP_{t\text{-}i}+\sum_{i=1}^{m}\beta_{3i}\Delta lnOREV_{t\text{-}i}+\zeta_{1i}\mu_{t\text{-}i}+\varepsilon_{3i} \qquad (12)$$

As stated out by Engle & Granger, (1987), the ECM approach offers another possibility to test for causality. Therefore, the inclusion of lagged value of error term from co-integrated regression in the ECM permits to evaluate for causality relationship between the series either through the traditional F-test for the joint significance of the parameters β1i and β2i or through the significance of ξ1i and ξ2i. As before, four lags of each variable (m = 4) were used.

RESULTS AND DISCUSSION

In this section, first we conducted the preliminary analyses of the data series to justify the choice of the methods applied in the paper and finally the main analyses to accomplish the set objectives.

Descriptive Statistics

The statistics for the economic variables, Oil revenue (OREV), nonoil revenue (NOREV) and recurrent expenditure (REXP) are presented in the Table 1. The statistics explain the measure of central tendency, the degree of variation, and the degree of asymmetry and the peakness of each of the observations in the data.

Table 1: Descriptive Statistics

	lnREXP	lnOREV	lnNOREV
Mean	6.509543	6.089495	5.025228
Median	7.207109	6.585375	5.415057
Maximum	9.566461	9.091441	8.094083
Minimum	2.656925	1.981415	1.093298
Std. Dev.	2.293885	2.472427	2.452123
Skewness	-0.363814	-0.448757	-0.290012
Kurtosis	1.724411	1.747464	1.623618

The measures of skewedness, -0.363814, -0.44757 and -0.290012 indicate that the data for recursive government expenditure (REXP), Oil revenue (OREV) and nonoil revenue (NOREV) respectively are negatively and moderately skewed.

Table 2: Correlogram

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |*******	. |*******	1	0.938	0.938	35.257	0.0001
. |******|	.*| . |	2	0.871	-0.071	66.540	0.0001
. |******|	.*| . |	3	0.794	-0.123	93.276	0.0001
. |***** |	.*| . |	4	0.712	-0.072	115.47	0.0001
. |***** |	. | . |	5	0.630	-0.045	133.38	0.0001
. |**** |	.*| . |	6	0.546	-0.066	147.25	0.0001
. |*** |	.*| . |	7	0.457	-0.092	157.29	0.0001
. |*** |	. | . |	8	0.371	-0.029	164.15	0.0001
. |** |	. | . |	9	0.294	0.010	168.59	0.0001
. |** |	. | . |	10	0.225	0.011	171.29	0.0001
. |*. |	.*| . |	11	0.145	-0.161	172.46	0.0001
. |*. |	. | . |	12	0.077	0.013	172.80	0.0001
. | . |	.*| . |	13	0.001	-0.116	172.80	0.0001
. | . |	. | . |	14	-0.065	-0.007	173.07	0.0001
.*| . |	. | . |	15	-0.115	0.071	173.94	0.0001
.*| . |	.*| . |	16	-0.170	-0.127	175.93	0.0001

Since the ACF from the correlogram above is declining towards zero (0) it shows that there is a trend in the dataset which will be verified from the Figure 1.

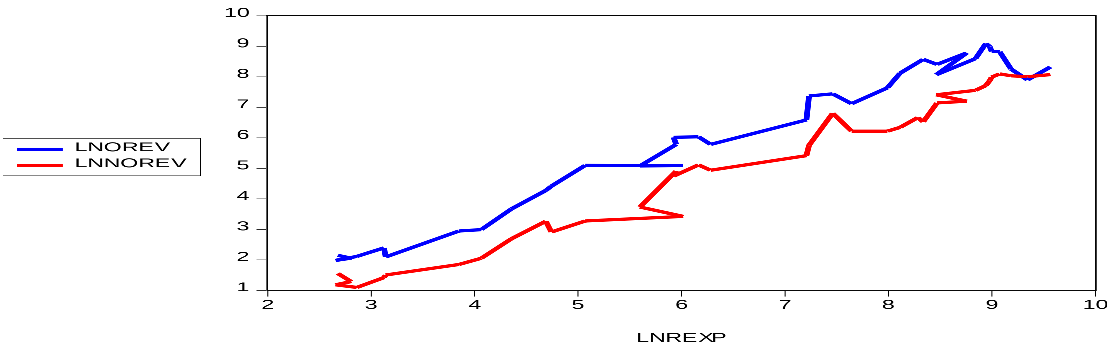

Figure 1: Plot of OREV and NOREV against REXP

From Figure 1, the graph shows a linear trend which also means that the data is not stationary.

