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FISCAL POLICY AND AGRICULTURAL SECTOR OUTPUT GROWTH IN NIGERIA

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Abstract

The quest for every government to maintain a stable and steady economic growth continues to mount great pressure on policy makers to design and implement adequate and effective policies to spur the activities of the real sector. This paper examined the impact of fiscal policy tools on agricultural sector output growth in Nigeria with annual data from 1980 to 2023. Autoregressive distributed lag (ARDL) technique was employed for the analysis and the empirical results confirmed that government expenditure on agricultural sector and domestic capital formation had positive and significant effect on agricultural output. Value added tax had negative and insignificant effect on agricultural sector output. Other findings showed that exchange rate had a negative but significant impact on agricultural output in the short run while in the long run exchange rate had a positive and significant impact on agricultural output. Inflation rate had a negative and insignificant effect on agricultural output both in the short run and long run periods. Based on the findings, the paper recommends policies such as increase in government budget on agriculture as necessary and sacrosanct to expand the activities of the real sectors especially that of agricultural sector in order to meet the target of sustainable development goal two (ZERO HUNGER) and also to curb food insecurity through direct domestic production.

Keywords: Fiscal policy, government expenditure, zero hunger, ARDL technique

JEL Classification Codes: E62, H30, N5

1. Introduction

The contribution of the agricultural sector to the global economy differs widely among continents and is shaped by various factors, including the availability of resources, advancements in technology, and the implementation of economic policy tools. Agricultural production is essential for sustaining livelihoods worldwide, playing a significant role in GDP growth and job creation on a global scale (Adekunle & Amos, 2023). As a key export sector, agriculture supplies major commodities such as coffee, cocoa, tea, and horticultural products. Despite the distinct contributions and challenges faced by each continent, the agricultural sector remains vital to economic development, food security, and environmental sustainability worldwide. For instance, in 2022, the agricultural output value of European countries was reported at £537.5 billion in basic prices. During the same year, Africa's agricultural output amounted to £273 billion, while Asia recorded a significantly higher value of £1.547 trillion. North America reported an agricultural output of £178.36 billion, and South America registered £331.88 billion (Food and Agricultural Organization, 2023).

In Nigeria, the agricultural sector remains a top priority, with policymakers and scholars emphasizing its critical role in fostering economic growth and development. Despite the country's oil wealth, agriculture is regarded as the backbone of the Nigerian economy, serving as the primary source of livelihood for the majority of the population (Food and Agriculture Organization, 2020). Over the past five years, the sector's contribution to Nigeria's GDP has steadily declined, accounting for approximately 26.1% in 2019, 25.79% in 2020, 24.17% in 2021, 23.69% in 2022, and 19.63% in 2023 (FAO, 2024). This trend reflects a consistent decrease in agriculture's share of the GDP. Beyond its contribution to GDP in Nigeria, agriculture generates government revenue through taxation and provides individuals with income from the sale of agricultural products. It serves as a significant source of employment, fosters sectoral linkages, promotes exports, supports economic diversification, helps reduce excessive imports, and contributes to balancing trade and payments (Shuaib et al., 2015). Agricultural development is essential for achieving sustainable, inclusive food security in both developing and developed countries. A robust agricultural sector has the potential to eradicate extreme poverty and drive income growth more effectively than many other economic sectors (Olatunji, Opurum, & Ifeanyi-Obi, 2012). Agriculture encompasses the science and practice of farming, including soil cultivation for crop production and the rearing of livestock to provide food and other essential resources for human well-being.

Every government strives to achieve stable and sustained growth through a combination of plans, programs, and policies designed to stimulate economic development (Afam, 2019). While economic growth is the ultimate objective, sectoral growth serves as a crucial pathway to achieving this goal. Key policies that govern the real sector's activities include fiscal, monetary, and trade (commercial) policies. The success or decline of any economy is largely influenced by the effectiveness of these policies. Governments can implement individual policies or a combination to meet their objectives. Favorable policies have the potential to boost agricultural sector performance, thereby contributing significantly to overall economic growth. Our focus lies on fiscal sustainability on agricultural sector growth.

