



# Inflation, Exchange Rate and Agricultural Export in Nigeria.

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## ABSTRACT

The study examined the Impact of Inflation and Exchange Rate on Agricultural Exports in Nigeria from 1986 to 2019. Annual data from 1986 to 2019 that is, 34 observations was used in this study. The Data was sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, Food and Agriculture Organization Statistical Database (FAOSTAT), and World Development Indicator (WDI). The study employed both Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root test, Granger causality test and Autoregressive Distributed Lag (ARDL) technique in order to achieve the objectives of the study. The study revealed that there is a unidirectional causality running from Agricultural export value (AEV) to inflation rate (INF) and also from Exchange rate (EXR) to inflation rate (INF). The findings of the study show that Exchange rate with a coefficient of (1057.724) has a positive and significant relationship with Agricultural export value while inflation rate with a coefficient of (3661.635) had a positive significant impact on AEV. From the findings, the study recommended that in order to increase Agricultural export, the government should implement an appropriate policy mix in other to stabilise and improve the value of the naira to boost Agricultural export value.

## INTRODUCTION

To gain more foreign currency (or save foreign exchange when primary products are imported) and to create a larger domestic manufacturing market, agriculture must grow to provide food for a growing non-

agricultural working population, raw materials for industrial production, savings, and tax revenue to support the development of the rest of the economy (Meier, as cited in Gatawa & Mahmud, 2017). Nigeria has a big population that can support a healthy and cultivable agricultural sector, as well as an abundance

of land, rivers, streams, lakes, woods, and grasslands, according to Gatawa and Mahmud (2017). Despite these resources, the sector often fell short of expectations.

The Nigerian economy was dominated by agricultural exports and trade before to independence in 1960 and up to the early 1960s. According to Tule (2015), despite shifts in the pricing of commodities globally, agriculture accounted for about 70% of all exports and around 65% of GDP in Nigeria. As peasant farmers produced enough food to feed the entire population and raised significant amounts of money through the various marketing boards, agriculture provided the foreign exchange needed to import raw materials and capital goods. The government then used the remaining funds to build the essential infrastructure needed for long-term growth (Tule, 2015).

Petroleum oil has dominated the nation's export portfolio since 1973/1974 and has been more dominant since the 1980s. The fundamental problem was that non-oil exports were declining while oil exports were rising, hastening, and widening the dominance. Although oil still accounts for the majority of the country's exports, attempts to buck these trends (begun in 1986) often have little success. "Petroleum oil was discovered in Nigeria and since then has not only been the backbone of the nation's economy but also, with a share of over 90%, its principal export, source of income, and source of foreign money. As a result, the output of non-oil items has been disastrously little. The nation has continued to post an enormous balance of trade and payment deficits in international commerce due to the high level of imports and low level of non-oil exports. Experts claim that this was the country's economic development's albatross (Fosu & Twumasi, 2022). The decline of the non-oil sector appears to have stopped, and several unconventional exports, including horticultural goods, apparel, textiles, furniture parts, and other manufactured goods, seem to have their origins in Nigeria's export inventory, according to Fosu & Twumasi. (2022)

The bulk of Nigeria's workforce roughly three-quarters is engaged in agriculture, like the majority of sub-Saharan Africa (SSA). Since agriculture is Nigeria's main source of food and means of livelihood, projects aiming at preventing famine and achieving food security in Nigeria must include it. Interest in raising agricultural productivity has been prompted by the realisation that revenue growth is reliant on productivity increase and investment funded by savings. Estimates of Nigeria's agricultural production showed a drop in growth from the early 1960s to the late 1980s. Economic growth in Nigeria has been strong, with real annual GDP growth averaging 8.8% from 2000 to 2007. Although it increased, the agriculture sector has lagged behind economic growth (Etale, Suwari, & Adaka, 2021).

