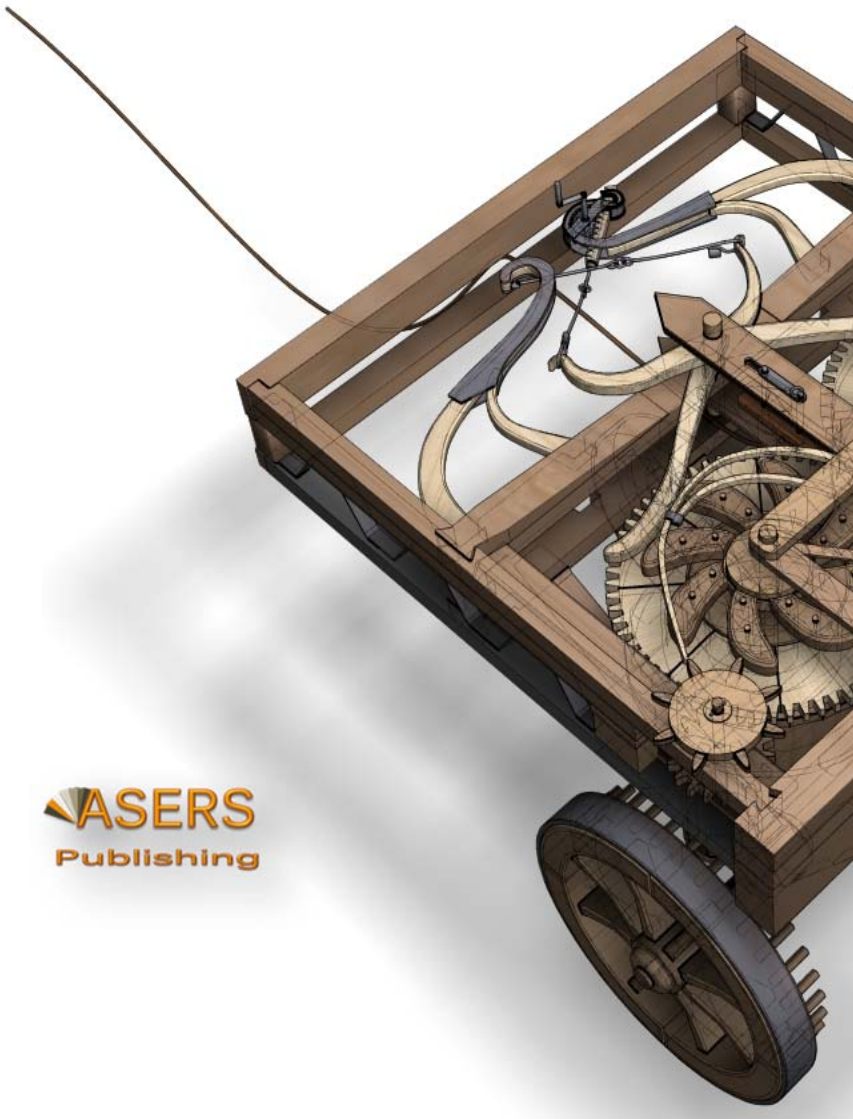
Theoretical and Practical Research in Economic Fields



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FISCAL DEFICIT AND THE GROWTH OF DOMESTIC OUTPUT IN NIGERIA

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Abstract: *The study focuses on the relationship between fiscal deficit and domestic output (using agricultural output as a proxy) in Nigeria. In other to have a robust model, other parameters of fiscal operations were included as explanatory variables namely, government revenue, government expenditure and government total debt stock. The study argued that even though there are no shortages of theoretical justifications on the impact of fiscal deficit on the national domestic output, empirical probe of the issue is scarcely pursued most especially for the agricultural sector. The model was estimated using the Engle-Granger testing approach to cointegration for the long-run analysis while a restricted error correction model was relied upon to explore the contemporaneous dynamics. The data obtained from Central Bank of Nigeria Statistical Bulletins covered the period 1986-2018. The study found that agricultural output has a long-run relationship with fiscal policy variables. In the long run, the study finds that government revenue and expenditure exert significant positive impact on agriculture output contrarily to the negative impact exhibited by government fiscal deficit and total debt stock. However, in the short run, agriculture output responded negatively to changes in fiscal deficit by 0.03%, government expenditure 0.03% and government total debt stock 0.09% contrarily to its 0.16% response to changes in government revenue. The paper recommended that government may consider reduction in deficit spending so as to minimize the country's current level of borrowings. Also, government may consider broadening its revenue bases by intensifying its taxation policy. Finally, no effort should be spared by the government in blocking all looped holes in the country's expenditure operations such as rent seeking and inflation of contracts.*

Keywords: fiscal deficit; agriculture; domestic output; Engle-Grange co-integration test; ECM.