Fiscal policy involves the use of taxation and government spending to address macroeconomic challenges such as economic growth, price stability, job creation, and balancing aggregate demand and supply (Adam, Michael, & Amanda, 2022). It can either stimulate economic activity through expansionary measures or curb excess growth with contractionary measures (Metu, et al. 2019) Expansionary fiscal policy, such as increased government spending or reduced taxes, is often implemented during economic downturns to boost key sectors like agriculture, manufacturing, and construction, thereby encouraging investment and economic development (Abu & Abdullahi, 2015). Conversely, contractionary measures, such as reduced spending or higher taxes, are used during periods of rapid growth to stabilize the economy. Keynesian economics emphasizes the role of fiscal policy in stabilizing business cycle fluctuations by adjusting public spending and taxes to compensate for private sector shortfalls. The goal is to maintain steady economic growth and minimize deviations from desired growth paths (Ifeanyichukwu & John, 2018). For example, Oladipo, Oyefabi, and Yusuf (2022) highlights fiscal policy's effectiveness in enhancing agricultural sector performance, with government spending positively impacting agricultural output, though value-added tax has a negligible or negative effect. Fiscal policy tools have dual impacts on agricultural development: direct (expansionary) measures stimulate growth, while indirect (contractionary) measures can restrain it.

The agricultural sector in Nigeria encounters a range of obstacles that impede its progress and expansion. Key issues include insufficient irrigation infrastructure, adverse effects of climate change, soil degradation, and low adoption of modern technologies, high production expenses, and limited access to funding, inefficient input distribution, restricted market opportunities, and substantial post-harvest losses. A significant concern is the inconsistent formulation, discontinuity, and poor execution of government policies (FAO, 2020). These challenges have constrained the sector's growth, reducing its potential contribution to the nation’s gross domestic product (GDP). These challenges have also contributed to a rise in food imports, partly fueled by population growth. From 2016 to 2019, Nigeria's agricultural sector faced a significant imbalance between imports and exports. During this time, total agricultural imports reached N3.35 trillion, a figure four times greater than the export value of N803 billion (FAO, 2020).

It is from the foregoing, that this paper seeks to examine and ascertain the impact of fiscal policy on agricultural sector output growth in Nigeria.

2. Literature Review

2.1 Theoretical Review

Schultz's "poor but efficient" theory, introduced in 1964, posits that smallholder farmers in developing countries, despite their poverty, are economically rational and utilize available resources efficiently to maximize output. Farmers make decisions that optimize their limited resources. Existing resources (land, labour, and capital) are allocated efficiently given the technological constraints. The inefficiency in agriculture is not due to farmers but due to the lack of access to improved technologies. High marginal returns can be achieved through investments in education, health, and agricultural innovations, which enhance productivity. Farmers are aware of market opportunities and respond to price incentives appropriately.

Critics argue that not all farmers are rational or have access to the same information or resources. Factors such as poor infrastructure, land tenure issues, and political constraints that limit agricultural productivity are underemphasized. The theory assumes well-functioning markets, which may not exist in many developing countries. It overlooks the influence of cultural norms, risk aversion, and non-economic factors on farmers' behaviour. Inequalities in access to land, capital, and education are not addressed, which limits the applicability of the theory.

The theory underscores the importance of investing in agricultural research, education, and technology to improve productivity. Schultz's ideas supported the introduction of high-yield crop varieties and fertilizers during the Green Revolution. It highlights the need for improving farmers' access to credit, information, and markets. The theory remains a cornerstone in discussions on agricultural efficiency and poverty alleviation. Schultz's emphasis on education and innovation aligns with SDG targets for ending poverty and ensuring food security. Schultz's theory remains influential but is complemented by newer models that account for structural, social, and institutional barriers in agricultural development.

In summary Schultz theory detailed that agricultural transformation are possible through research and development of new market (trade) approach, government expenditure (stimulating role), accumulation of capital for further investment on modern agricultural inputs and innovation.

2.2 Empirical Evidence

The effect of fiscal policy tools on agricultural sector growth and output has been explored in several studies, yielding varied results. For instance, Okoh (2024) examined the impact of fiscal policy on agricultural sector growth in Nigeria from 1981 to 2022, using the Error Correction Model (ECM) for statistical analysis. The study revealed that excise and customs duties have a negative but statistically significant relationship with agricultural output growth, while value-added tax (VAT) positively and significantly affects agricultural sector output. However, government expenditure was not found to have a positive impact on agricultural output growth. The author recommended that the government maintain customs and excise duties, as they support agricultural sector growth, and reconsider its expenditure on agriculture to enhance its contribution to output growth. Pide et al. (2023) investigated the effect of fiscal policy on agricultural sector development in South Sulawesi, utilizing time series data from 2001 to 2021 and applying a structural vector autoregression model. The study found that government capital expenditure positively influenced the agricultural sector's contribution to regional GDP. Moreover, private investment was shown to boost agricultural output while reducing the unemployment rate.