One of the most dramatic occurrences in Nigeria during the last several decades was the depreciation of the naira in 1986 as a consequence of the adoption of a structural adjustment programme

(SAP). Restructuring the economy's production base with a focus on agricultural export output was a key goal of the SAP. Foreign currency measures that caused the effective exchange rate to depreciate cumulatively were expected to improve domestic output by accelerating local agriculture export prices (CBN, 2000). This devaluation resulted in significant changes in the structure and amount of Nigeria's agricultural exports, as determined empirically by several scholars (Hassan, & Onoshole 2022; Oye, Lawal, Eneogu, & IseOlorunkanmi, 2018; and. Nweke, Eze & Atuma, 2020). Studies have indicated that agricultural export volumes have grown significantly over time, and the devaluation also raised agricultural export prices. The influence of these swings on agricultural trade flows, however, is disputed given the volatility, rapidity, and unpredictable nature of exchange rate movements since the implementation of the floating exchange rate.

The relationship between exchange rate and inflation is crucial, especially in emerging economies. In such economies, exchange rate fluctuations can have a significant impact on the general price level (Musa, 2020). According to the work when the exchange rate (defined as the rate of change between two national currencies) rises, the aggregate price level will rise. Then, when the exchange rate falls, i.e., when the domestic currency appreciates, it is anticipated that general prices will decline. According to Olubukoye et al., as cited in Enilolobo et al., (2021), exchange rate plays an important role in agriculture sector performance in Nigeria, owing to the fact that machineries required for mechanized farming are usually imported. Therefore, changing exchange rates would impact production costs as the price of imported goods rises (Enilolobo et al., 2021). Therefore, it can be inferred that the exchange rate and inflation have a very close relationship. In this regard, it is necessary to investigate how inflation and exchange rates influence agricultural exports in Nigeria. This research aims to objectively determine the impact of exchange rates and inflation on the export markets for agricultural goods from Nigeria. The paper also analyses the type and direction of causation amongst inflation, exchange rate, and agricultural export in Nigeria.

## LITERATURE REVIEW

Exchange rate changes and agricultural credits have a positive impact on cocoa exports in Nigeria, while relative cocoa prices have a negative effect, according to Ufoeze et al., (2018) on the Effects of Price and Exchange Rate Fluctuations on Agricultural Exports in Nigeria. The investigation of factors that affect Nigeria's cocoa export flows by Abdullahi et al., (2021) was carried out in the work which used a commodity-specific gravity model, with three different analytical approaches: Heckman Sample Selection Model, the Generalised Least Square, and Poisson Pseudo Maximum Likelihood over a period of 24 years for

Nigeria and her 36 importing partners. The results found that GDP, exchange rate policy, World Trade Organisation, European Union, and colonial link have positively correlated with cocoa export flows in Nigeria.

Akinlo and Adejumo (2014) examined the effect of exchange rate fluctuations on Nigerian non-oil exports between 1986 and 2008 using the error correction model (ECM) technique and found that lagging foreign income and real exchange rates had positive and significant effects on exports outside the oil industry. For Russia and Nigeria, respectively, Bernadina (2004) and Rano (2008) discovered a negative link between the real exchange rate and non-oil export (including agricultural export). Although it relies on the interaction of demand and supply elasticities, research by Kandil and Mirzaie (2004), Colacelli (2008), Essien et al. (2011), and Umaru et al. (2013) indicated that unanticipated local currency appreciation enhanced agricultural production from the supply side.

According to Mbutor et al., (2013), agricultural finance frees farmers from the cycle of poverty by raising productivity and living standards. According to Essien et al. (2011), Abdullah et al., (2009), and Saboor et al. (2009), as cited by Mbutor et al. (2013), farmers can buy the heavy equipment and inputs they need to run their farms and increase production with timely and straightforward access to agricultural credit. As the value of the currency declines, agricultural producers mostly small-scale farmers must increase their output to sustain the same level of revenue. Export prices are based on agricultural exports, claim Sabouni and Piri (2008) and Essien et al., (2011). Therefore, the relationship between the export price and agricultural exports is positive. The demand for American agricultural exports would decline proportionately to the price difference between domestic and overseas exports, according to Batten and Belongia (1984).