JEL Classification: H20; H30; H53; H68; Q14.

Introduction

The persistence rises in fiscal deficits have been blamed for much of the economic crisis that have engulfed the Nigerian economy most especially the growth of the domestic output over the last three

decades or so. This resulted in high debt profile thereby leading to debt crisis, high inflation, high unemployment as well as poor investment and growth (Fagbohun 2017). According to Umeora (2013), the high annual fiscal deficits in Nigeria were predicated on bloating of government bureaucracy, cost of providing critical infrastructures and shortage of revenue generation. A number of factors have contributed in exacerbating the fiscal deficit of the federal government among which the reliance on oil revenue is relatively more pronounced (Obinabo and Agu 2018). This is hinged on the fact that the crude oil price is determined at the world market thereby making oil revenue highly volatile. There is the problem of both external and internal debts where external debt servicing involves a quantum of large sum. The implication of these is a fall on the nation domestic output.

Anecdotal evidence reveals that Nigerian economy found itself in the deficit web following the collapsed of the world oil market in the early 1980s. Although, the economy has been making frantic efforts to exit the deficit trap but only little success (if any) has been recorded, rather the strategy that will aid in financing the deficit has been a key policy issue. Accordingly, a number of macroeconomic fundamentals have been experienced within the Nigeria economy. They included but not limited to rapid monetary growth, exchange rate depreciation and rising inflation. Previous studies in the field focused on the relationship between fiscal deficit and economic growth in Nigeria (see Wosowei 2013, Ubi and Inyang 2018, Tung 2018). The present study narrows the effect of fiscal deficit on the output of the agricultural sector in Nigeria. Although, fiscal deficit is not a problem peculiar to the Nigerian economy alone, but rather a common problem for the majority of developing countries especially sub-Sahara Africa (SSA).

Accordingly, the World Bank's statistics noted that rising fiscal deficit has been a reoccurring decimal in most developed and developing economies. Although many of these economies have strengthened their policies and accumulated significant savings over the past two decades, they still could not fully solve their fiscal problems and stabilized their macroeconomic fundamentals. In Nigeria, statistics from the Central Bank Statistical Bulletin (2018) indicate that average deficit stood at 0.13% of GDP in 1986 and in a decade later rose to 6.48% of GDP in 1996. It witnessed significant decline in 2006 falling to 1.91% of GDP before declining further to -1.17% of GDP in 2018. In the case of agricultural output as a percentage of GDP, it recorded 19.6%, 19.5%, 25.6% and 25.1% respectively in the same period. Whilst there are no shortages of theoretical justifications on the impact of fiscal deficit on the national domestic output, empirical evidences on the issue are sparse most especially for the agricultural sector.

Added to this is the issue of available research results on this topic which provide rather contradictory conclusions. Thus, there were some evidences showing negative impact of fiscal deficit on domestic output (Adam and Bevan 2005, Tung 2018) and some other researchers presented positive impact (Narayan 2006, Obinabo and Agu 2018) or an insignificant one (Wosowei 2013, Obinabon and Agu 2018). Essentially, the study even becomes more imperative as the agricultural sector holds the largest share in gross domestic product (GDP) of the Nigerian economy and in fact the entire SSA. It is against this backdrop that the current study is germane. The objectives of the study therefore are two folds namely, to access the long run relationship between fiscal deficit and domestic output of the agriculture sector and also establish from the list of fiscal policy variables if fiscal deficit is a key determinant of domestic output. Expectedly, the sequence of the paper is clear. Section two presents a brief theoretical and empirical underpinning of the paper. In section three, the method of study is unveiled. Whist section four presents and discusses the results, section five concludes the paper with policy remarks.

1. Review of Related Literature

Basically, the fiscal policy of the government encompasses public expenditure and government revenue where the latter entails income from all taxes. There is also revenue from crude oil export which in the case of Nigeria made up of about 80% of government revenue. Deficit may be financed either by printing money or issuing debt or both. Again, debt may be domestic or external where domestic debt involves

interest rate equal to the net private rate of return (Adam and Bevan 2005). Accordingly, the authors aver that two types of government spending exist namely consumption and capital with basically five ways of financing spending. They are taxes, grants, printing money, domestic and external debts. The last three forms of financing spending are referred to as deficit financing. The difference between government expenditure and revenue is what has come to be regarded as fiscal deficit. Obinabo and Agu (2018) argue that fiscal expenditure in Nigeria is predicated on crude oil sales which is characterized by volatile revenue. The volatility leads to decline in government revenue thereby resorting to fiscal deficits.