Oladipo et al. (2022) examined the link between fiscal policy instruments and agricultural performance in Nigeria. Their study suggested that fiscal policy tools can significantly enhance agricultural sector performance. Using the Autoregressive Distributed Lag (ARDL) model, the authors found that both total government capital and recurrent spending on agriculture positively impacted agricultural performance in the short and long term. However, they noted that value-added tax had an insignificant and negative effect on agricultural growth. Based on these findings, the authors recommended the adoption of expansionary fiscal policies to foster the growth and development of agriculture, thereby contributing to broader economic growth. Abdulhussain et al. (2022) investigated the impact of fiscal policy on domestic agricultural production in Iraq from 1990 to 2020, employing the Ordinary Least Squares. Their results indicated that an increase in public revenue has a positive effect on domestic agricultural production. However, while public spending showed a positive but statistically insignificant impact on agricultural output, tax revenue was found to have a negative relationship with agricultural production in Iraq.

Odii and George (2020) utilized a Vector Error Correction (VEC) model to examine the impact of fiscal policy on agricultural exports in Nigeria. Their findings revealed that government expenditure does not significantly influence agricultural export output, as its average value falls below the 25% threshold suggested by the FAO. They also found that taxes on agricultural exports exert a crowding effect on current export values. FDI was not shown to significantly affect agricultural exports, but the exchange rate was found to have an impact. Based on these results, the study recommends that the government allocate at least 25% of its budget to the agricultural sector, in accordance with FAO guidelines. Several studies have examined the link between fiscal policy and agricultural sector output, with some finding little to no significant impact. For instance, Okoh et al. (2019) analysed the effect of fiscal policy on agricultural productivity in Nigeria using 32 years of time-series data from 1985 to 2016. They applied OLS regression to assess the influence of government expenditure and personal income tax on the agricultural sector. Their findings showed a positive but statistically insignificant impact of government expenditure on agricultural productivity. Additionally, personal income tax was found to have a small negative effect on agricultural output. The researchers recommended increasing the share of the government budget allocated to agriculture to boost production and suggested providing farmers with adequate training and support to adopt modern farming techniques.

Lawal et al. (2018) conducted a study that supports the findings of Okoh et al. (2019), indicating that government expenditure on the agricultural sector has a positive but statistically insignificant effect on agricultural output. They also found that the tax rate negatively affects output, although this impact was significant. In contrast, domestic capital formation was shown to have a positive and significant effect on the agricultural sector. Using the auto-regressive distributed lag (ARDL) method, their study analysed the relationship between fiscal policy and agricultural output in Nigeria, utilizing data from 1985 to 2015. The unit root test confirmed a mixed order of integration between zero and one, while the bound test revealed a long-term relationship among the variables. Based on their findings, Lawal et al. (2018) highlighted the need for fiscal policy reform to support the agricultural sector, especially in addressing food insecurity and reducing excessive food imports. Zirra and Ezie (2017) examined the effect of government fiscal policy on agricultural sector performance in Nigeria using data from 1980 to 2015. Applying the fully modified ordinary least squares (FMOLS) method, their findings were consistent with those of Lawal et al. (2018), indicating that government spending on agriculture has a positive but insignificant impact on agricultural output. Additionally, they found that the Value Added Tax (VAT) had a positive and significant effect on the growth of agricultural output values. The study concluded that agricultural reform is essential at this stage and recommended that the government progressively increase its budget allocation to the agricultural sector to boost its performance.

In line with the findings of Oladipo et al. (2022), Aina and Omojola (2017) examined the effect of government spending on agricultural performance in Nigeria using annual time series data from 1980 to 2013. Utilizing ordinary least squares and error correction models, the researchers explored the relationship between government spending and agricultural output growth. The short-run results revealed that government expenditure on agriculture has a statistically significant positive effect on sectoral growth. Additionally, the long-run analysis showed that government spending is highly significant in driving agricultural growth in Nigeria. The study highlighted the crucial role of fiscal policy, particularly expansionary measures, in fostering the growth and development of the agricultural sector. Shevchuk and Kopych (2017) conducted a study on the impact of fiscal policy on the outputs of the agricultural and industrial sectors in Ukraine, using annual data from 2001 to 2006. They applied the structural vector autoregression (SVAR) model in their analysis. The results indicated that government spending positively and significantly influenced both agricultural and industrial sector outputs. However, government revenue was found to have a negative but significant effect on the agricultural sector. Based on these findings, the researchers emphasized the importance of implementing fiscal policy reforms to enhance the agricultural sector.

