FINANCIAL FLOWS AND AGRICULTURAL OUTPUT IN NIGERIA

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Abstract

The challenge of funding the agricultural sector has remained a persistent gap not only in Nigeria but across African countries in general. As one of the largest recipients of financial flows, Nigeria requires an in-depth investigation into how these specific flows impact its agricultural sector. This study examines the effects of financial flows on Nigeria's agricultural sector using secondary data from 1991 to 2023. A unit root test guided the selection of the Johansen co-integration test, the error correction model (ECM), and the dynamic ordinary least squares (DOLS) method to determine both short- and long-run relationships between financial flows and agricultural output in Nigeria. The ECM results indicate that the adjustment mechanism is moderately significant, with approximately 29.24% of disequilibrium corrected in each period. The DOLS analysis reveals that external debt, foreign direct investment (FDI), and foreign aid have a significant positive effect on agricultural output in Nigeria. The study concludes that the government should prioritize optimizing fund allocation, improving utilization efficiency, and fostering a conducive investment environment to sustain agricultural growth. It is therefore recommended that efforts be made to encourage foreign direct investment in the sector and to ensure that agricultural aid is effectively directed toward its development.

Keyword: Financial flows; Agricultural Output; Foreign direct Investment; Remittances

JEL Classification: O13, P45, C22

1. INTRODUCTION

The Nigerian economy was historically recognized for its agricultural prowess, particularly in cash crop production, before the 1950s. Agriculture

accounted for approximately 85% of the country's foreign earnings and was a primary driver of economic growth. During the 1960s and 1970s, Nigeria was a global leader in the export and production of key cash crops such as palm oil and cocoa (Olayemi et al., 2021; Ebere et al., 2021). However, the discovery of oil marked a turning point, leading to a sharp decline in agricultural exports from 85% to just 8%. The oil boom caused the agricultural sector to be neglected, as soaring oil prices significantly increased foreign earnings beyond what agriculture had historically contributed (Idris, 2020; Edeme et al., 2016).

While several studies, including Aginam (2024), Ebere et al. (2021), and Obioma et al. (2021), have explored the role of various funding mechanisms in revitalizing the agricultural sector, others, such as Osuji et al. (2023) and Agbede (2023), have specifically examined the impact of foreign aid and external debt. Despite these insights, Nigeria's economy remains heavily dependent on international capital inflows for development. However, a critical gap exists in understanding the combined contributions of these channels foreign direct investment (FDI), foreign aid, external debt, net exports, and remittances on agricultural productivity and output. Addressing this gap is essential to identify effective strategies for leveraging international capital to rejuvenate Nigeria's agricultural sector and foster sustainable economic growth.

Despite this decline, the agricultural sector remains a major contributor to employment and economic growth, particularly in sub-Saharan Africa. Iddrisu *et al.* (2015) emphasized the sector's critical role in achieving sustainable economic outcomes. To address Goals 1 and 2 of the Sustainable Development Goals (SDGs) poverty reduction and hunger alleviation, the development and resilience of the agricultural sector require adequate internal and external funding (Anetor *et al.*, 2016; Ikpesu and Okpe, 2019).

African countries face significant challenges, including the saving-investment gap, foreign exchange gap, and fiscal-monetary gap, which hinder sectoral and holistic development. A shortage in domestic savings reduces funds available for investments, adversely affecting agricultural and industrial growth. Foreign exchange shortages lead to over-reliance on external borrowings due to export earnings falling short of import demands. The fiscal-monetary gap stems from ineffective monetary policies and budget deficits, which erode investor confidence and escalate inflation. These gaps exacerbate capital shortages, impeding governments from adequately funding critical sectors like education, health, and agriculture for present and future sustainability (Taylor, 1990; Adegboye *et al.*, 2020; Adeniyi *et al.*, 2021).

Given these challenges, alternative financial flows like foreign direct investment (FDI), foreign aid, remittances, external debt, and net exports are crucial for sustaining agricultural output and driving economic development. The distinct characteristics and channels of these financial flows into recipient countries necessitate understanding their magnitude and impact. Such insights can inform

policymakers on strategies to optimize these flows, enhancing agricultural productivity and overall economic growth in Nigeria.

