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Nigeria's International Trade Instruments and Agricultural Output

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Abstract
The agricultural sector is a primary driver of employment, food security, and GDP growth in any economy. This study empirically investigates the long-run impact of international trade instruments on agricultural output (AGO) in Nigeria, focusing on the roles of tariffs (TAR), exchange rates (EXR), and exports (EXPT). Utilizing annual time series data from 1986-2025, the paper employs the Dynamic Ordinary Least Squares (DOLS) estimation technique to address potential endogeneity and serial correlation inherent in long-term macroeconomic data. The empirical findings reveal that the exchange rate and export volume are the primary significant drivers of agricultural output in Nigeria. Specifically, the exchange rate exhibited a positive and significant coefficient of 0.742128, suggesting that currency depreciation enhances the international competitiveness of domestic agricultural goods. This indicates that the competitiveness effect of a depreciating Naira has historically incentivized domestic production more than the input-cost effect has hindered it. Similarly, exports exerted a positive and significant influence with a coefficient of 0.445665, strongly validating the export-led growth hypothesis in the sector. Conversely, tariffs were found to have a positive but statistically insignificant impact, indicating that trade protectionism has limited effectiveness in stimulating long-run output, likely due to persistent smuggling, porous borders, and the supply-side constraints that characterize the Nigerian agrarian landscape. Based on these findings, it is recommended that policymakers prioritize the maintenance of a competitive exchange rate regime and transition from volatile, protectionist tariff regimes towards smart protectionism and infrastructure-led trade integration. Strengthening Export Processing Zones and stabilizing input costs for food-crop farmers are essential to balancing trade-driven growth with domestic food security.

Keywords: Agricultural output, international trade, tariffs, export, exchange rate, Nigeria

1. Introduction

Agriculture remains a cornerstone of the Nigerian economy, serving as a primary source of livelihood for over 70% of the population, employing over 35% of the labour force and contributing significantly to the non-oil Gross Domestic Product (GDP) (National Bureau of Statistics [NBS], 2024). Despite this significance, Nigeria's agricultural output has consistently fallen short of domestic demand and export potential, necessitating a critical examination of the policy environment shaping the sector's performance. Successive administrations have deployed various international trade instruments; principally tariffs, exchange rate management, and export promotion schemes to stimulate agricultural productivity, enhance food security, and diversify the economy away from oil dependence (Central Bank of Nigeria [CBN], 2023). According to the National Bureau of Statistics (NBS), the agricultural sector contributed approximately 24.01% to the real GDP in 2024, showing a slight fluctuation from previous years (NBS, 2024). While the sector grew by 1.13% in the fourth quarter of 2024, this growth remains sluggish compared to the population growth rate, raising concerns about food security and industrial raw material supply.

Historically, Nigeria's agricultural trade policy has evolved through distinct phases; from the immediate post-independence era (1960–1970) saw agriculture contributing over 70% of export earnings, primarily through commodity marketing boards. The oil boom of the 1970s precipitated policy neglect, transforming Nigeria from a net food exporter to a net importer. The Structural Adjustment Programme (SAP) of 1986 introduced trade liberalisation, including tariff rationalisation and exchange rate deregulation, yielding mixed outcomes (Adewuyi & Adebayo, 2021). Between 2015 and 2023, the CBN's multiple exchange rate windows and the closure of land borders (2019–2020) represented significant trade policy interventions intended to boost local production. However, agricultural imports, particularly rice, wheat, and fish, exceeded ₦1.2 trillion in 2023, underscoring persistent policy implementation gaps (NBS, 2024).

The Central Bank of Nigeria (CBN) has implemented various trade-related interventions, including the Anchor Borrowers' Programme (ABP) and restrictions on foreign exchange for certain food imports, to stimulate local production. However, the external sector remains volatile. Statistics from the CBN Statistical Bulletin indicate that while agricultural exports rose significantly in nominal terms—reaching N1.1 trillion in the first quarter of 2025 due to currency depreciation—the real volume of output hasn't matched this fiscal surge (CBN, 2025). Recent statistics reveal troubling trends. Agricultural exports grew marginally from ₦302 billion in 2019 to ₦701 billion in 2023, representing a compound annual growth rate of merely 6.8%—substantially below the Africa Continental Free Trade Area (AfCFTA) utilisation benchmark of 15% (CBN, 2023). Conversely, agricultural imports increased by 23% between 2021 and 2023 alone. The CBN's trade policy measures, including the 41 items banned from official foreign exchange (2015–2023), the Anchor

Borrowers' Programme, and various import substitution strategies, have not translated into commensurate productivity gains. Food imports as a percentage of total merchandise imports averaged 12.4% between 2019 and 2023, with wheat imports alone costing $2.1 billion annually (NBS, 2024).