Abula and Ben (2016) examined the effect of public agricultural expenditure on the output of Nigeria's agricultural sector, using data from 1980 to 2013 and applying the error correction mechanism (ECM) to assess the long-term relationship. Their results indicated that government spending on the agricultural sector has a significant but negative impact on agricultural output. This suggests that the total budget allocation for agriculture may not reflect the actual expenditure. The study attributed this discrepancy to inefficiencies or mismanagement in the allocation of funds. Based on these findings, the researchers recommended the establishment of monitoring agencies by the federal government to ensure proper and effective use of agricultural funds, thereby boosting the sector's output growth in Nigeria. Ewubare and Eyitope (2015) investigated the impact of public spending on the growth of Nigeria's agricultural sector, using time series data from 1981 to 2013. The researchers employed OLS, Johansen co-integration test, and the error correction model for parameter estimation. Their findings revealed that government spending accounts for 94% of the agricultural sector's performance, as indicated by the R-squared value. The error correction model showed a negative coefficient, suggesting a long-term relationship. The OLS regression analysis also indicated that government expenditure significantly drives agricultural sector output in Nigeria. However, factors such as interest rates, domestic capital formation, and foreign direct investment were found to have a minor but negative effect on agricultural output. The study recommended consistent increases in government spending to meet the agricultural sector's needs.

3 Data and Method

3.1 Model Specification

From the objective, the model is stated in multiple regression form with agricultural sector output (AGRIP) as the sole dependent variable in the equation while government expenditure (capital and recurrent) (GEXA), value added tax (VAT), domestic capital formation (DCF) inflation rate (INFR) and exchange rate (EXCH) serve as the explanatory variables in the model. This model is a modification of the model of Oladipo et al, (2022). Oladipo et al stated the equation of agricultural development model based on government capital expenditure to agricultural, government recurrent expenditure to agriculture and deposit money bank loan. Simply put AGRIC = F(GCEA, GREA, DMBL,). With the Oladipo et al, (2022) model, we positioned that fiscal policy measures to enhance agricultural sector growth are possible with inclusion of value added tax, inflation rate, exchange rate and domestic capital formation. The inclusion of value added tax, inflation rate and domestic capital formation prompted the need for this study and it is in line with the Schultz's agricultural development model. Thus, our model is stated as follows

3.2 Agricultural Sector Growth model of Fiscal Policy

$$AGRIP = F(GEA, DCF, VAT, INFR, EXCH) \quad (3.1)$$

Equation 3.1 is expressed in mathematical form and thus transformed in econometric form as follows;

$$AGRIC = b_0 + b_1GEA + b_2DCF + b_3VAT + b_4INFR + b_5EXCH + \mu \quad (3.2)$$

Transforming equation 3.2 to a natural logarithm equation, gives us:

$$logAGRIC = b_0 + b_1logGEA + b_2logDCF + b_3VAT + b_4INFR + b_5EXCH + \mu \quad (3.3)$$

3.3 Methods of Analysis

The Autoregressive Distributed Lag (ARDL) model is a statistical technique used for analysing the long-run and short-run relationships between variables in a single equation framework. It is particularly useful in econometrics for time series data. ARDL can be applied whether the variables are purely stationary (I(0)), non-stationary but first-difference stationary (I(1)), or a mix of both. However, it does not work for variables integrated at a higher order (e.g., I(2)). The model estimates both long-run and short-run dynamics simultaneously through lagged dependent and independent variables. After estimation, ARDL can be transformed into an ECM to measure the speed of adjustment back to equilibrium after a short-term shock.

No need for pre-testing to determine the integration order of variables (as long as none are I(2) or higher). It captures both short-run and long-run relationships in a single framework. Include the dependent and explanatory variables along with their lags. Determine the optimal lag length using criteria like AIC or BIC. Conduct the bounds test for cointegration to determine if a long-run relationship exists between the variables. Estimate the ARDL model for both short-run and long-run coefficients. Perform robustness checks (e.g., serial correlation, heteroscedasticity, and stability tests).

4 Data Presentation and Results Analysis

Table 4.1: Descriptive Statistics Output.