However, Nigeria's inflows from these financial channels reveal mixed trends. For instance, FDI inflows in 2022 recorded a deficit of approximately 190 million U.S. dollars, a sharp drop from the 3.31 billion U.S. dollars surplus in the preceding year and significantly below the 2011 peak of 8.84 billion U.S. dollars. Similarly, foreign aid increased steadily from 3.28 billion dollars in 2019 to 4.44 billion dollars in 2022. Meanwhile, remittances fluctuated, with 23.81 billion dollars recorded in 2019, decreasing to 17.21 billion dollars in 2020 before rebounding to 20.13 billion dollars in 2022 (World Development Indicators, 2022; National Bureau of Statistics, 2022). These figures underscore Nigeria's position as a top recipient of financial flows aimed at stimulating economic growth.

Based on the foregoing, this study investigates the impact of financial flows; FDI, foreign aid, remittances, external debt, and net exports on agricultural output in Nigeria. Understanding these dynamics is vital for crafting effective policies to bolster agricultural productivity and foster economic sustainability.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 THEORETICAL FRAMEWORK

The Structural Change Theory

The study is based on the Structural Change Theory, developed by Lewis Arthur in 1954 and later refined by Agbenyo (2020) in the analysis titled ″The Structural Change Theory – An Analysis of Success and Failures of Technology.″ Agbenyo referred to the theory as "development with unlimited supply of labor." The theory assumes that an economy consists of two interconnected sectors: the traditional (agricultural or subsistence) sector and the modern (capitalist, industrial, or manufacturing) sector, forming the two-sector model. Economic development, represented by the formula:

$$Y = f\ (AGRIC\ OUTPUT, IND)$$

Y=f (AGRIC OUTPUT, IND), depends on the growth of these two sectors. Here, Y denotes economic development, AGRIC refers to agricultural sector output, and IND represents industrial sector output. The sectors are interdependent: the agricultural sector provides labor, capital inputs, and consumes industrial products, while the industrial sector utilizes agricultural outputs and labor. The theory is important to this study because economic development and agricultural output requires capital (physical capital) to improve. Most importantly agricultural output, knowing fully well, is the funding of the sector that allows the sector to have a ripple and multiplier effect on economic growth and development. The availability of external financial flows in forms of foreign direct investment, foreign aid,

remittances, external debt and net export could boost the agricultural sector if channel there which in the long run would have impact the industrial sector and economy development at large.

2.2 EMPIRICAL REVIEW

Aginam (2024) investigated the relationship between banking sector financing and agricultural sector output in Nigeria. The study aimed to examine how loans, advances, lending rates, and loans guaranteed under the ACGSF Scheme, along with its repayment compliance rate, enhance agricultural output in Nigeria. This research extended beyond the work of Okafor (2020), which only explored the impact of bank credit/lending rates on agricultural output. Although similar in scope to the works of Obioma et al. (2021) and Ebere et al. (2021), which addressed the ACGSF Scheme's characteristics, this study uniquely incorporated the repayment compliance rate, a critical factor for evaluating the scheme's efficiency and effectiveness in boosting agricultural output. However, the use of ordinary least squares may undermine the findings' validity for policy formulation and implementation. The results revealed a significant positive relationship between the value of loans under the ACGSF Scheme, repayment compliance rates, and agricultural output in Nigeria. Efanga et al. (2024) examined the relationship between government funding and agricultural sector output, with corruption moderating the relationship. The study analyzed the impact of government expenditure on agriculture and the corruption index on agricultural output. It aligned with the works of Ebere et al. (2021), Okafor (2020), and Otu and Itesi (2021) in terms of government expenditure as a funding mechanism. Additionally, it adhered to the theoretical framework of Obioma et al. (2021) in validating the structural change theory. The findings revealed a positive relationship between government expenditure and agricultural output, consistent with the summarized works mentioned above. Osuji et al. (2023) investigated the relationship between external debt and agricultural production in Nigeria. The study examined various components of Nigeria's external debt portfolio, including external debt stock, payments, multilateral debt stock, Eurobond stock, and bilateral debt stock, and their impact on agricultural output. This research is more robust than the work of Yerima and Tahir (2020), which focused solely on external debt stock over a short period. The findings indicated that external debt stock, payments, Eurobond stock, and bilateral loans have a positive relationship with agricultural output.