The persistence of suboptimal agricultural output despite these trade interventions stems from multiple structural deficiencies and policy-implementation gap. First, trade policy implementation suffers from incoherence and frequent reversals, creating an unpredictable business environment that discourages long-term investment in agricultural value chains (Ogunleye & Olayiwola, 2022). Second, tariff structures remain largely revenue-focused rather than developmental, with effective protection rates inconsistently applied across agricultural sub-sectors. Despite high tariffs on imports meant to protect local farmers, the high cost of imported inputs (fertilizers, machinery) driven by exchange rate volatility has neutralized these protections (Orisdare & Olofin, 2024). Third, exchange rate volatility has increased input costs for farmers, undermining competitiveness. Fourth, non-tariff barriers—including port inefficiencies, arbitrary standards enforcement, and inadequate testing facilities—continue to impede both imports of essential inputs and exports of finished agricultural products (Eze & Okpara, 2023). Not forgetting to mention insecurity in farming belts which continue to stifle the supply-side response to trade incentives. Thus, the sector remains trapped in a cycle of high nominal export values but low productivity and high domestic food inflation.

Against this backdrop, this paper examines the relationship between Nigeria's international trade instruments and agricultural output, addressing a critical gap in the literature by providing contemporary empirical evidence to bridge existing literature gaps.

The hypotheses that were tested are stated as follows:

H_{01}: Tariff has no significant impact on agricultural sector output in Nigeria.

H_{02}: Exchange rate has no significant effect on agricultural sector output in Nigeria.

H_{03}: Export has no significant impact on agricultural sector output in Nigeria.

2. Literature Review

2.1 Conceptual Clarifications

Tariffs are said to be duties or taxes imposed on imported goods. In the agricultural context, Nigeria utilizes the Common External Tariff (CET) of ECOWAS, often supplemented by Import Adjustment Taxes to shield domestic infant industries from foreign competition (Toriola, 2022). Tariffs represent the most traditional instrument of trade policy, serving both protective and fiscal functions. In the Nigerian context, agricultural tariffs operate within the Economic Community of West African States (ECOWAS) Common External Tariff (CET) framework, which categorises products into five bands ranging from 0% to 35% (Osabuohien et al., 2022). Protective tariffs are designed to raise the domestic price of imported agricultural commodities, thereby enhancing the competitiveness of local producers. However, the efficacy of tariff policy depends critically on domestic supply response capacity—where domestic production cannot meet demand, tariffs merely increase consumer prices without stimulating output (Olomola & Nwigwe, 2021). Nigeria's tariff structure on key agricultural commodities—rice (30% plus additional levy), wheat (5%), and poultry products (35%)—reflects an import substitution strategy that has yielded uneven results across sub-sectors.

Exchange rate represents the price of the Naira against foreign currencies. A stable exchange rate is crucial for importing agricultural technology, while a depreciated Naira theoretically makes Nigerian exports like cocoa and cashew more competitive globally (Okoh & Nwakwanogo, 2024). Exchange rate policy influences agricultural output through two primary transmission mechanisms: input costs and export competitiveness. An overvalued exchange rate cheapens imported agricultural inputs—fertiliser, agrochemicals, and machinery—potentially reducing production costs, but simultaneously undermines the competitiveness of agricultural exports in international markets (Akinlo & Odusola, 2023). Conversely, exchange rate depreciation improves price competitiveness of exports but increases input costs, creating a policy dilemma for import-dependent agricultural systems. Nigeria's managed float regime, characterised by periodic adjustments and administrative rationing of foreign exchange, has generated significant distortions in agricultural value chains. The gap between official and parallel market rates, which exceeded 60% in 2023, has incentivised rent-seeking behaviour and diverted investment from productive agricultural activities (CBN, 2023).

The outflow of agricultural commodities to international markets is termed exports. Trade policy aims to shift Nigeria from being a primary producer to an exporter of value-added agro-processed goods. Export promotion encompasses a range of policy measures including export subsidies, duty drawback schemes, export processing zones, and bilateral trade agreements. Nigeria's export promotion framework for agriculture operates primarily through the Nigerian Export Promotion Council (NEPC) and the Export Expansion Grant (EEG) scheme. The EEG, reintroduced in 2019 after a five-year hiatus, provides negotiable duty credit certificates to exporters based on their value-added performance (NEPC, 2024). Despite these instruments, non-oil exports—overwhelmingly agricultural—constituted only 8.7% of total exports in 2023, reflecting persistent structural constraints including inadequate quality certification, limited compliance with sanitary and phytosanitary standards, and weak logistics infrastructure (NBS, 2024).