Additionally, using the Vector Error Correction Model (VECM), Bernardina (2004), Mustapha and Nishat (2004), and Hasanov and Samadova (2011) investigated the causal link between exchange rate deregulation and Nigeria's agricultural GDP share. The Autoregression Distributed Lag (ARDL) model was used by Goudarzi et al. (2012) and Mehare and Edriss (2013) to investigate the impact of currency rate volatility on specific Iranian agricultural exports (pistachios, saffron, and dates). Akinlo and Adejumo (2014) looked at how changes in the exchange rate affected Nigeria's non-oil exports, and their results confirm that there is a steady, strong link between real exports and exchange rate changes.

Taiga and Ameji (2020) looked analysed the relationship between agricultural exports and economic development in Nigeria from 1981 to 2017. They found a strong and positive correlation between agricultural exports and economic development using the Ordinary Least Square (OLS) regression model. The findings of the Co-Integration test also showed a long-term link between the variables under investigation. However,

the research did discover that, at 5%, the contribution of agricultural exports to economic development was rather marginal. The study recommended policies like government funding for cutting-edge farm equipment, increased budgetary allocation to the agricultural sector, and stronger collaborations between research institutions and higher education to close the gap between theory and practice to increase the benefits of agricultural exports.

Enilolobo et al., (2021) investigated the impact of exchange rate and FDI on Agricultural productivity in Nigeria from 1986 to 2018 using Vector autoregressive (VAR) method of analysis and found out that FDI and exchange rate both have a negative impact on agricultural output in Nigeria.

## METHODOLOGY

The study employed the time-series secondary data, which was sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, the Food and Agriculture Organization Statistical Database (FAOSTAT), and the World Development Indicator (WDI).

Annual data was used and covered the period from 1986 to 2019 that is, 34 observations. The variables employed in this study include the following: Agricultural export value, inflation, and exchange rate, while trade openness and interest rate were employed as control variables.

The trend of Inflation, exchange rate and Agricultural export were analysed graphically as depicted in Figure 1 below in other to achieve the first objective of this study; also, a unit root test was carried out using Augmented Dickey-Fuller (ADF) & Phillip-Perron (PP) Test. In other to achieve the second objective of this study which is to evaluate the nature and direction of causality among inflation, exchange rate and agricultural export, Granger Causality (GC) test was employed. The third objective of this study was achieved by employing the autoregressive distributed lag (ARDL) estimation technique.

### Model Specification

The model of Gatawa and Mahmud (2017) is adopted and presented below as;

$$AEV = f(OER, REP, AGL) \text{ ----- (1)}$$

$$\ln AEV_t = \beta_0 + \beta_1 \ln AGL_t + \beta_2 \ln OER_t + \beta_3 \ln REP_t + U_t \text{ ----- (2)}$$

Where; **AEV** = agricultural export volume. **REP** = relative export price. **OER** = official exchange rate. **AGL** = agricultural loans.

Equation 2 will be specified in other to incorporate the objectives of this current research as follows. The model is given as;

$$AEV = f(ER, INF, TO, INR) \text{ --- (3)}$$

$$AEV_t = \beta_0 + \beta_1 ER_t + \beta_2 INF_t + \beta_3 TO_t + \beta_4 INR_t + U_t \text{ --- (4)}$$

Where;

**AEV** = Agricultural export value. **ER** = Exchange rate.

**INF** = Inflation rate. **TO** = Trade openness. **INR** =

Interest rate.  $\beta_0$  = vector of the intercept.  $\beta_1$  = vector of the parameter of exchange rate.  $\beta_2$  = vector of the parameter of Inflation rate.  $\beta_3$  = vector of the parameter of Trade openness.  $\beta_4$  = vector of the parameter of interest rate. **U** = error term. **t** = time.