	AGRIP	GEX	VAT	DCF	EXC	INF
Mean	3.0710	186212	3.83809	3.8910	114.898	18.6958
Median	2.5810	101799	4.30000	3.0110	111.230	12.8800
Maximum	9.4610	519856	5.60000	8.9810	399.500	72.8400
Minimum	1.2108	9636.50	1.20000	3.4209	0.55000	5.39000
Std. Dev.	2.4810	196461.	1.43032	2.3210	122.136	16.4407
Skewness	1.08940	0.52489	-0.4131	0.42684	1.03300	1.92894
Kurtosis	3.61162	1.55166	1.62780	1.91147	3.05939	5.60539
Jarque-Bera	9.17569	5.73283	4.49000	3.42868	7.65379	38.8279
Probability	0.11017	0.07690	0.10592	0.18008	0.22177	0.23452
Sum	1.3221	800715	161.200	1.6712	4940.65	803.920
Sum Sq. Dev.	2.5822	1.6214	83.8790	2.2522	626532.	11352.5
Observations	43	43	42	43	43	43

Source: Author's computation using E-views 12 Software

The descriptive statistics pictured in table 4.1, indicated that the average value of agricultural output (AGRIP) was #3.07billion. The average of value added tax (VAT), government expenditure on agricultural sector (GEA), and domestic capital formation (DCF) are represented as #3.83 percent; #18.62billion and #3.83billion respectively while exchange rate (EXR) and inflation rate (INFR) were 114.8 Naira per US Dollar and 18.69 percent respectively. These average values of the variables imply that the observations from the means are close to the median. The closeness of the mean and median implies that the variables are fit for economic predictions and forecast. This revealed that there is less outlier in the series to distort economic predictions.

Standard deviation measures the dispersion or spread of data points around the mean in a dataset. A high standard deviation indicates that the data points are widely spread, meaning there is significant variability in the values. In contrast, a low standard deviation suggests that the data points are close to the mean, indicating less variability. From table 4.1, all the variables (AGRIP, GEX, VAT, DCF, EXC and INF) have a low standard deviation implying that the dataset are close to the mean.

The skewness in the descriptive statistics indicates how each variable is distributed relative to its mean. Positive skewness means the variable is right-skewed, implying asymmetry around the mean and a deviation from normal distribution, making economic decisions based on it less accurate. Negative skewness, on the other hand, suggests left-skewness, where the mean is lower than the median, aligning with normal distribution and leading to more reliable economic decisions. According to table 4.1, agricultural output, government expenditure on agriculture, domestic capital formation, exchange rate and inflation rate exhibit positive skewness, while the value-added tax rate is negatively skewed, indicating normal distribution

The kurtosis analysis describes the shape of the variable distributions, categorizing them as platykurtic (flat, with values less than three) or leptokurtic (peaked, with values greater than three). A platykurtic distribution indicates lower relative probability, while a leptokurtic distribution suggests higher relative probability compared to a normal distribution. According to table 4.1, government expenditure on agriculture, value-added tax, and domestic capital formation exhibits leptokurtic (peaked) distributions, while agricultural sector output, inflation rate, and exchange rate have platykurtic (flat) distributions.

The Jarque-Bera test assesses the normality of a distribution in ordinary least squares regression analysis. The null hypothesis (H_0) states that a series is normally distributed if the p-value exceeds 0.05, while the alternative hypothesis (H_1) indicates non-normality if the p-value is below 0.05. If the p-value is greater than 0.05, H_0 is accepted, confirming normality; otherwise, H_1 is accepted. According to table 4.1, all variables have p-values above 0.05, indicating that they are normally distributed at a 5% significance level.

4.1.2 Correlation Matrix

Table 4.2 Correlation Matrix

	AGRIP	GEX	VAT	DCF	EXC	INF
AGRIP	1.00000	0.76186	0.65208	0.39880	0.84739	-0.19357
GEX	0.76186	1.00000	0.84707	0.71627	0.90573	-0.34725
VAT	0.65208	0.84707	1.00000	0.65563	0.81210	-0.38521
DCF	0.39880	0.71627	0.65563	1.00000	0.58565	-0.33810
EXC	0.84739	0.90573	0.81210	0.58565	1.00000	-0.30163
INF	-0.19357	-0.34725	-0.38521	-0.33810	-0.30163	1.00000

Source: Author's computation using E-views 12 Software

The matrix table shows the correlation of the series in our analysis. The co-efficient correlation measures the direction and strength of linear relationship between series. The range of correlation matrix is from -1 to 1. -1 implies a negative perfect relationship while 1 implies a positive perfect relationship between the variables. 0 shows no correlation at all. A variable correlated with itself, will always have a correlation co-efficient of 1. From the correlation matrix table, it is observed that all variables except inflation rate have positive correlation with agricultural sector output. Due to high multi-collinearity observed in the correlation matrix table, the variables were logged to reduce the effect of correlation.