2.2 Empirical Review

Ibrahim (2025) on tariffs, fertilizer and import, using ARDL. Discovered that high tariffs on processed fertilizers increase cost of production, reducing overall crop yield. Thus, he proposed the removal of all tariffs and VAT on essential agricultural inputs and machinery.

An examination of exchange rate pass-through to domestic food prices employed structural vector autoregression with monthly data spanning 2015 to 2023. The analysis incorporated parallel market exchange rates, consumer price indices for food, agricultural raw material imports, and money supply aggregates. Findings revealed

complete pass-through within six months of exchange rate movements, with imported inflation substantially eroding farmers' real incomes and production capacity. Rather than administrative controls, the study recommended stabilising the exchange rate through genuine productivity improvements that address the structural origins of currency pressure (Akinbode & Adekunle, 2024).

The determinants of agricultural export diversification have been investigated using Poisson pseudo-maximum likelihood estimation on bilateral export data from 2010 to 2022. The analysis incorporated tariff differentials, real exchange rates, geographical distance, AfCFTA membership status, and export concentration indices. Exchange rate misalignment—defined as sustained deviation from equilibrium levels—was found to significantly constrain diversification into processed agricultural products. This finding suggests that an appropriately valued and stable currency may be more consequential for export upgrading than preferential market access alone. The study recommended deliberate alignment of exchange rate policy with industrial policy objectives for agro-processing (Fasoranti & Ogunniyi, 2024).

The effectiveness of tariff protection in stimulating domestic agricultural production has received considerable empirical attention. An assessment of the ECOWAS Common External Tariff on Nigeria's rice subsector over the 2010–2022 period, using autoregressive distributed lag methodology, revealed that a 10 percent increase in tariff rates was associated with only a 3.2 percent expansion in domestic rice output in the long run. The study incorporated tariff rates, rice output, harvested area, fertiliser prices, and rainfall index as explanatory variables. This weak supply response led the authors to recommend complementary public investments in irrigation infrastructure and seed technology development to enhance the elasticity of domestic supply response to price incentives (Adewumi & Ogundipe, 2023).

The relationship between agricultural import tariffs and food security outcomes has also been scrutinised through error correction modelling spanning 1985 to 2022. Using effective tariff rates, per capita food production indices, food import dependency ratios, and household food expenditure data, the analysis uncovered a non-linear relationship. Tariff levels exceeding 25 percent were found to generate adverse food security consequences through elevated consumer prices that disproportionately burdened low-income households. The study advocated targeted social protection mechanisms to accompany protective tariffs, recognising that trade policy alone cannot address the distributional consequences of food price inflation (Chibueze & Okonkwo, 2023).

An investigation which employed nonlinear autoregressive distributed lag methodology with quarterly data from 2007 to 2022 to examine the relationship between real exchange rate movements and disaggregated agricultural commodity export performance. The model included cocoa, cashew, sesame, and ginger exports; real exchange rate; world income; and relative prices. Findings revealed pronounced asymmetric effects: currency depreciation positively affected cocoa exports—where Nigeria possesses established market presence—but produced insignificant effects on other commodities due to persistent supply-side constraints including inadequate quality certification, limited processing capacity, and weak logistics infrastructure. The study recommended commodity-specific export strategies rather than relying on uniform exchange rate expectations to stimulate diversified agricultural exports (Ogunbiyi & Oyelade, 2023).

Idoko and Ocheni (2023) assessed the effects of Nigeria's border closure policy (2019–2020) on domestic rice value chain development using difference-in-differences methodology with survey data from 600 rice farmers and processors. Variables included farm-gate price, milling capacity utilisation, local rice consumption frequency, and smuggling intensity index. Findings indicated short-term price increases benefiting farmers but limited evidence of sustained productivity gains. The study recommended permanent investments in border infrastructure and regional cooperation rather than episodic closure policies.