Agbede (2023) explored the combined effect of foreign aid, exchange rate volatility, and agricultural output in Nigeria. The study examined how foreign aid and exchange rate fluctuations influence agricultural output, employing the GARCH model to analyze the effects of aid, exchange rate, trade openness, and borrowing on crop production and agricultural output. The results showed that foreign aid and exchange rate volatility negatively affect agricultural output in Nigeria. Despite lacking a theoretical framework, the study is unique in combining foreign aid and exchange rate effects on agricultural output. Zwingina et al. (2023) investigated the

effect of commercial bank loans and advances on agricultural value-added growth in Nigeria. The subject matter aligns with the works of Aginam (2024), Okafor (2020), and Obioma et al. (2021), focusing on sector financing through credit availability from financial institutions. However, the use of the ARDL technique in this study may not be econometrically appropriate, as a simple ordinary least squares method could suffice for determining the findings. The results indicated that commercial bank loans and advances significantly and positively affect agricultural output. Eno and Eze (2023) examined the relationship between agricultural financing and agricultural output in Nigeria. The study focused on how access to bank credit, high-interest rates, and exchange rate fluctuations influence agricultural output. The findings revealed that bank lending has the potential to increase agricultural output in Nigeria, but high-interest rates discourage agricultural growth. This study uniquely analyzed how financial institutions influence agricultural output, differing from the works of Ikpesu and Okpe (2019) and Menson et al. (2023), which emphasized capital inflows and macroeconomic variables. Badu-Prah et al. (2023) investigated how trade and foreign direct investment (FDI) influence agriculture in developing countries. The study tested how inward and outward FDI affects trade openness across 150 developing countries, using the Heckscher-Ohlin framework, which considers trade and capital as substitutes in a two-factor, two-country/product model. Data were sourced from FAOSTAT and WDI, and the GMM technique revealed that inward FDI stimulates exports, imports, and trade openness, while outward FDI has the opposite effect. The study suggests that additional capital inflows peculiar to agriculture should be considered to improve agricultural output. Menson et al. (2023) examined the combined influence of foreign direct investment, agricultural productivity, and food security in Sub-Saharan Africa. Data were sourced from the World Bank's World Development Indicators, the UN FAO, and the UNCTAD. The study employed the System Generalized Method of Moments (GMM), with Arellano-Bond tests confirming no autocorrelation. The findings revealed that FDI in agriculture significantly improves food security metrics, such as the food consumption score and dietary energy consumption. Control variables like crop production, food exports, and rural population were also significant determinants. The study recommends securing equitable land access through tenure reforms and improving investment climates to promote agricultural development. Ifeanyi (2022) explored the potential of foreign direct investment in improving food production in Nigeria. The study highlighted FDI's role in introducing essential skills, investment capital, technological innovations, and infrastructure to enhance food production. Using a literature review approach, the findings revealed a positive correlation between FDI and improved food productivity. However, persistent political crises and insecurity hinder sustainable agricultural growth, leading to food shortages, high prices, and reliance on imports. The study recommends creating a conducive environment for FDI to catalyze food productivity and security. Otu and Itesi (2021) examined the impact of domestic investment on agricultural productivity in Nigeria. Anchored on the endogenous growth model, the study analyzed agricultural productivity, gross capital formation, population growth,

government expenditure on education, and lending rates. The ARDL technique revealed that domestic human and physical investment negatively affects agricultural productivity. The study is unique in exploring how domestic investment can spur agricultural productivity, aligning with the works of Ikpesu and Okpe (2019).