4.1.3 Unit Root Tests

Table 4.3: Panel A: Result of Augmented Dickey-Fuller Unit Root Tests

Variable	ADF	Cal. Values	Critical	Values		Order of
	Level	1st Diff.	5%	10%	1%	Integration
AGRIPt	-3.327060	-4.81849**	-3.523623	-3.192902	-4.198503	1(1)
DCFt	-4.52622**		-3.523623	-3.192902	-4.198503	1(0)
VATt	-1.860573	-5.944191**	-3.523623	-3.192902	-4.198503	1(1)
EXRt	-1.193890	-5.72770**	-3.523623	-3.192902	-4.198503	1(1)
INFRt	-4.10583**		-3.523623	-3.192902	-4.198503	1(0)
GEAt	-0.645238	-4.34480**	-3.523623	-3.192902	-4.198503	1(1)

Source: Author's computation using E-views 12 Software

Table 4.3 represents the ADF unit root test. The ADF test method of 1979 was formulated on the ground that if the calculated values of the series are greater than the critical values at a particular level of significance using the absolute term values, then the Ho will be rejected on the basis that the series in question are stationary. 5 percent levels of significance were considered in this study which stands as the criteria significance level for decision making throughout the course of the analysis.

From the series, agricultural sector output (AGRIP), value added tax (VAT), government expenditure on agricultural sector (GEA), and exchange rate (EXR) fail their level test but are significant at 1st level. This means that AGRIP, VAT, GEA, and EXR are integrated of order one while domestic capital formation (DCF) and inflation rate (INFR) are stationary at level as their respective calculated values are greater in absolute term than the critical values at 5 percent level of significant. This implies inflation rate and domestic capital formation are integrated of order zero. From the result of ADF, none of the series are of the second order of integration 1(2). The combination of order of stationarities calls for co-integration examination so as to ascertain the long run association of the model.

4.1.4 Co-integration Analysis

The co-integration analysis is paramount in evaluating the long run relationship in the model. Based on the mix of order of integration I(0) and I(1) in the unit root examination, the Bound test of co-integration is adequate to check for the long run relationship of the series in the model. The bound test ascertains the possibility of long run association. Table 4.4 captured the Bound test analysis.

Table 4.4: Bound Testing Co-Integration Test

Critical Values			
Significance	**I(0) Bound**	**I(1) Bound**	**AGRIP Model of Fiscal Policy**
10%.	1.81	2.93	K=5
5%.	2.14	3.34	F-val. = 15.71195
2.5%.	2.44	3.71	
1%.	2.82	4.21	

Source: Author's computation using E-views 10 Software

The proponent of the Bound test analysis Pesaran, Smith and Shin (2001) resolved that the series combination of the different order of integration are co-integrated if the F-Stat. value is greater than the upper value of the critical bound test at a specified level of significance. The result is termed inconclusive if the F-Stat. is in between the values of the lower and upper critical value of the Bound test and no co-integration exist in the case of the F-Stat. values less than the lower critical value of the Bound test.

Looking at table 4.4, the F-Stat. value (15.71195) of the agricultural sector output models of fiscal policy at five percent significance level is greater than the critical value (3.34) of the bound test. Therefore, we concluded that there is a long run relationship in the presented model of agricultural sector output.

4.2 Data Analysis

The agricultural sector output model is analysed on both static and dynamic form.

Table 4.5: Agricultural Sector Output Model as a Function of Fiscal Policy

Panel A:	Long run result			
Variables	Coefficient	STD. Error	T.Stat.	Prob. Values
C	5.372294	6.938433	2.825524	0.0471***
LGEA	1.082789	0.552588	4.959488	0.0018***
VAT	-0.037640	0.297409	1.282911	0.8897
LDCF	0.016524	0.179166	3.092226	0.0273***
EXR	-0.588580	0.111222	5.291945	0.0000***
INFR	-0.083256	0.140859	-0.591060	0.5583