Trade policy uncertainty has emerged as a significant but under-researched constraint on agricultural investment. A panel vector autoregression using firm-level data from 2015 to 2021 constructed a policy uncertainty index derived from newspaper coverage frequency of trade policy debates. The analysis incorporated private agricultural investment, manufacturing capacity utilisation, and import penetration ratios. Results demonstrated that policy uncertainty—particularly regarding import restriction reversals and exchange rate administration changes—depressed private agricultural investment by an estimated 18 percent during the study period. The unpredictable policy environment discouraged long-gestation investments in perennial crops, irrigation infrastructure, and processing facilities. The study recommended institutionalising trade policy review mechanisms with fixed review calendars to enhance predictability (Ibrahim & Lawal, 2022).

The effectiveness of Nigeria's Export Expansion Grant (EEG) scheme has been assessed using panel data from fifteen agro-processing firms covering 2016 to 2021. Fixed effects estimation examined EEG utilisation rates, export volumes, firm size, and capital intensity. EEG utilisation positively correlated with export volume, but the effect was conditional on firms' absorptive capacity—their ability to translate financial incentives into productive capabilities. Firms with higher capital intensity and better technological capabilities derived substantially greater export benefits from the scheme. Recommendations included streamlining EEG administration to reduce bureaucratic delays and linking grant eligibility to demonstrable technological upgrading rather than merely rewarding historical export performance (Bello & Yusuf, 2022).

The effectiveness of Nigeria's import prohibition list—a more extreme form of trade restriction—was evaluated using interrupted time series analysis over two decades (2000–2020). The model incorporated the number of prohibited agricultural items, domestic production indices for rice and poultry, border prices, and smuggling proxies. While rice production increased significantly following prohibition, the study documented substantial welfare losses for low-income consumers who faced higher prices without commensurate quality improvements. The authors recommended implementing compensating mechanisms

for vulnerable households alongside continued import restrictions, recognising that trade policy inevitably creates both winners and losers (Yusuf & Ajayi, 2021).

Another investigation into tariff protection and technical efficiency within Nigeria's poultry sector employed stochastic frontier analysis on cross-sectional survey data from 2019. The analysis considered tariff rates on frozen poultry imports, technical efficiency scores, farm size, and extension contact frequency. Although the 35 percent tariff regime successfully expanded domestic production volumes, technical efficiency remained disappointingly low, with a mean efficiency score of 0.61. This finding suggests that protectionist measures, unaccompanied by productivity-enhancing interventions, generate quantity expansion without corresponding improvements in production efficiency. The study recommended conditioning tariff protection on demonstrable compliance with performance standards and productivity benchmarks (Nwachukwu & Odularu, 2021).
The dynamic relationship between exchange rate volatility and agricultural sector growth has been analysed using GARCH-MIDAS methodology with quarterly observations from 2000 to 2020. The investigation incorporated real exchange rate volatility indices, agricultural GDP, agricultural credit disbursement, and government capital expenditure in agriculture. Results demonstrated a significant negative impact of volatility on agricultural output, with asymmetric effects observed during appreciation and depreciation cycles. The authors recommended developing agricultural commodity exchanges to provide farmers and agribusinesses with price risk management instruments, thereby insulating production decisions from exchange rate uncertainty (Egbetunde & Fasanya, 2021).

2.3 Theoretical Framework

The Heckscher-Ohlin (H-O) theory, originally developed by Eli Heckscher (1919) and later extended by Bertil Ohlin (1933), represents one of the most influential frameworks in international trade economics. The theory emerged as a critique of the Ricardian model's exclusive focus on technological differences as the basis for trade, offering instead an explanation grounded in the interaction between factor endowments and factor intensities.

The H-O theorem posits that comparative advantage, and consequently the pattern of international trade is determined by the relative abundance of factors of production (labour, capital, land) and the relative intensity with which these factors are employed in producing different goods. Formally, the theorem states that a country will export goods whose production requires intensive use of the factors that are locally abundant and will import goods whose production requires intensive use of factors that are locally scarce. This proposition rests on several core assumptions: perfect competition in both product and factor markets; identical production technologies across countries; constant returns to scale; factor immobility internationally but perfect mobility domestically; and the absence of transport costs, tariffs, or other trade barriers (Appleyard & Field, 2017).

Applying the H-O framework to Nigeria requires careful specification of the country's factor endowment profile. Nigeria is abundantly endowed with agricultural land, approximately 70.8 million hectares of arable land, of which less than 40 percent is cultivated and unskilled labour, with the agricultural sector employing over 35 percent of the workforce (NBS, 2024). The country also possesses abundant natural resources, particularly crude oil, which has shaped the economy's structural evolution. Conversely, Nigeria is relatively scarce in physical capital (machinery, irrigation infrastructure, storage facilities), human capital (technical skills, agricultural extension personnel), and technological capabilities.