A number of theories of fiscal deficit exist in the literature. Earlier theory was developed by Ricardian Equivalence Theory (RET) which argues that fiscal deficit has little or no effect on private consumption and interest rates only if certain criterions were present. They include but not limited to: that the capital market is well-organized and that individuals should internalize to ensure the certainty of government's budget constraint and also to ensure that distortion of taxes does not exist (Obinabo 2018). In the view of Barro (1989), the RET is relevant for government deficits or debts financed with tax income which does not affect trade balance and the real exchange rate thereby implying absence of a relationship between deficit expenditure and current account deficit.

On the other hand, Keynesian economics postulated that the growth of domestic output is a function of the increase in government expenditure which is predicated on deficit financing. They aver that the family units feel better off in the short run if growth of output is spurred by deficit spending thereby leading to rise in private and public consumption spending (Okpanachi and Abimiku 2007 cited in Ubi and Inyang 2018). They stress that deficit spending will only affect macroeconomic activities positively if and only if there is increase in aggregate demand. However, the Keynesians foresee that in the event of trade deficit, fiscal deficits might negatively affect the external sector should the domestic economy unable to absorb the excess liquidity which result from output expansion. They further argue that if deficit rises faster than the domestic supply of output, demand for imports will rise and trade deficit is then likely to occur thereby affecting the exchange rate, a phenomenon characterized as "the twin-deficits" hypothesis (Monacelli and Perotti 2006, Okpanachi and Abimiku 2007). To the monetarists, fiscal deficits refer to transfer of resources from the private sector to the public sector with very little effect on output. They believe that increase in government spending financed by monetary expansion has the potential to stimulate the economy thereby raising aggregate demand (Okpanachi and Abimiku 2007).

From the empirical corridor, Adam and Bevan (2005) investigate the effect of fiscal deficits on growth using a panel of 45 developing countries covering the period, 1970-1999. The study made growth as a function of deficit financing disaggregated into taxes, grants, printing money, domestic and external debts. The study finds that a threshold effect of 1.5% of GDP was evidence in deficit financing in developing countries. It was observed by the study that increase in deficit financing reduces growth and vice versa. Also, the study finds evidence of correlation existing between deficits and debt stocks where further increase in debt stocks exacerbated the effect on high deficits. The empirical results also suggest that while the impacts of taxes and grants on growth were reasonably straightforward, the overall impact of deficit on growth was likely to be complex, depending on the financing mix and the outstanding debt stock. The authors argue that if deficits where been financed by limited seigniorage its positive effect on growth may be relatively pronounced. Contrariwise, effect of deficits on growth may be deleterious if financed by domestic debt (Adam and Bevan 2005).

Narayan (2006) accesses the relationship between government spending and the economy level of output growth. He finds that government spending had a positive and highly significant impact on output growth rates. The study suggests that an increase in current expenditure positively and significantly affects growth while a negative relationship has the opposite effect. Wosowei (2013) examines the effect of fiscal deficit on macroeconomic performance in Nigeria spanning a data period of 1980-2010. The study observes that fiscal deficits exerted insignificant negative impact on macroeconomic output. Also, the study reveals evidence of bidirectional causality between government

deficit and gross domestic product as well as government tax and unemployment. However, the study could not establish any relationship between government deficit, government expenditure and inflation. The Ordinary Least Square, co integration and the Engle Granger procedure were utilized for the study.

Sanya and Abiola (2015) assess the extent at which fiscal deficit affects the growth of Nigerian economy. Employing co-integration and error correction model, the study finds that fiscal deficit has significant negative impact on the growth of the economy. Edame and Okoi (2015) employ the Chow breakpoint and co-integration tests to assess the impact of fiscal deficit on economic growth in Nigeria. The study finds evidence of growth difference between the military and civilian regimes in Nigeria using the Chow test. Similarly, the study also found that economic growth responded significantly to changes in fiscal deficit during the military era contrarily to its insignificant response during the democratic regime. The study covers the period, 1985-1998 for military era and 1999-2013 for civilian regime.