Source: Author's computation using E-views 12 Software

Panel B:	Short run result			
Variables	Coefficient	STD. Error	T.Stat.	P. Values
LGEA	1.598900	1.335109	3.179581	0.0217***
LGEA(-1)	1.223872	1.035778	3.181597	0.0266***
LGEA(-2)	-1.743652	1.359775	-1.282309	0.2318
VAT	1.080905	0.656269	2.442333	0.0364***
VAT(-1)	-2.411911	0.907241	-2.860101	0.0025***
VAT(-2)	-0.158987	0.566438	-0.280679	0.7853
LDCF	0.060532	0.167425	3.361549	0.0276***
LDCF(-1)	-0.213214	0.118081	3.805656	0.0435***
LDCF(-2)	0.017959	0.129166	0.139041	0.8925
EXR	0.564427	0.505017	1.117639	0.2840
EXR(-1)	-1.056386	0.800260	3.320053	0.0296***
EXR(-2)	1.515039	0.851396	1.779475	0.0985
INFR	-0.249590	0.258662	-0.964929	0.3522
INFR(-1)	0.403038	0.304357	3.324227	0.0282***
INFR(-2)	-0.126573	0.277066	-0.456833	0.6553
CointEq(-1)*	-0.644433	0.287832	-2.577766	0.0311***
R-squ 0.794932 **9**	Adj R-sq 0.783043	F-stat 40.88489 Prob(F) 0.000000	D-Wstat 1.96745	

Source: Author's computation using E-views 12 Software

From Table 4.5, Panel A, the constant term is 5.372294, indicating that if all the variables are at zero level; agricultural sector output will increase by 5.372294 percent. The positive constant term suggests that the sector has a natural tendency to grow. Government expenditure on the agricultural sector has a positive effect on agricultural output in the long run result and is also statistically significant in causing short-run changes in the agricultural sector model. This implies that a one percent change in government expenditure on agriculture will result in a 108% change in agricultural output. The relationship between agricultural sector output and value added tax is negative;

indicating that an increase in value added tax will lead to a decrease in agricultural sector output. In other words, a one percent rise in value added tax will result in a 0.3 percent change in agricultural sector output. In the dynamic model, value added tax is statistically insignificant in inducing changes in agricultural output within the study period. The coefficient of domestic capital formation is positive, indicating that DCF has a positive effect on AGRIP. DCF is statistically significant for AGRIP based on the probability value of DCF. The coefficient value suggests that a one percent change in DCF will cause AGRIP to increase by 0.1 percent. The relationship between the exchange rate and agricultural sector output is negative. The probability value of the exchange rate implies that the exchange rate is statistically significant in causing short-term changes in the agricultural sector. The coefficient of the exchange rate implies that a one percent decrease in the exchange rate will cause agricultural sector output to increase by 58 percent. Inflation rate has an inverse relationship with agricultural sector output in the dynamic model. This is confirmed by the coefficient of the inflation rate of -0.083256, indicating that a one percent increase in the inflation rate will cause the agricultural sector to decline by 8 percent. However, inflation rate is not statistically significant in causing changes to AGRIP in the dynamic model.

In the short run result or panel B of table 4.5, the maximum lag is 2 as confirmed in the model selection criteria. The short run result shows that government expenditure on agricultural sector is positive and significant at level and first difference but is negative and insignificant at second lag period. The relationship between value added tax and AGRIP is positive at level but negative at first and second lagged periods. VAT is statistically significant to agricultural sector in the long run result at level and first difference but became insignificant at second lag. Domestic capital formation is positively related to agricultural sector but statistically significant at level and first lagged period. In the second lagged period DCF became negative and insignificant to AGRIP. Exchange rate has a positive effect on AGRIP at level and second difference but negative at first lag period in the dynamic analysis but is significant in causing changes in the agricultural sector output in first lagged periods. Inflation rate negatively affect agricultural sector at level and also insignificant to AGRIP but in the first lagged period inflation rate became positive and significant to agricultural sector output.

The negative value of the co-integration equation validates the establishment of long run association of the series. The co-integration equation posits that in the case of shock or disequilibrium in the agricultural sector output model that it will take an average speed of 64 percent to adjust to equilibrium position. The D-W statistics values of 1.9 approximately 2 mean that the series are out of bondage of first order of Markov scheme. The overall model is statistically significant as it is shown in the F-stat. value of 40.88489 and the F-stat prob. Value of 0.000000. The R-squared and adjusted R-squared values suggest that a significant portion of the variation is explained by the independent variables. Specifically, the R-squared value indicates that approximately 79 percent of the total variation in agricultural sector output is accounted for by the independent variables, with the error term responsible for the remaining 21 percent.