Based on this endowment profile, the H-O theorem predicts Nigerian comparative advantage in land-intensive and labour-intensive agricultural commodities. Indeed, historical trade patterns confirm this prediction: cocoa, palm oil, groundnuts, rubber, and hides and skins formed the backbone of Nigeria's pre-oil export economy. However, contemporary trade data reveal a stark contradiction with H-O predictions. Despite continued factor abundance in land and labour, Nigeria has become a net importer of numerous agricultural commodities for which it should possess comparative advantage; rice, wheat, fish, poultry, and dairy products collectively cost over ₦1.2 trillion in annual imports (CBN, 2023).

The H-O framework provides an indispensable benchmark: it specifies the pattern of production and trade that should emerge in the absence of distortions, enabling identification and measurement of the policy-induced and structural deviations that characterise Nigeria's agricultural sector. By estimating the empirical relationship between trade policy instruments and agricultural output, this study quantifies the extent to which current policies align with or contradict the logic of comparative advantage derived from Nigeria's factor endowments.

3. Methodology

3.1 Research Design and Data Sources

This study adopts an ex-post facto research design, utilizing annual time-series data from 1986 to 2025. Data for all variables, including Agricultural Output (GDP), Average Exchange Rate, Custom Duties (Tariffs), and Agricultural Export values, are sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and the National Bureau of Statistics (NBS).

3.2 Specification of the Model

Following the theoretical framework and empirical literature, this study specifies agricultural output as a function of trade policy instruments. To capture the long-run relationship while accounting for endogeneity and serial correlation in a time-series framework, we employ the Dynamic Ordinary Least Squares (DOLS) technique developed by Stock and Watson (1993). The DOLS model involves augmenting the cointegrating regression with lags and leads of the first differences of the regressor variables.

The general functional form is:

$$AGO_t = f\left(TAF_t, EXR_t, AEXP_t\right)$$

The econometric form for the DOLS estimation is specified as:

$$\ln AGO_t = \beta_0 + \beta_1 TAR_t + \beta_2 \ln EXR_t + \beta_3 \ln EXP_t + \sum_{j=-k}^{k} \delta_j \Delta TAR_{t-j} + \sum_{j=-k}^{k} \delta_j \Delta \ln EXR_{t-j} + \sum_{j=-k}^{k} \delta_j \Delta \ln EXP_{t-j} + \varepsilon_t$$

Where:
LnAGO = Natural log of Agricultural Output (Proxy for Sector Performance)
TAR = Import Tariffs/Custom Duties
LnEXR = Natural log of Official Exchange Rate
LnEXPT = Natural log of Agricultural Exports
δ = Coefficients of leads and lags of the differenced explanatory variables
k, p = The number of leads and lags, respectively
$\beta_0, \beta_1, \beta_2$ and β_3 are the intercept and slope of the coefficient of the independent variables to be determined.
ε_t = Stochastic error term

Based on economic theory and empirical literature, the following coefficient signs are expected:

Variable	Symbol	Expected Sign	Justification
Tariffs	TAR	Positive (+)	High tariffs on imports should protect local farmers and boost domestic output (Import Substitution).
Exchange Rate	EXR	Positive/ Negative (+/-)	Depreciation (higher EXR) may boost exports (+) but increase the cost of imported inputs like fertilizer (-).
Exports	EXPT	Positive (+)	Increased export demand should incentivize higher domestic production levels.

Source: Researcher's Compilation, 2026.

3.3 Estimation Procedure

The estimation proceeds through the following sequential steps:

Unit Root Test

Augmented Dickey-Fuller (ADF) test was used to determine stationarity properties and order of integration. The variables are expected to be integrated at mixed orders to validate the use of DOLS.

Cointegration Test

The Hasen Parameter method is appropriate to establish long-run relationship among the variables.

3.4 DOLS Estimation

Upon confirmation of cointegration, the DOLS model is estimated with optimal lead-lag length determined by AIC. Heteroscedasticity and autocorrelation consistent (HAC) standard errors are computed using the Newey-West procedure. DOLS is preferred for the following methodological reasons: first, it addresses the spurious regression problem inherent in time series analysis with non-stationary variables. DOLS provides consistent and asymptotically efficient estimates of the long-run cointegrating relationship among such variables. Secondly, DOLS corrects for endogeneity and serial correlation—pervasive issues in agricultural trade policy analysis—by incorporating leads and lags of first-differenced regressors. This is particularly important given bidirectional causality between agricultural output and exports, and potential simultaneity between tariff policy and domestic production conditions. Finally, DOLS performs well in small samples relative to alternative cointegration estimators such as the Engle-Granger two-step method and the Johansen maximum likelihood procedure.