The dynamic effect of changes in fiscal deficit on economic growth of Sri-Lanka was evaluated by Aslam (2016). The study made gross domestic product as a function of fiscal deficit, exports earnings, exchange rate and inflation rate. Among other things, the study finds a negative impact of fiscal deficit on economic growth of Sri-Lanka economy. The study utilizes the Johansen co-integration technique and error correction model for a data period spanning 1959-2013. Fagbohun (2017) in his examination of the relationship between budget deficit and economic performance in Nigeria found a positive significant relationship between the variables. The study which utilized the OLS on data spanning 1970 to 2013 also employed bank rate, broad money supply, external reserves and fiscal balance among the list of independent variables.

Obinabo and Agu (2018) assess the relationship between fiscal deficit and some macroeconomic variables in Nigeria. These variables include gross domestic product (GDP), money supply and inflation. Employing the Johansen co-integration, OLS and granger causality tests on data covering the periods, 1986-2018, the study finds that money supply and inflation had negative and insignificant response to changes in fiscal deficit contrary to its insignificant positive response to changes in GDP. Ubi and Inyang (2018) aver that between 1980 and 2016, Nigeria ran a fiscal deficit for 35 of the 37 years. A deficit which was tailored in favour of recurrent expenditure at the expense of capital expenditure. Their study examines the relationship between fiscal deficit and some macroeconomic variables namely, per capita income, economic growth, unemployment, inflation and balance of payments. The study which was largely descriptive found that fiscal deficit in Nigeria has positively contributed to the growth of per capita income, economic growth and balance of payments stabilization. The study however observed that the growth of unemployment and inflation rates was not affected by the ever-rising fiscal deficit in Nigeria. In Vietnam, Tung (2018) scrutinizes the effect of fiscal deficit on economic growth for a data period of 2003 – 2016. The study finds the deleterious impact of fiscal deficit on economic growth, private investment, foreign direct investment as well as net export not only in the short run but also in the long run as well. The study uses co-integration and error correction model.

From the review of the empirical literature, it can be observed that virtually all the studies concentrated on the relationship between fiscal deficit and economic growth to the exclusion of the agricultural sector. Similarly, most of the studies have only included fiscal deficit in their models as variable of interest to the exclusion of other fiscal policy variables. The present study intends to fill this lacuna by disaggregating fiscal operations in our model as well as narrowing output growth to agricultural sector.

2. The Model

The study specifies a linear model of agricultural output as a function of disaggregated fiscal policy variables with fiscal deficit as variable of interest for the period, 1986-2018 as follows:

$$AGO = f(GFD, GRV, GEX, GDS) \quad \ldots\ldots(1)$$

In long stochastic form, equation (1) becomes:

$$AGO_t = \alpha_0 + \alpha_1 GFD_t + \alpha_2 GRV_t + \alpha_3 GEX_t + \alpha_4 GDS_t + \varepsilon_t \quad \ldots\ldots(2)$$

where: AGO = agriculture output, GFD = government fiscal deficit, GRV = government revenue, GEX = Government expenditure and GDS = government total debt stock.

A positive relationship is expected between agriculture output and the explanatory variables. The error correction model (ECM) is estimated as follows:

$$\Delta InAGO_t = \sigma_0 + \sum_{i=1}^{K} \sigma 1i \Delta InAGO_{t-1} + \sum_{i-1}^{K} \sigma 2i \Delta InGFD_{t-1} + \sum_{i=1}^{K} \sigma 3i \Delta InGRV_{t-1} + \sum_{i=1}^{k} \sigma 4i \Delta InGEX_{t-1} + \sum_{t-1}^{k} \sigma 5i \Delta GDS_{t-1} + \lambda ECT_t \qquad (.3)$$

The ECT_{t-1} in Equation 3 is the error correction term and λ signifies the speed of convergence to the equilibrium process. It used to ascertain the stability of the parameters using the cumulative sum of recursive residuals (CUSUM) and or cumulative sum of square of recursive residuals (CUSUMSQ) or both developed by Brown, Durbin and Evans (1975).

3. Unit Root Test

The Augmented Dickey Fuller (ADF) test is conducted to ensure that none of the series is integration of order 2 to avoid breaks down of the model and also to avoid spurious regression. The ADF test is estimated as follows:

$$\Delta Y_t = C_i + \omega Y_{t-1} + C_{2t} + \sum_{t=1}^{p} di \Delta Y_{t-1} + \varepsilon t \qquad (4)$$

where: yt = relevant time series; Δ = first difference operator; t = a linear trend and εt = error term.