**Granger Causality Model**

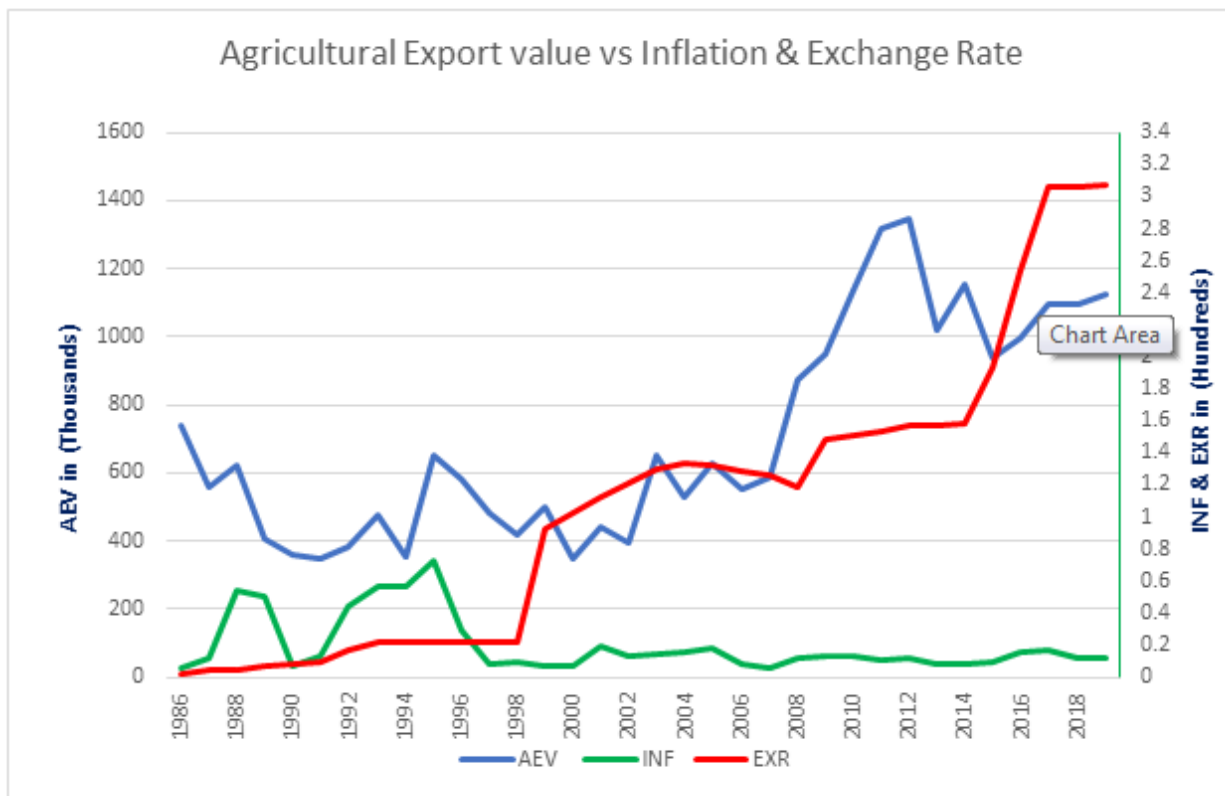
$$AEV_t = \delta_0 + \sum_{p=1}^k \delta_1 AEV_{t-j} + \sum_{p=1}^k \delta_2 ER_{2t-j} + \sum_{p=1}^k \delta_3 INF_{t-j} + \mu_1 \text{..... (5)}$$

$$ER_{2t} = \pi_0 + \sum_{p=1}^k \pi_1 ER_{2t-j} + \sum_{p=1}^k \pi_2 AEV_{t-j} + \sum_{p=1}^k \pi_3 INF_{t-j} + \mu_2 \text{..... (6)}$$

$$INF_t = \Omega_0 + \sum_{p=1}^k \Omega_1 INF_{t-j} + \sum_{p=1}^k \Omega_2 AEV_{t-j} + \sum_{p=1}^k \Omega_3 ER_{t-j} + \mu_3 \text{..... (7)}$$

$\Omega_0, \pi_0,$  &  $\delta_0$  are intercepts.  $\delta_1$  to  $\delta_3;$   $\pi_1$  to  $\pi_3;$   $\Omega_1$  to  $\Omega_3;$  are parameter estimates for equations 5-7 respectively t-j are lag lengths; and k, p are periods;  $\mu_{is}$  are independent serially uncorrelated random variables.