Testing Unit Roots

The first step in our empirical work was to determine the degree of integration of both variables. The Augmented Dickey Fuller (ADF) unit root test at level with intercept and trend and first difference intercept and trend is adopted to check whether the variables contain a unit root or not. The results of ADF test is reported in Table 3 and 4 for the level as well as for the first difference of each of the variables. The result shows that the null hypothesis that the series contain unit root cannot be rejected at zero order levels meaning it is non-stationary. But the hypothesis of a unit root is strongly rejected for the differenced series of the variables meaning it is stationary. Given the consistency and ambiguity of the results from this testing approach, we conclude that the series under investigation are integrated of order one 1(I). This reveals that government recurrent expenditure (REXP), Oil Revenue (OREV) and nonoil revenue (NOREV) are non- stationary in its levels and stationery in first difference. Table 04 and 05 clearly shows the differences in the trend with stationarity and non-stationarity of the series. The Hypotheses tested are H_0: $\Upsilon=0$ (not stationary) against H_1: $\Upsilon \neq 0$ (stationary) at $\alpha = 0.05$ level of significance. The Test statistic = ADF.

Table 3: Results of Augmented Dickey fuller Test at Level

Method	*Statistic*	*Prob.***
ADF - Fisher Chi-square	*0.07049*	*1.0000*
ADF - Choi Z-stat	*4.34043*	*1.0000*

Intermediate ADF test results UNTITLED

Series	*Prob.*	*Lag*	*Max Lag*	*Obs*
LNREXP	*0.9701*	*1*	*8*	*35*
LNOREV	*0.9978*	*2*	*8*	*34*
LNNOREV	*0.9973*	*5*	*8*	*31*

Table 4: Results of Augmented Dickey Fuller Test at first Difference

Method	*Statistic*	*Prob.***
ADF - Fisher Chi-square	*59.0945*	*0.0000*
ADF - Choi Z-stat	*-6.27707*	*0.0000*

Intermediate ADF test results

Series	*Prob.*	*Lag*	*Max Lag*	*Obs*
D(LNREXP)	*0.0000*	*0*	*8*	*38*
D(LNOREV)	*0.0009*	*1*	*8*	*37*
D(LNNOREV)	*0.0166*	*4*	*8*	*36*

Testing Cointegration and Error Correction
Mechanism and the Normality Check of the Residuals of the Error Correction Models (ECM)
Since the first difference series are stationary, we therefore examine the existence of cointegration between government recurrent expenditure (REXP), Oil revenue (OREV) and Nonoil revenue (NOREV). To test the cointegration or long run relationship, first we run the regression, Tables 5 and 6 reports the results obtained from the Regression cointegration tests respectively. The Hypotheses tested are H_0: $\eta = 0$ (At most 1 cointegrated equation) against H_1: $\eta \neq 0$ (more than 1 cointegrated equation) at $\alpha = 0.05$ level of significance. The Test Statistics = ADF. The normality of the residuals of the error correction models(ECM) was checked and the result presented in Figure 2.

Table 5: Regression Analysis

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
LNOREV	*0.372892*	*0.100257*	*3.719380*	*0.0007*
LNNOREV	*0.556786*	*0.101087*	*5.507999*	*0.0000*
C	*1.440843*	*0.156039*	*9.233879*	*0.0000*
R-squared	0.985267	Mean dependent var		6.509543
Adjusted R-squared	0.984400	S.D. dependent var		2.293885
S.E. of regression	0.286504	Akaike info criterion		0.415475
Sum squared residual	2.790871	Schwarz criterion		0.546090
Log likelihood	-4.686286	Hannan-Quinn criteria.		0.461523
F-statistic	1136.865	Durbin-Watson stat		1.144537
Prob(F-statistic)	0.000000			

The regression results in Table 5 show that for every oil revenue generated, there is 3.7 billion Naira increment in government recurrent expenditure also for every nonoil revenue generated, there is 5.6 billion Naira increment in the government recurrent expenditure.

Table 6: Cointegration Tests

Dependent	*tau-statistic*	*Prob.**	*z-statistic*	*Prob.**
LNREXP	*-4.201015*	*0.0325*	*-44.76481*	*0.0000*
LNOREV	*-2.083172*	*0.7016*	*-10.54187*	*0.5060*
LNNOREV	*-4.042856*	*0.0445*	*-21.52430*	*0.0411*

From the result in Table 6, we can therefore reject the null hypothesis, and conclude that the p-values (0.0325 and 0.0445) respectively suggests cointegration among two of the series at 5% significant level.