The null hypothesis of the existence of a unit root is Ho: ω=0. Failure to reject the null hypothesis leads to conducting the test on further differences of the series. Further differencing is conducted until stationarity is reached and the null hypothesis is rejected.

4. Co-integration Test

Two types of cointegration tests are used, namely Engle-Granger (1987) procedure which states that if all variables are stationary, it is not necessary to proceed since standard time series method apply to stationary variables and if the variables are integrated of different orders, it is possible to conclude they are not cointegrated for the set of 1(1) and 1(0) variables. But when specifying a model say W_t as an unrestricted vector autoregressive (VAR) involving up to k-lags, the EG test becomes deficient.

The other test is the Johasen (1988) and Johasen and Juselius (1990) where they specified the lag length in such a way as to render the error terms serially uncorrelated since the results of the cointegration test tend to be sensitive to the order of VAR test. Johasen and Juselius (1990) then propose the use of two likelihood ratio tests namely, the trace and the maximum eigenvalue tests. On the one hand, the trace statistic for the null hypothesis of co-integrating relations is computed as follows:

$$\Gamma_{trace}(r) = -\tau \sum_{i=1}^{m} \log[1 - \lambda_t] \qquad (5a)$$

On the other hand, maximum Eigen value static tests the null hypothesis of r co-integrating relation against r + 1 co-integrating relations and is computed as follows:

$$\Gamma_{\max}(r, r+1) = \iota \log(1 - \lambda r + 1) \qquad (5b)$$

5. Data and Discussion

Nigeria like most developing countries is an agrarian economy and the fiscal operations of the government should go a long way in positively affecting the sector. This is not the case as the agricultural sector has performed below expectation. This is so as most food items ranging from tooth pick to rice are imported thereby creating employment in those economy. Although, among the non-oil contribution to GDP, the output of the agriculture sector is relatively more pronounced. The Nigerian government has been running huge fiscal deficit but has very little impact in funding the agriculture sector.

Table 1. Growth of Agricultural Output and Fiscal Policy Variables (%)

Year	Agric Output	Fiscal Deficit	Govt Revenue	Govt Expt	Total Debt Stock
1986-1990	5.0	-165.5	54.2	36.3	54.9
1991-1995	2.8	-1741.8	45.1	38.9	26.3
1996-2000	4.0	12.0	42.0	29.0	40.5
2001-2005	16.0	125.8	27.4	21.9	3.1
2006-2010	6.5	-10-0	10.6	18.6	10.2
2011-2015	4.1	-294.4	2.3	4.7	16.0
2016-2018	3.2	72.8	14.0	16.2	23.6

Source: CBN Statistical Bulletin (2018)

For instance, Table 1 indicates that the growth of the agricultural sector has consistently hovers below double digit except during the 2001-2005 period when it recorded an average growth of 16.0%.