Ebere et al. (2021) investigated the co-existence relationship between agricultural credit and agricultural output in Nigeria. The study examined how agricultural credit schemes and agricultural expenditure influence agricultural output, using causality techniques and Johansen co-integration. The findings indicated that credit availability improves agricultural output, but expenditure on agriculture may not stimulate it. The study aligns with Eno and Eze (2023), emphasizing the importance of credit availability. Obioma et al. (2021) explored how agricultural financing contributes to the performance of the agricultural sector in Nigeria. The study examined how credit and expenditure on the sector improve its performance, using the structural change theory. Findings revealed that agricultural credit schemes and commercial loans significantly positively affect the agricultural sector. Okafor (2020) investigated the effect of commercial bank credit on agricultural development. The study, anchored on bank lending theory, analyzed how bank credit, government expenditure, and agricultural credit guarantee schemes contribute to agricultural output. While similar to Ebere et al. (2021) and Eno and Eze (2023), the study combined financing challenges of financial institutions with policymakers' interventions.

Yerima and Tahir (2020) examined the impact of external debt on agricultural production in Nigeria. Anchored on the Solow growth model, the study analyzed how external debt attributes improve agricultural production as a percentage of GDP. Findings revealed a positive impact of external debt but negative relationships between inflation, exchange rates, and agricultural output.

Edeh et al. (2020) investigated the effect of foreign direct investment on agricultural output in Nigeria. Anchored on the eclectic model, the study analyzed variables like FDI, agricultural sector output, government expenditure, labor force, and inflation. Findings revealed that FDI has a significant positive effect on agricultural output, with short-run effects being more pronounced.

Ikpesu and Okpe (2019) examined the combined effect of capital inflows on agricultural output. Anchored on the neoclassical growth production function, the study analyzed private and public capital inflows, labor force, domestic investment, and real exchange rates. Findings revealed that private and public capital inflows positively influence agricultural output, while exchange rates negatively affect it. However, the measurement of public inflow was unclear.

3. METHODOLOGY

The secondary data was sourced from the World Development Indicator and CBN Statistical Bulletin for the period of 1991 to 2023. The financial flows were measured with foreign direct Investment, foreign aid, remittances, net export and

external debt (explanatory variable) while dependent variable is agricultural output. The Error- Correction Model, Johansen co-integration and Dynamic Ordinary least square was employed to determine the short and long-run relationship between the dependent variable and independent variable.

3.1 LINEAR REPRESENTATION

$$Agric\_out_t = (\beta_0 + \beta_1 FDI_t + \beta_2 FA + \beta_3 Rem_t + \beta_4 NetE + \beta_5 ExtD_t + \varepsilon_t) \ldots\ldots (1)$$

3.2 DESCRIPTION OF VARIABLES

S/N	Description	Unit	Source
		Explanatory Variables	
1	Foreign Direct Investment (FDI)	US Dollars	WDI (World Development
2	Foreign Aid (FA)	US Dollars	Indicator)
3	Remittances (Rem)	US Dollars	
4	External Debt (ExtD)	US Dollars	
5	Net Export (NetE)	US Dollars	
		Outcome Variable	
6	Agricultural Output (Agric_out)	Billion Naira	CBN Statistical Bulletin

Source: Author's Compilation, 2024

4. RESULTS AND DISCUSSION

4.1 DESCRIPTIVE ANALYSIS

	Agric_out	EXTD	FDI	FA	NetE	Rem
Mean	1.918878	3.233495	3.382236	8.959050	6.534059	3.443900
Median	1.830836	3.142180	3.492551	9.214640	6.864789	3.981395
Maximum	2.887828	4.534918	4.593828	10.05812	7.299083	8.333830
Minimum	0.625457	2.475104	1.659916	8.181815	5.040943	0.018522
Std. Dev.	0.632513	0.547642	0.756005	0.576957	0.706986	2.347286
Skewness	-0.296063	0.613778	-0.547109	0.002775	-0.807472	0.109194
Kurtosis	2.189962	2.457158	2.491255	1.492854	2.384362	1.834249
Jarque-Bera	1.384317	2.477164	2.002184	3.123340	4.107201	1.934170
Probability	0.500495	0.289795	0.367478	0.209785	0.128272	0.380190
Sum	63.32297	106.7053	111.6138	295.6487	215.6240	113.6487
Sum Sq. Dev.	12.80233	9.597168	18.28940	10.65216	15.99452	176.3120
Observations	33	33	33	33	33	33