**RESULTS (PRESENTATION AND DISCUSSION)**



**Figure 1. The Trend of Agricultural Export Values vs Trend of Inflation & Exchange Rate. Source Authors' Computation**

From 1986 to 1998, Inflation rate was at its peak while exchange rate was at its minimum and the agriculture export value was decreasing during this period. From 1999, as exchange rate increased, Agricultural export

value was also increasing till it got its peak in 2012 further increases in the exchange rate were accompanied by a decline in Agricultural export value while the inflation rate remained relatively constant.

**TABLE 1: Augmented Dickey-Fuller and Phillip Perron Unit Root Test**

VARIABLE	ADF		PP		Order of Integration
	Level	1 <sup>st</sup> diff	Level	1 <sup>st</sup> diff	
AEV	-1.009963 (0.7381)	-7.309379 (0.000)*	0.95575 (0.000)*	7.259775 (0.000)*	I(1)
INF	3.276249 (0.0245)**	-6497593 (0.000)*	3.383816 (0.0189)**	6.612652 (0.000)*	I(0)
EXR	0.9854055 (0.9954)	-4.034116 (0.0038)*	0.930638 (0.9947)	-3.925169 (0.0051)**	I(1)
TO	-3.5924 (0.0114)**	-7099527 (0.000)*	-3.576341 (0.0119)**	-7.941580 (0.000)**	I(0)
INT	-3276249 (0.0243)**	-6.497593 (0.000)*	-3.383816 (0.0189)**	-6.612652 (0.000)*	I(0)

Sources Authors computation \* stationary at 1%, \*\* stationary 5%.

**Table 2: Granger Causality Tests**

NULL HYPOTHESIS	OBS	F-TEST	Probability
EXR does not granger cause AEV	32	2.11825	0.1398
AEV does not granger cause EXR		0.18034	0.8360
INF does not granger cause AEV	32	0.45109	0.6416
AEV does not granger cause INF		2.51081	0.1000***
INF does not granger cause EXR	32	1.14741	0.3325
EXR does not granger cause INF		2.50591	0.1004***

Source Authors Computation \*significant at 1%\*\*significant at 5%\*\*\*significant at 10%.

Table two above shows the result of the Granger causality test. From the first panel, it is evidence that there is no causal relationship between agricultural export value and exchange rate. Similarly, from the second panel, it is observed that there is a

unidirectional causality running from Agricultural export value (AEV) to inflation rate (INF). Finally, the third panel also shows a unidirectional causality running from Exchange rate (EXR) to inflation rate (INF).

### Co-integration Analysis

**Table 3: Bonds Test Results**

F-statistic			T-statistics		
Value (K)	3.266(4)		Value	-2.326	
Critical value Bond			Critical value Bond		
Significance	I(0)	I(1)	Significance	I(0)	I(1)
10%	2.45	3.52	10%	-2.57	-3.66
5%	2.86	4.01	5%	-2.86	-3.99
2.5%	3.25	4.49	2.5%	-3.13	-4.26
1%	3.74	5.06	1%	-3.43	-4.6

Source: Author's Compilation

Table 3 above depicts the results for both F-stat and T-stat bond tests. The value of the F-statistics is 3.266 which is greater than the lower (2.86) and lesser than the upper (4.01) value at a 5% level of significance, hence the test is inconclusive. However, the absolute

value of the T-statistics is 2.326 which is less than the absolute value of the lower (2.86) and upper (3.99) values at a 5% level of significance indicating the absence of a long-run relationship among the variables, hence we proceed to the ARDL regression.

## Regression Analysis

**Table 4: ARDL Regression Results**

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
AEV (-1)	0.733	0.115	6.369	0.000*
EXR	1057.724	355.588	2.975	0.006*
INF	3661.635	1548.338	2.365	0.026**
INT	-11629.32	8206.447	-1.417	0.168
TO	6359.600	2607.802	2.439	0.022**
C	139.772	214872.4	0.001	0.100
<b>Summary statistics</b>				
R-squared	0.865	Mean dependent var		706734.9
Adjusted R-squared	0.840	S.D. dependent var		315925.3
S.E. of regression	126526.9	Akaike info criterion		26.497
Sum squared resid	4.32E+11	Schwarz criterion		26.769
Log likelihood	-431.205	Hannan-Quinn criter.		26.589
F-statistic	34.501	Durbin-Watson stat		2.458
Prob(F-statistic)	0.000*	Mean dependent var		706734.9
Jarque-bera p-value	0.543	Breusch-pagan Test for Heteroscedasticity		0.618
		Ramsey REST pvalue		0.406