Figure 1. Trend of Agricultural Output and Fiscal Policy Variables

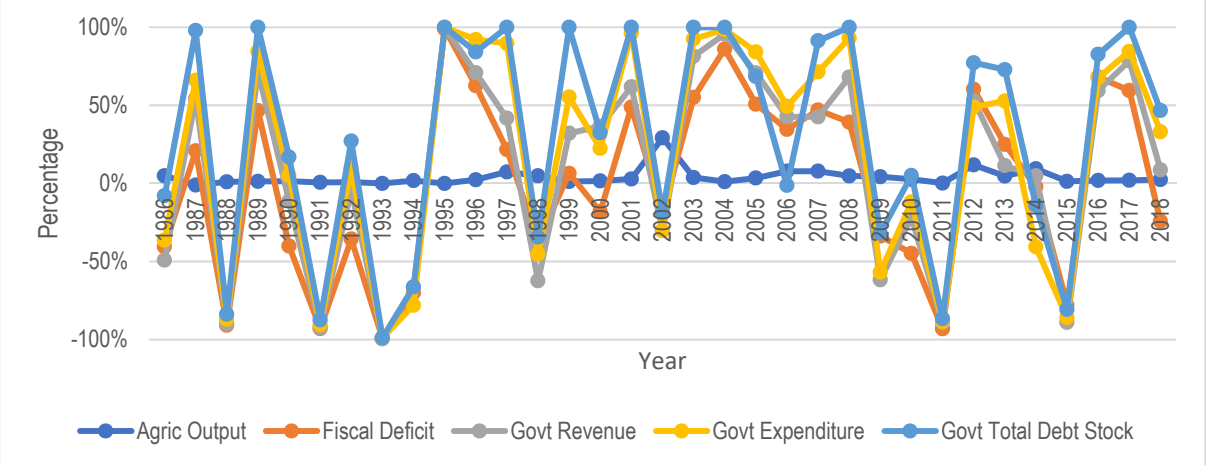


Table 1 also reveals that for most of the period under review the government budget was mainly funded by deficit financing with very little surpluses. The period of surplus fiscal operations, 1996-2005, was occasioned by favourable crude oil price at the global market before the country slide into recession by 2007. Even at that the surpluses may be partly influenced by the five years moving average analysis. Also, the growth rate of government revenue, expenditure and total debt stock can be seen in Table 1. Similarly, the trend of the variables in Figure 1 indicates that agricultural output was relatively stable while the fiscal operations were highly volatile.

Table 2. Unit Root Test Results

	Augmented Dickey Fuller Test					Phillips-Peron Test		
Variable	Level	First Dif	2nd Diff	Order	Level	First Diff	2nd Diff	Order
LAGO	-2.00	-3.63	-	I(1)	-1.90	-5.40	-	I(1)
GFD	-0.44	-2.25	-5.58	I(2)	-1.61	-2.67	-7.12	I(0)
LGRV	-0.73	-5.72	-	I(1)	-0.20	-8.90	-	I(1)
LGEX	-0.47	-6.70	-	I(I)	-0.60	-12.58	-	I(1)
LGDS	-2.84	-3.34	-5.06	I(2)	-2.63	-3.92	-	I(1)
C.V = 5%	-3.56	-3.57	-3.57		-3.56	-3.56	-3.57	

Source: Author's computation using Eview 8.0

Table 2 shows that the variables were integrated at orders 1 and 2. Essentially, integration of order 2 variables violate the necessary condition for the application of Johasen co-integration test. Similarly, the ARDL model intended for the study is also violated. Consequently, the Engle-Granger test is utilized to determine con-integration between agriculture output and fiscal operations namely government fiscal deficit, government revenue, government expenditure and government total debt stock.

Table 3. Engle-Granger cointegration test

Variable	ADF	5% Critical Value	Order
ECM	-5.65	-3.57	I(1)

Source: Author's computation using Eview 8.0

In conducting the test in Table 3, agriculture output is made as a function of the averages of all four fiscal variables taken as one variable since the EG test can only permit the estimation of bivariate model. The test reveals that the ECM coefficient exceeds the critical value thereby indicating the presence of a long run relationship between agriculture output and fiscal policy variables. As such, the dynamic long run model is presented in Table 4. Thus, the result shows that 94% of agriculture domestic output is explained by the independent variables. Also, the DW of 1.86 falls within the range of 1.59-2.41 of no autocorrelations while the F-statistic suggests that the model is statistically significant.

The result further reveals that government fiscal deficit, expenditure and total debt stock were significant at 1% level while government revenue was weakly significant at about 10% level. However, agricultural output had negative significant responses to changes in fiscal deficit and debt stock contrarily to its positive responses to changes in government revenue and expenditure. For instance, a 1% increase in fiscal deficit led to about 0.1% decrease in agriculture output and vice versa. On the other hand, a unit increase in government revenue and expenditure increases agriculture output by 0.21% and 0.45% respectively.

Table 4. Long run dynamic estimate
Dependent variable: LAGO
Method: Least Square

Variable	Coefficient	Std Error	t-statistics	Probability
Constant	7.44	0.22	33.69	0.00
LGFD	-0.10	0.02	-4.21	0.00
LGRV	0.21	0.11	1.93	0.07
LGEX	0.45	0.13	3.40	0.00
LGDS	0.35	0.07	-4.71	0.00
Diagnostic Test				
R^2	0.94			
DW	1.86			
F-stat	79.13			

Source: Author's computation using Eview 8.0

The over-parameterized error correction model not shown in the paper for lack of space is estimated. The lag length suggested by Akaike information criterion (AIC) and Schwarz Baysian information criterion (SBC) is 1. Accordingly, Table 5 depicts the parsimonious error correction model. Using the general to specific, parsimony was achieved by eliminating insignificant variables. The diagnostic tests conducted revealed that the model is serially uncorrelated. The null of no heteroscedasticity hypothesis (ARCH effect) was accepted. Likewise, the DW statistic of 1.81 reveals that there is no autocorrelation while the F-stat of 6.63 supports the joint significant level of the model. Further, the test of parameter stability indicates that the model is stable as the CUSUM plot does not cross the two critical lines. Thus, the model passes all the diagnostic tests considered and is satisfactory.