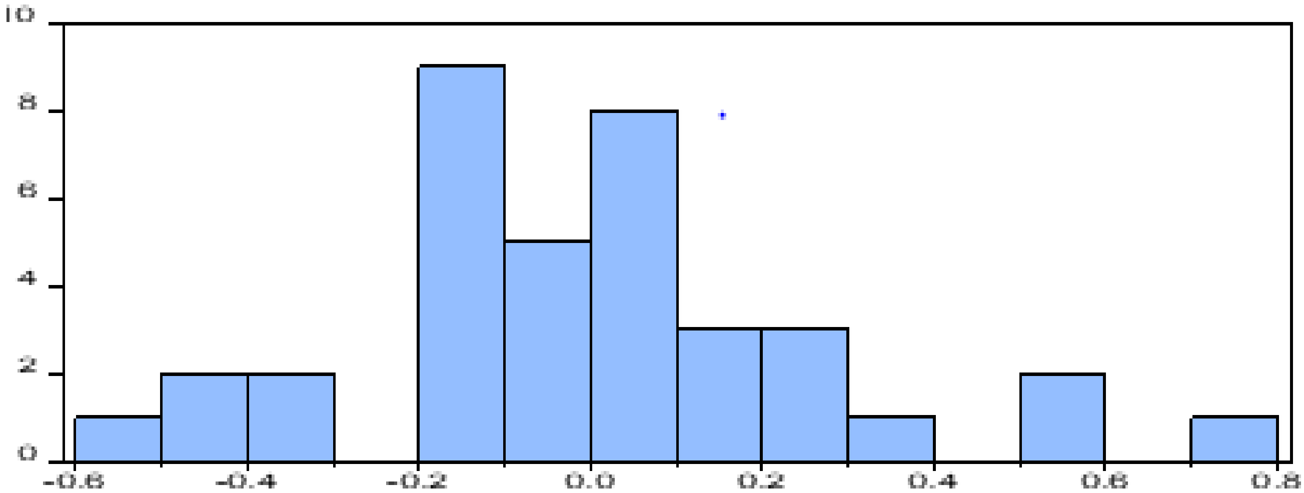

Figure 2: Normal density plot for the residuals of the error correction Models (ECM)

From Figure 2, the normality plot p (0.35032) greater than 0.05 level of significance. Thus, the null hypothesis (H_0) is not rejected, hence the residuals are normally distributed.

Causality Tests

The above analysis suggests that there exists a long-run relationship between government Oil revenue, Nonoil revenue and recurrent expenditure in the country. But in order to determine which variable causes the other, granger causality test was used. The granger causality test results are presented in Table 7.

Table 7: Granger Causality Test

Null Hypothesis:	*Obser.*	*F-Statistic*	*Prob.*
lnOREV does not Granger Cause lnNOREV	*38*	*2.53152*	*0.0964*
lnNOREV does not Granger Cause lnOREV		*0.06110*	*0.9408*
lnREXP does not Granger Cause lnNOREV	*37*	*13.3038*	*7.E-05*
lnNOREV does not Granger Cause lnREXP		*0.00653*	*0.9935*
lnREXP does not Granger Cause lnOREV	*36*	*2.02661*	*0.1494*
lnOREV does not Granger Cause lnREXP		*0.06106*	*0.9409*

As shown in Table 7, OREV on NOREV and NOREV on OREV are not statistically significant at the 5% level, this implies that there is bidirectional causality running from OREV to NOREV and NOREV to OREV. The p-values (0.0964 and 0.9408) implies that the null hypothesis OREV does not granger cause NOREV and NOREV does not granger cause OREV cannot be rejected respectively at the 0.05 significance level. This indicates that increase in Oil revenue would not lead to increase in Nonoil revenue and vice versa.

On the other hand, the p-values (7.E-05 and 0.9935) implies that the null hypothesis REXP does not granger cause NOREV can be rejected at 5% significant level and NOREV does not granger cause NOREV cannot be rejected at the 0.05 significance level. This indicates that an increase in Recurrent expenditure would lead to increase in Nonoil revenue, also increase in Nonoil revenue does not cause increase in recurrent expenditure.

The p-values (0.1494 and 0.9409) implies that the null hypothesis OREV does not granger cause REXP and REXP does not granger cause OREV cannot be rejected respectively at 0.05 significance level. This indicates that an increase in Oil revenue would not lead to increase in recurrent expenditure, also increases in recurrent expenditure would not lead to increase in oil revenue. Therefore, the paper reveals bi-directional causation between government revenue and expenditure in Nigeria. We find a bidirectional causal association between government revenue and government expenditure, which lends support to the fiscal synchronization hypothesis in this country, implying that expenditure decisions are not made in isolation from revenue decisions. This outcome suggests that fiscal policy makers in this country should set revenues and expenditures simultaneously.

CONCLUSIONS

This paper applies cointegration and error-correction models to examine the causal relation between government revenue and expenditures in Nigeria over the period 1981 to 2020.The empirical results obtained from the models indicate that bidirectional causality exists between government revenue and expenditures in Nigeria. This implies that government revenue and expenditures decisions are jointly made by the fiscal authority of this country. All the results suggest that there exists a feedback mechanism between revenue and expenditure for Nigeria. In other words, in Nigeria budgetary process, both revenue and expenditure levels affect each other so that higher tax levels are caused by higher spending levels and vice-versa.

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