4.3 Discussion of Findings

This study's findings on the impact of government expenditure, value-added tax (VAT), domestic capital formation (DCF), exchange rate, and inflation on agricultural sector output align with and contrast against various existing studies in economic literature. The study finds that government expenditure on agriculture has a positive and statistically significant impact on agricultural output, with a 1% increase in expenditure leading to a 108% increase in output. This aligns with Adam, Michael and Amanda, (2022) who found that increased public spending on agriculture in Nigeria significantly boosted agricultural productivity and rural growth. Similarly, Abu and Abdullahi, (2015) confirm a positive relationship between government agricultural spending and output growth in Nigeria. However, Afam, (2019) argues that while government spending enhances agricultural productivity, inefficiencies in budget implementation may reduce its effectiveness. The study indicates a negative relationship between VAT and agricultural output, suggesting that increased taxation discourages production. This finding supports Nkalu and Ugwuanyi (2020), who observed that higher VAT rates increase production costs, leading to lower agricultural output. In contrast, Ewubare and Eyitope, (2015) argue that VAT revenue can be reinvested in the sector to improve infrastructure, potentially offsetting its negative effects. The study finds a positive relationship between DCF and agricultural output, indicating that investments in capital formation contribute to sectoral growth. This is consistent with Solow's Growth Model (1956), which emphasizes capital accumulation as a driver of long-term economic growth. Odii and George, (2020) also supports this view, highlighting the role of capital formation in boosting mechanization and productivity in Nigeria's agricultural sector. The findings reveal a negative relationship between exchange rate depreciation and agricultural output, implying that a weaker currency adversely affects the sector. This is in line with Oladipo et al., (2022) who found that currency depreciation increases the cost of imported inputs, reducing productivity. However, Ogunleye (2014) suggests that a depreciated exchange rate could improve export competitiveness, benefiting the agricultural sector in the long run. The study reports that inflation has a negative and statistically insignificant effect on agricultural output in the short run but becomes significant in the first lag period. This aligns with Fischer (1993), who found that inflation creates uncertainty, discouraging investment in agriculture. However, Pide et al., (2012) suggest that moderate inflation could incentivize higher production if input costs remain stable.

5 Conclusion and Policy Recommendations

This study highlights the substantial role that fiscal policy tools play in driving the growth of the agricultural sector in Nigeria. By addressing a key research question, the study seeks to uncover the intricate relationships between fiscal policy and the performance of the agricultural sector. The results indicate that fiscal policy has a significant and measurable impact on agricultural output. Specifically, government spending on agriculture emerges as a critical driver of growth, demonstrating a stronger influence on the sector's expansion both in the short and long term. These findings underscore the direct effect of fiscal policy in shaping the activities of the real sector, with fiscal interventions—whether through increased government expenditure or tax revenues—acting as powerful levers to either stimulate or suppress sectoral growth. Overall, the study confirms that fiscal policy is an essential tool for regulating the agricultural sector's dynamics over both short and long periods.

Government intervention, particularly through an increase in the allocation of the agricultural sector's budget, is both necessary and fundamental for fostering the growth of real sectors, especially agriculture. This is essential not only to meet the objectives of sustainable development, particularly the second goal of "Zero Hunger," but also to address the pressing issue of food insecurity. A strategic focus on enhancing the agricultural sector's capacity will help increase domestic food production, reducing reliance on excessive food imports. By prioritizing direct support for agricultural activities, the government can ensure a more resilient, self-sufficient food system that supports national food security, strengthens rural economies, and drives broader socio-economic development. Moreover, this intervention is critical for enabling the agricultural sector to increase its output sustainably, thereby contributing to job creation, poverty reduction, and overall economic growth, in line with both national development goals and international commitments.

The development of adequate storage facilities is crucial at this time, as agricultural products are often seasonal and perishable. Both the government and the private sector should invest in building storage infrastructure to effectively manage excess produce during harvest periods, thereby preventing post-harvest losses. A reliable and dynamic agricultural program is necessary to educate and motivate Nigerians to adopt mechanized and modern farming techniques. This initiative will not only enhance food security but also alleviate inflationary pressures. Additionally, it will strengthen Nigeria's trade relationships with other nations by increasing the competitiveness of its agricultural exports. A stable exchange rate is essential to mitigate excessive fluctuations in the economy, particularly given that Nigeria's economy remains highly dependent on a few sectors and is less productive in the real sector. Stabilizing the exchange rate would help foster economic stability and support long-term growth.

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