4. Result and Discussion

4.1 Stationarity Test Result

Table 1: Stationarity Test Result

ADF Test Statistics			
Variables	ADF-Value	Critical Value	Order of Integration
AGO	- 3.71951**	-2.943427	*I*(1)
TAR	-12.13007 **	-2.967767	*I*(0)
EXR	-5.78407*	-3.621023	*I*(1)
EXPT	-4.583529*	-3.639407	*I*(1)

Note: *, and ** represents 1% and 5% level of Significance
Source: Researcher's Compilation, EViews-12 (2026)

In Table 1, it is observed that all the 4 variables of interest were found stationary at different form, and are integrated at mixed order [I(0) & I(1)]. At this order of integration, agricultural output test statistics of - 3.71951 was found to be greater than the critical value of -2.943427at 5% level of significance. Tariff had a test statistic of -12.13007 and was found to be greater than the critical value of -2.967767 at 5% level of significance. Furthermore, exchange rate also had its test statistic of -5.78407 greater than its corresponding critical value of -3.621023 at 1% level of significance. Lastly, export was statistically significant at 1% having its test statistic of -4.583529 greater than its critical value of -3.639407.

Table 2: Cointegration Result

Hansen Parameter Instability	
Lc-Statistic	P-value
0.037058	> 0.2

Source: Researcher's Compilation, EViews-12 (2026)

To complement the Engle-Granger approach, the Hansen parameter instability test was conducted. The Lc statistic of 0.037058 with a p-value greater than 20 percent (0.20) indicates failure to reject the null hypothesis of cointegration. This further goes to confirm that a stable long-run relationship exists among the variables, thus justifying the use of the Dynamic Ordinary Least Squares.

4.2 Regression Result and Test of Hypotheses

Table 3: Regression Result

Method: Dynamic Ordinary Least Squares (DOLS)
Dependent Variable: AGO

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TAR	0.420788	0.450128	0.934818	0.3596
EXR	0.742128	0.139495	5.320088	0.0000
EXPT	0.445665	0.085221	5.229493	0.0000
C	-0.10018	0.313337	-0.319705	0.7521
R-squared	0.992129			
Adjusted R-squared	0.988022			
Long-run variance	0.017401			

Source: Researcher's Compilation, Eviews-12 (2026)

The DOLS empirical results, as presented in Table 3, evaluate the long-run drivers of agricultural output in Nigeria. The model demonstrates an exceptionally high explanatory power, with an adjusted R-squared of 98.8%, indicative that approximately 98.9 percent of the variation in Nigeria's agricultural output is explained by the independent variables.

The coefficient of TAR is positive indicating a direct but insignificant relationship with agricultural output. meaning that 1 percent increase in tariff, drives agricultural output by 0.42 percent. Although, the p-value shows that it is statistically insignificant at 5 percent level of significance. While the coefficient of EXR revealed a direct and significant relationship with agricultural output; indicative that a 1 percent increase in exchange (naira depreciation), is associated with a 0.74 percent increase in agricultural output. Further to this, EXPT has a positive and significant relationship with agricultural output, meaning that a 1% increase in export will lead to a 0.45% increase in agricultural output.

4.3 Hypotheses Outcome

The hypotheses were tested by using multiple linear regression and determined using p-values of the t-statistics (or t-value) The rejection/ acceptance criteria were that, if the p-value is less than 0.05, we reject the null hypothesis. But if it is more than 0.05, the null hypothesis is not rejected.

Hypothesis 1: Tariff has no significant impact on agricultural sector output in Nigeria

Using the result from Table 3, the t-statistic is 0.934818 and its associated p-value is 0.3596. since its p-value is greater than 0.05 (5%level of significance), we accept the null hypothesis, and conclude, it is statistically insignificant in affecting agricultural output in Nigeria.

Hypothesis 2: Exchange rate has no significant effect on agricultural sector output in Nigeria

From the estimates from the regression result, it is observed that exchange rate (EXR) has a t- statistic of 5.320088, with its p-value of 0.0000, using 95% confidence interval. Since the p-value is less than 0.05, the null hypothesis is rejected. Hence, it is concluded that exchange rate has statistically significant effect on agricultural output.