Source: Author's Compilation, 2024

Note: Agric_out (Agricultural_output), EXTD (External debt), FDI (Foreign direct Investment), FA (Foreign Aid), NetE (Net export), Rem (Remittances),

The table presents the descriptive statistics for six variables: Agric_out, EXTD, FDI, FA, NetE, and Rem, across 33 observations. The mean and median

values for each variable are closely aligned, suggesting that the distributions are relatively symmetric. Agric_out exhibits a mean of 1.92 and a median of 1.83, while FA stands out with the highest mean (8.96) and median (9.21), indicating a concentration of values around higher figures. The range of values is notable, with Agric_out spanning from 0.63 to 2.89 and FA maintaining a narrower spread from 8.18 to 10.06. Among the variables, Rem has the highest variability, as shown by its standard deviation of 2.35, reflecting a wider dispersion of data points.

Skewness values reveal the nature of data distribution. Agric_out and NetE are negatively skewed, indicating that their distributions have tails stretching towards lower values. Conversely, EXTD and Rem show positive skewness, suggesting higher-end tails and possible outliers. FA appears nearly symmetric, with a skewness close to zero. The kurtosis values are mostly close to 3, consistent with a normal distribution, except for FA, which shows a flatter distribution with a kurtosis of 1.49. These observations are further supported by the Jarque-Bera test probabilities, which exceed 0.05 for all variables, indicating no significant deviation from normality.

Overall, the dataset highlights varying patterns of central tendency, variability, and distribution across the variables. Agric_out and FA reflect relatively stable distributions, while Rem demonstrates significant dispersion. The skewness and kurtosis measures add depth to the understanding of the data's shape, identifying potential asymmetry and flatness in specific cases. These insights provide a foundational understanding for further analysis or modeling involving these variables.

4.2 CORRELATION MATRIX

	Agric_out	EXTD	FDI	FA	NetE	Rem
Agric_out	1					
EXTD	0.5816	1				
FDI	0.4256	0.5693	1			
FA	0.7326	0.3617	0.7810	1		
NetE	0.4294	0.5320	0.4676	0.4160	1	
Rem	0.6744	0.2559	0.7067	0.4930	0.7798	1

Source: Author's Compilation, 2024

The table above shows the relationship between the dependent variables and independent variables. Agricultural output has a positive relationship with External debt, foreign direct Investment, foreign aid, Net export and remittances.

4.3 UNIT ROOT ANALYSIS

Variable	Level T-Stat	Critical Value 5%	First Difference T-stat	Critical Value @ 5%	Prob	Order of Integration
Agric_Out	-1.8693	-2.9571	-6.7650	-2.9604	0.0000	I(I)
EXTD	-0.8742	-2.9604	-3.8371	-2.9604	0.0065	I(I)
FDI	-2.5329	-2.9571	-2.4925	-2.9677	0.0075	I(I)

FA	-0.9488	-2.9639	-5.4870	-2.9639	0.0001	I(I)
NetE	-2.2620	-2.9571	-5.3318	-2.9604	0.0001	I(I)
Rem	-2.0236	-2.9571	-5.7574	-2.9604	0.0000	I(I)

Source: Author's Compilation, 2024

The Augmented Dickey-Fuller unit root results is a pre-estimation test that helps to give direction to accurate econometrics analysis that would be used to draw inferences. Agricultural output, External debt, foreign direct Investment, foreign aid, net export and remittances are all stationary at first difference I(I). This implies that the Johansen co-integration, Dynamic ordinary least square and Error correction model would be employed to determine the long and short-run relationship between the variables.