A cursory look at the short run results in Table 3 indicate that only government revenue had positive significant impact on agriculture output as against the significant negative impact of government fiscal deficit, expenditure and total debt stock.

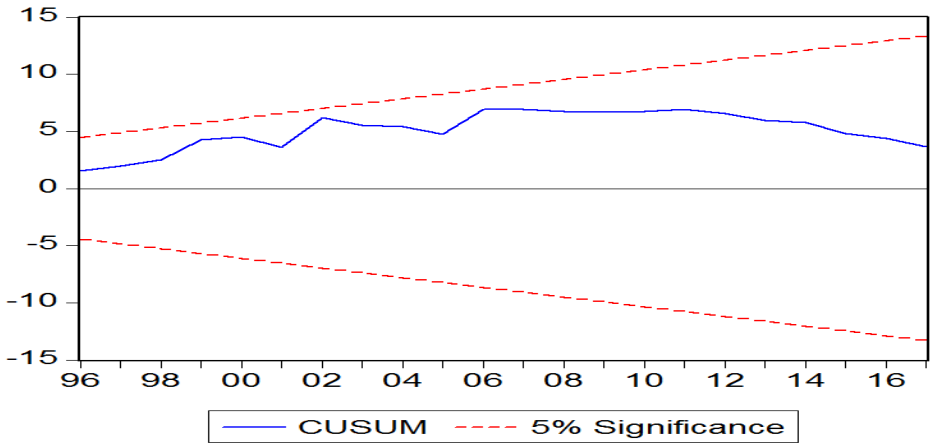
Table 5. Parsimonious Error Correction Model of Domestic Output and Fiscal Variables
Dependent Variable: DLAGO
Method: Least Square

Variable	Coefficient	Std error	t-statistic	Probability
Constant	0.10	0.04	2.84	0.01
ΔLGFD	-0.03	0.01	-2.57	0.02
ΔLGRV(-1)	0.16	0.08	2.06	0.04
ΔLGEX(-1)	-0.03	0.02	-2.19	0.04
ΔLGDS	-0.09	0.02	-3.72	0.01
ECM(-1)	-0.31	0.07	-4.13	0.00
Diagnostic Test				
R^2	0.69			
DW	1.81			
F-stat	6.63			
Serial Correlation	0.44(0.65)			
ARCH LM	0.26(0.62)			

Source: Author's computation using Eview 8.0

This implies that in the period of review, agriculture output responded negatively to changes in fiscal deficit by 0.03%, government expenditure (0.03%) and government total debt stock (0.09%) contrarily to its 0.16% response to changes in government revenue.

Figure 2. Test of Stability (CUSUM)



Adam and Bevan (2005) in their study of 45 developing countries, Sanya and Abiola (2015) in Nigeria, Aslam (2016) in Sri-Lanka and Tung (2018) in Vietnam have earlier reached similar findings on the relationship between fiscal deficit and domestic output. Also, the finding reveals that the coefficient of the ECM which is the speed of adjustment between the short and the long runs is very robust and statistically significant. It implies that in the event of disequilibrium in the system, equilibrium is restored with a speed of about 31% a year.

Conclusion

The study scrutinizes the relationship between agricultural output (a proxy for domestic output) and fiscal deficit in Nigeria. In other to have a robust model, other parameters of fiscal operations were included as explanatory variables namely, government revenue, government expenditure and government total debt stock. The study which covers the periods, 1986-2018, uses descriptive and analytical approaches. In the long run, the study finds that government revenue and expenditure exert significant positive impact on agriculture output contrarily to the negative impact exhibited by government fiscal deficit and total debt stock. On the other hand, whilst the impact

of government revenue on agriculture output is positive, government expenditure, fiscal deficit and total debt stock induce significant negative impact on agriculture output in the short run.

The findings suggest that fiscal deficits contribute significantly to the overall performance of the economy and the management of which will go a long way in ensuring economic stability. Over the last three decades or so, the Nigerian government has been running a consistent budget deficit usually financed by both domestic and external borrowings. A number of factors have contributed to the rising deficit in Nigeria among which is over inflation of the country's expenditure and government contracts. All of which are largely unproductive. Although, the growth in government expenditure could be attributed to growth from revenues accruing from the rent seeking activities prevalent in the oil sector, both in the up and down stream sectors, high level of official corruption in Nigeria is major reason for frivolous spending by government officials. Annually, the government budgets for debt servicing are huge thereby reducing funds available for domestic productivity including the agriculture sector. The use of external borrowing in financing deficit in turn creates a deficit in the current account resulting in exchange rate appreciation and disequilibrium in the balance of payments, while domestic borrowing stimulates high interest rates and a decrease in private investment borrowing and seigniorage. The result is a crowding out of private investment. Therefore, it is recommended that government may consider reduction in deficit spending so as to minimize the country's current level of borrowings. Also, government may consider broadening its revenue bases by intensifying its taxation policy. Finally, all looped holes in the country's expenditure operations such as rent seeking, inflation of contracts, should closed.