Hypothesis 3: Export has no significant impact on agricultural sector output in Nigeria

The calculated t-value for the relationship between export and agricultural output was found to be 5.229493 with an associated p-value of 0.0000 at 95% confidence interval level. This means p-v<0.05. Based on this, we reject the null hypothesis ($\mathbf{H_{03}}$) and conclude that export exerts significant impact on agricultural output in Nigeria.

5. Discussion of Results

The statistical insignificance of TAR (Tariffs) is a critical finding. It suggests that trade protectionism or liberalisation via tariff adjustments has not been an effective lever for stimulating agricultural growth in Nigeria. This could be due to several factors such as smuggling and porous borders as a result of high tariffs intended to protect local farmers, are often undermined by illegal cross-border trade. Secondly, agricultural output in Nigeria may be more constrained by supply-side issues (infrastructure, storage, and technology) than by international trade barriers. Finally, frequent changes in tariff regimes (policy inconsistency) may prevent farmers from making long-term production decisions based on trade protection. Typical of what happened to Nigerian farmers in 2025. The tariff policy of re-opening the borders created market shock, greatly affected farmers production and profits as well, as they recorded losses due to fall in prices of agricultural products due to competition from imported goods (cheaper substitutes). This volatility suggests that in Nigeria, the uncertainty of the tariff regime is a more potent deterrent to investment than the actual level of the tariff itself. Thus, the finding aligns with the broader development economics literature, which emphasises that trade policy operates within a wider ecosystem of supporting institutions and that protection without productivity enhancement generates rents without structural change.

The highly significant and positive relationship between the exchange rate and agricultural output suggests that currency movements are a primary driver of agricultural productivity in Nigeria. In economic theory, a depreciation of the local currency (higher EXR) makes domestic agricultural products cheaper and more competitive on the global market. For Nigeria, this result indicates that the export competitiveness channel effect outweighs the input-cost effect**.** This implies that for a given world price in dollars, depreciation increases the naira equivalent received by exporters, enhancing profitability and creating incentives for expanded production. This channel is particularly potent for Nigeria's traditional export crops such as cocoa, cashew, sesame, ginger, and rubber which face elastic demand in international markets. The competitiveness channel operates through several mechanisms. First, higher naira returns encourage more intensive cultivation of existing export crop areas—increased application of fertiliser, more frequent weeding, and improved harvesting practices. Second, depreciation incentivises area expansion, as farmers bring additional land into export crop production, potentially switching from food crops or fallow. Third, the profitability signal encourages investment in tree crop rehabilitation, replanting of ageing stands, and adoption of improved varieties. Fourth, depreciation stimulates entry into processing activities, as higher margins make investments in shelling, grading, and primary processing economically viable. While a weaker Naira increases the cost of imported fertilizers and machinery, it significantly boosts the income of farmers producing cash crops (like cocoa, sesame seeds, and cashew nuts) for the international market. This price incentive encourages increased cultivation and investment in the sector (the input cost channel). The input cost channel operates through several mechanisms. Higher fertiliser prices reduce application rates, depressing yields and output per hectare. Increased machinery costs delay mechanisation and limit the adoption of productivity-enhancing technologies. More expensive agrochemicals may reduce pest and disease control efficacy, increasing crop losses. For farmers with limited

working capital, higher input costs may force production onto a lower technology trajectory, reducing potential output even as price incentives encourage expansion.

While the aggregate coefficient is positive, the exchange rate effect is unlikely to be uniform across agricultural sub-sectors. For Export-oriented cash crops such as cocoa, cashew, sesame, and ginger, these sub-sectors experience the strongest positive effects. Depreciation directly increases naira revenues from given physical output, creating unambiguous profitability improvements. They are integrated into global value chains, meaning they benefit directly from the Export-Led Growth (ELG) "pull factor." For farmers in this sub-sector, international trade policy is the primary determinant of their production cycle. Supply response is significant, though constrained by biological lags—cocoa new plantings require 3-5 years to bear fruit. The input cost effect is modest because these crops, particularly when grown traditionally, use few purchased inputs. While the Import-competing food crops like rice, maize, poultry, fish: these sub-sectors face more complex effects. Depreciation increases the naira cost of competing imports, providing natural protection that substitutes for tariff policy. For rice, a weaker naira raises the domestic price of imported rice, expanding market space for domestic producers. However, these sub-sectors also tend to be more input-intensive, with higher reliance on imported fertiliser, feed concentrates, and veterinary products. The net effect depends on the balance between output price increases and input cost increases—essentially, the rate of pass-through from exchange rates to output prices versus input prices. Evidence suggests that for rice, the protection effect dominates, but for poultry, high feed import dependence may attenuate or reverse the positive effect.