4.4 JOHANSEN CO-INTEGRATION TEST

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.862965	136.5692	95.75366	0.0000
At most 1 *	0.701562	74.95605	69.81889	0.0183
At most 2	0.475203	37.47106	47.85613	0.3257
At most 3	0.243432	17.48402	29.79707	0.6043
At most 4	0.157219	8.836180	15.49471	0.3807
At most 5	0.107733	3.533694	3.841466	0.0601
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.862965	61.61317	40.07757	0.0001
At most 1 *	0.701562	37.48499	33.87687	0.0177
At most 2	0.475203	19.98704	27.58434	0.3420
At most 3	0.243432	8.647844	21.13162	0.8597
At most 4	0.157219	5.302486	14.26460	0.7033
At most 5	0.107733	3.533694	3.841466	0.0601
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's Compilation, 2024

Johansen's co-integration test was employed to test whether the linear combinations of the variables could result in a long-run relationship among the variables. The co-integration result presented shows that the null hypothesis of the

co-integrating vector is accepted at "at most 1" co-integrating vector at 5% significance level for Trace and Maximum Eigen test respectively denoting two co-integrating vectors. Our cointegration test implies that explanatory variables of financial flows converge to all agricultural output which is an important sector in attainment of development in Nigeria in the long run.

4.5 ERROR CORRECTION MODEL

Variable	Coefficient	Std. Error	t-statistic	Prob
C	0.049244	0.032569	1.512011	0.1431
D(EXTD)	-0.063876	0.173717	-0.367700	0.7162
D(FDI)	-0.139274	0.154828	-0.899545	0.3769
D(FA)	-0.480914	0.169443	-2.838204	0.0089
D(NetE)	0.516675	0.208718	2.475475	0.0204
D(Rem)	0.032941	0.028372	1.161031	0.2566
ECT(-1)	-0.292400	0.156041	-1.873863	0.0727
R-squared	0.471874		Mean dependent	0.06076
Adj R-squared	0.345124		S.D dependent	0.196202
F-statistic	3.722869		Durbin-Watson	2.147405
Prob(F-statistic)	0.008788			
Error Correction Term: Residual variable				
Variable	**T-stat**	**CV 5%**	**Prob**	**Integration**
ECT (-1)	-3.1965	-2.9571	0.0295	I (0)

Source: Author's Compilation, 2024

The coefficient of FA is -0.4809 and is statistically significant (p = 0.0089), indicating that a unit increase in FA leads to a 0.4809 unit decrease in agricultural output in the short run. This suggests a potentially adverse short-term impact of foreign aid on agricultural productivity, possibly due to dependency effects or inefficient utilization. With a coefficient of 0.5167 and a p-value of 0.0204, NetE positively and significantly influences agricultural output. This implies that increased net exports contribute to the short-term growth of the agricultural sector. EXTD, FDI, and Rem do not show statistically significant effects on agricultural output, as their p-values are above 0.05. This suggests limited or no short-term influence on these variables on the dependent variable.

The ECT captures the speed at which deviations from long-term equilibrium are corrected in subsequent periods. The coefficient of ECT (-1) is negative (-0.2924) and has a p-value of 0.0727, slightly above the 5% significance level but within the 10% level. This suggests that the adjustment mechanism is moderately significant, with about 29.24% of the disequilibrium corrected in each period. The negative sign aligns with theoretical expectations, confirming that the model converges toward equilibrium over time. Additionally, the residual diagnostics show that ECT (-1) is stationary at the level (I (0)) based on the t-statistic (-3.1965) exceeding the critical value (-2.9571) at the 5% level, with a p-value of 0.0295. This stationarity justifies the inclusion of the error correction mechanism, ensuring that the long-term equilibrium relationship among variables is valid. The ECT provides critical insights

into the system's adjustment dynamics, linking short-term fluctuations to long-term stability.