**Source: Author's Compilation. (\*) (\*\*) indicate significance at 1% and 5% respectively**

AEV= 139.772(0.001) + 1057.724(2.975) \*EXR + 3661.635(2.365) \*\*INF - 11629.32(-1.417)INT + 6359.6(2.439)\*\*TO. (Note: values in parenthesis are t- stats)

Table 4 above shows the result of the estimated ARDL model. From the results above, the value of the r-squared is 0.865 indicating that the exogenous variables have been able to successfully explain 86.5% of the total variation in the dependent variable (AEV) hence the model has high goodness of fit. Also, the remaining 13.5% is been explained by variables not captured in the model. The value of the F-statistics is 34.501 which is significant at 1% levels of significance depicting that the model is statistically reliable in explaining the system. The Durbin-Watson Statistics value of 2.458 indicates the absence of serial autocorrelation in the model. The Breusch -Pagan Statistics was employed to test for Heteroscedasticity. The probability value of (0.618) indicates the absence of heteroscedasticity in the model. Also, the probability value of Jarque-Bera statistics is (0.543) indicating that the error term is normally distributed. Similarly, the P-value of Ramsey REST statistics was (0.406) indicating that the regressors of the model are stable.

The coefficient of the constant term (c) is 139.772 which is statistically insignificant. From the estimated model, it is evident that there exists a significant and positive relationship between AEV and exchange rate which implies that a unit increase in exchange rate (appreciation of naira) will cause AEV to increase by 1057.724 and this is because the appreciation of naira will result in increased earnings from Agricultural export, which is in line with the empirical findings of Akinlo and Adejumo (2014), who examined the impact of exchange rate fluctuations on

Nigerian non-oil exports between 1986 and 2008 and found that real exchange rates had positive and important effects on exports outside of the oil industry (inclusive of agricultural exports). The finding is also in correlation with the findings of Essien et al., (2011), Umaru et al., (2013), and Gatawa and Muhmud (2017). Likewise, INF with a coefficient of 3661.635 have a direct relationship with the dependent variable and it is statistically significant at 5%. INT with a coefficient of -11629.32 has an inverse relationship with the dependent variable although it is statistically insignificant. This implies that a unit decrease in interest rate will cause AEV to increase by 11629.32 this is because when the interest rate is reduced farmers are attracted to access loans at cheaper rates which will boost their productivity and hence increase Agricultural export value. This is supported by Mbutor et al., (2013), who asserted that agricultural credit consequently enhances productivity and promotes living standards by breaking the vicious cycle of poverty among farm owners. Finally, trade openness has a positive and significant relationship with Agricultural export value.

## CONCLUSION AND RECOMMENDATION

The study empirically investigated the impact of inflation and exchange rate on agricultural export in Nigeria. The findings of the study show that the exchange rate has a positive and significant relationship with agricultural

export value, implying that exchange rate is a major determinant of agricultural export value. Inflation rate also had a positive significant relationship with agricultural export value. Also, interest rate has an indirect and insignificant relationship with agricultural export value. Trade openness has a positive impact on Agricultural export value. Finally, the result from the Granger causality test shows that there exists a unidirectional causality running from AEV to inflation rate and likewise from exchange rate to inflation rate.

From the findings of this study, the following policy recommendations are postulated;

- i. To increase Agricultural export, the government should implement an appropriate policy mix in other to stabilise and improve the value of the naira to boost agricultural export value.
- ii. Trade openness should be encouraged in other to increase agricultural export value and improve the standard of living in the country.
- iii. Interest rates should be reviewed by policymakers and reduced as this will encourage farmers to access Agricultural credit which will improve their productivity and as a result, improve Agricultural export value in Nigeria.

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