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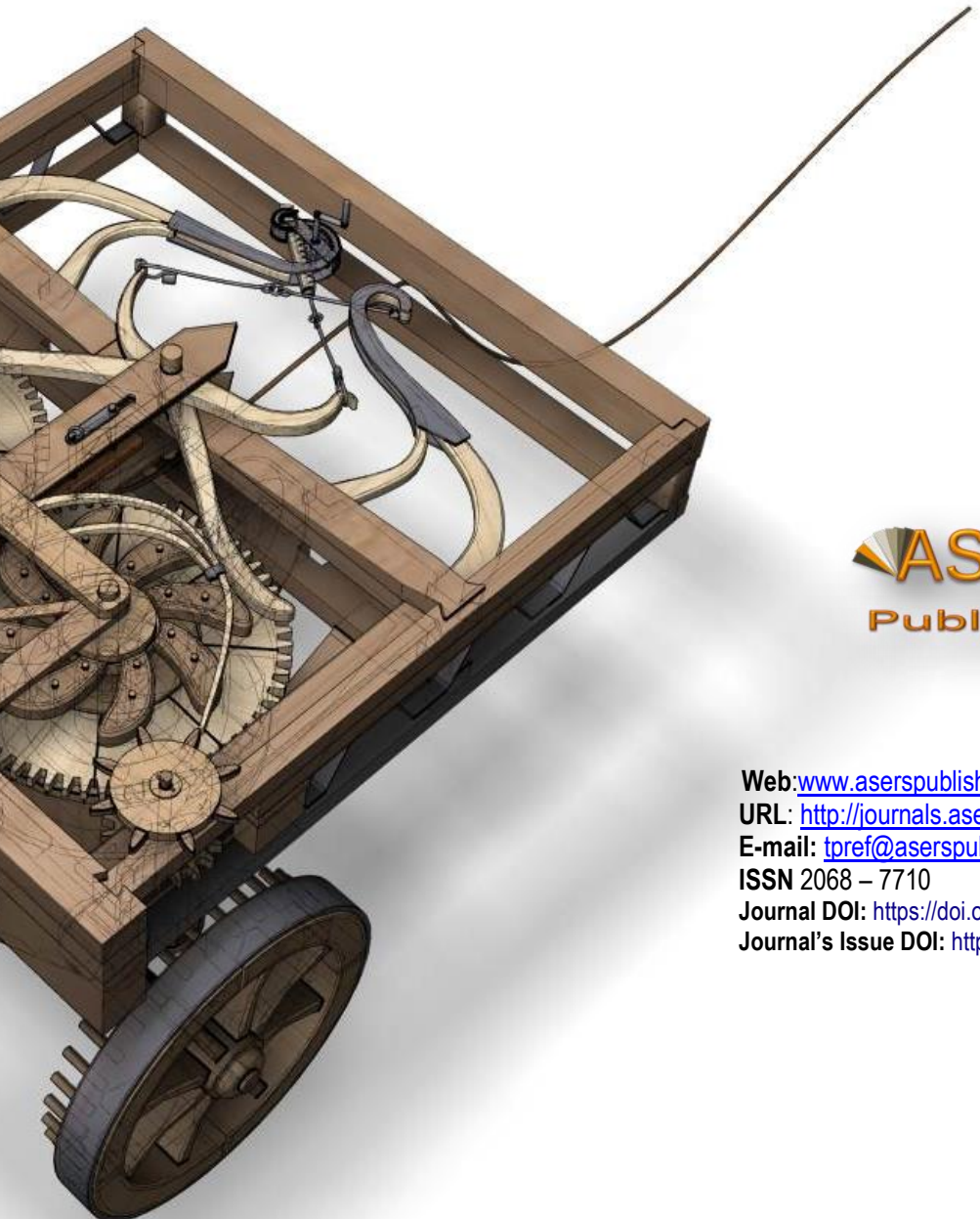

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