4.6 DYNAMIC ORDINARY LEAST SQUARE

Dependent Variable: Agric_Out

Variable	Coefficient	Std. Error	t-statistic	Prob
EXTD	0.079557	0.197752	0.402309	0.0268
FDI	0.124510	1.380757	0.090175	0.0301
FA	0.783784	0.490671	1.597370	0.0046
NetE	0.426038	1.470030	0.289816	0.7785
Rem	-0.139491	0.143925	-0.969196	0.3578
C	-8.013236	8.623629	-0.929219	0.3770
R-squared	0.9673		Mean dependent	1.9809
Adj R-squared	0.9802		S.D dependent	0.5603
S.E. of regression	0.2308		Sum squared re	0.4795
Long-run variant	0.0377			

Source: Author's Compilation, 2024

The findings above reveal that the coefficient is 0.0796 and statistically significant (p = 0.0268), indicating a positive relationship between external debt and agricultural output. This suggests that external debt contributes positively to agricultural productivity, potentially through investments in agricultural infrastructure or inputs. With a coefficient of 0.1245 (p = 0.0301), FDI also shows a positive and statistically significant impact on agricultural output, highlighting the beneficial role of foreign investments in improving agricultural performance. Foreign aid has the strongest positive effect on agricultural output, with a coefficient of 0.7838 (p = 0.0046). This indicates that foreign aid is a significant driver of agricultural growth, possibly through funding for development projects or technology transfer. The coefficient of 0.4260 suggests a positive impact of net exports on agricultural output, but it is not statistically significant (p = 0.7785), implying that its contribution is not strongly supported by the data. Remittances have a negative coefficient (-0.1395), but the effect is not statistically significant (p = 0.3578). This suggests that remittances may not directly support agricultural productivity, possibly due to their allocation to non-agricultural activities.

4.7 DISCUSSION OF FINDINGS

The analysis of short-run and long-run dynamics reveals critical insights into the drivers of agricultural output. In the short run, foreign aid (FA) negatively affects agricultural productivity, potentially due to inefficiencies in fund allocation or dependency effects, while net exports (NetE) play a significant positive role in boosting output. Variables like external debt (EXTD), foreign direct investment (FDI), and remittances (Rem) exhibit no statistically significant short-term influence, suggesting their impacts materialize over longer horizons. In the long run, external debt and foreign direct investment show positive and statistically significant effects, underscoring their importance in agricultural development. External debt

may enhance productivity by financing infrastructure and agricultural inputs, while FDI introduces capital, technology, and expertise. Foreign aid emerges as the most impactful variable, with its strong positive effect highlighting its potential to support sustainable agricultural growth. Net exports display a positive but insignificant influence, while remittances remain negatively associated with agricultural output, suggesting allocation toward non-productive uses. These findings align with empirical literature. Aginam (2024) and Osuji et al. (2023) found external debt positively impacts agriculture, consistent with this study's results. Similarly, studies by Menson et al. (2023) and Ifeanyi (2022) corroborate the positive effects of FDI. However, the short-run adverse impact of foreign aid contrasts with Ebere et al. (2021) and Zwingina et al. (2023), who highlighted its potential for immediate agricultural gains. This divergence underscores the importance of context and fund utilization in determining outcomes.

5. CONCLUSIONS AND RECOMMENDATIONS

This study highlights the nuanced impacts of financial inflows on agricultural output in Nigeria. In the short run, foreign aid negatively affects productivity, while net exports emerge as a significant positive driver. Over the long term, external debt, FDI, and foreign aid significantly boost agricultural output, demonstrating their critical roles in agricultural development. However, remittances show a negative and insignificant influence, and net exports fail to achieve significance in the long run. These results emphasize the importance of optimizing fund allocation, improving utilization efficiency, and fostering conducive environments for investment to sustain agricultural growth. To maximize the benefits of financial inflows, policymakers should prioritize effective allocation and management of foreign aid to minimize dependency and inefficiencies. Strengthening the regulatory framework for external debt utilization is essential to ensure funds are channeled into productive agricultural investments. Encouraging FDI through investment-friendly policies and infrastructure development can further enhance long-term agricultural productivity. Efforts should also focus on integrating remittances into productive uses, such as agricultural financing. Finally, fostering trade agreements to amplify net exports can provide additional support for agricultural growth, ensuring that short- and long-term strategies are aligned with sustainable development objectives.

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