Domestic Food Crops like cassava, yam, sorghum, and millet, the sub-sectors are relatively insulated from direct exchange rate effects because they are neither exported significantly nor face direct import competition. However, indirect effects operate through labour markets and land allocation. When depreciation stimulates export crop expansion, it draws labour and land away from domestic food crops, potentially reducing their output. This displacement effect—a manifestation of the Rybczynski theorem in reverse—implies that exchange rate policy involves trade-offs between export-oriented and domestic food sub-sectors. Lastly, Livestock and Dairy sub-sector exhibit the most complex exchange rate sensitivity. Depreciation increases costs of imported feed concentrates, veterinary products, and breeding stock. Simultaneously, it may stimulate demand for domestically produced livestock if imported meat and dairy become more expensive. The net effect depends on the import intensity of production systems. Intensive poultry operations with high feed import dependence may contract, while extensive grazing systems with minimal purchased inputs may expand.

The significance of the export variable validates the Export-Led Growth (ELG) hypothesis within the Nigerian agricultural context. The positive elasticity (0.446) confirms that access to international markets acts as a catalyst for domestic production. As Nigerian agricultural goods find more space in global value chains, it creates a "pull factor" that stimulates higher output levels to meet foreign demand. This finding aligns with the federal government's recent drive to diversify the economy away from crude oil by incentivizing non-oil exports as a driver of agricultural transformation. The federal government's diversification agenda, including the Zero Oil Plan, the Export Expansion Grant scheme, and various value chain development programmes, rests on the premise that export growth stimulates domestic production. This study's findings provide empirical support for that premise. However, the magnitude of the coefficient (0.446) also indicates that the transmission from exports to output is incomplete. Each naira of export growth is associated with only 44 kobo of additional agricultural output, suggesting substantial leakages in the transmission mechanism. Strengthening this relationship requires addressing the quality, infrastructure, finance, and institutional constraints that currently attenuate export-output linkages.

6. Conclusion and Recommendations

This study investigated the long-run impact of international trade components on agricultural output in Nigeria using the Dynamic Ordinary Least Squares (DOLS) framework. Following a rigorous econometric procedure; including unit root testing and the confirmation of a stable cointegrating relationship through Hansen Parameter Instability test.

The findings reveal that exchange rate movements and export volumes are the primary drivers of agricultural productivity in Nigeria (validating the Export-Led Growth hypothesis). Specifically, the positive and significant elasticity of the exchange rate (0.742) suggests that a depreciating Naira enhances the global competitiveness of Nigerian agricultural products, incentivizing increased domestic production. Similarly, the significant positive impact of exports (0.446) confirms that integration into global markets serves as a potent catalyst for sectoral growth. Conversely, the statistical insignificance of tariffs indicates that trade protectionism via import/export duties has not yielded the desired stimulus for agricultural expansion in the long run which has been undermined by smuggling and policy inconsistency. In summary, Nigeria's agricultural trajectory is more sensitive to price incentives and market access than to administrative trade barriers.

Based on the analysis and conclusions of this study, the following policy measures are recommended to boost agricultural output and ensure the sector's resilience within the global trade landscape:

i. The Federal Government should shift focus from tariff protection to addressing fundamental productivity constraints, such as rural electrification and modern irrigation, which are likely limiting output more than trade taxes do.
ii. The Central Bank should maintain a competitive exchange rate regime that avoids overvaluation, as a strong Naira could inadvertently "tax" agricultural exporters and discourage local production. Since a competitive (devalued) Naira supports agricultural output by making exports cheaper abroad, policy should avoid artificial overvaluation of the currency, which functions as an implicit tax on local farmers and exporters.

iii. Given that exports significantly drive agricultural growth, the Federal Government through the Nigerian Agricultural Quarantine Service (NAQS) and Nigerian Expoert Promotion Council should prioritize the development of specialized "Agro-Export Processing Zones." Efforts must be intensified to improve the quality, packaging, and phytosanitary standards of Nigerian produce to reduce the high rate of rejection in international markets (e.g., the EU and US markets).

Competing interest and Data Availability statement

The author declares no conflicts of interest, and the data used for analysis shall be provided upon request.

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