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Inflationary Trends, Agricultural Output and Economic Growth in Nigeria

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ABSTRACT

Rapid output growth and low inflation are common objective of macroeconomic policy, it is widely believed that Price stability promote long term economic growth whereas tradeoff exist between inflation and economic prosperity. This study investigates the relationship between inflation rate, agricultural output and economic growth in Nigeria, using time series data spanning from 1990 - 2022. The specific objectives of the study were to find the effect of inflation on agricultural output, the contribution of agricultural output to economic growth in Nigeria, and the causal relationship between inflation and agricultural output, agricultural output and economic growth in Nigeria. The study used descriptive statistics, correlation analysis, ADF unit root test, Auto Regressive Distribution Lag (ARDL) and granger causality to achieve the objectives of the study. The ARDL Bound Test revealed that a long run relationship exists between inflation and agricultural output, agricultural output and economic growth in Nigeria. Also, the ARDL test revealed a negative and significant relationship between Inflation and Agricultural output, which was in line with the apriori expectation and also a negative relationship exists between Gross Capital Formation and Economic growth in Nigeria, which is not in line with the A-priori expectation. Agricultural output on the other hand has a positive relationship with economic growth in Nigeria which is in line with the apriory expectation. The granger causality also revealed that there is unidirectional causality between agricultural output and economic growth and bidirectional causality exists between inflation and agricultural output in Nigeria. The study recommends that optimal economic performance could be achieved and economic slump prevented by influencing aggregate demand through active stabilization and economic intervention policy by the government.

INTRODUCTION

Agricultural productivity has been the origin and basis upon which growth of human community depended on throughout the continent of the world. It is concerned with the husbandry of animals and crops for food and for industrial purpose. Nowadays, the importance of agriculture has been conceived throughout continent of the world, as it among the sector that effectively contributes to a countries economic prosperity. The history of agriculture records the domestication of plants, livestock breeding, the development and dissemination of techniques for raising them productively. Agriculture has its origin in the history of Nigeria and this is the reason for the green and white in the national flag signifying the nation wealth and it rich human and natural resources, and also emphasizing the important role the sector played by serving as a major source of livelihood to over 75 percent of the entire population through which they engaged in production, processing and

distribution of agricultural product. (African Development Bank (ADB), 2020). The individual households in Nigeria spend more on food relative to overall spending and therefore, food price inflation has continued to register a new high, rising by more than 30 % year-on-year, underpinned by large increases in the prices of cereals, wheat, edible oils, meat and other common consumables (Aigbedion, 2017). While the most recent price increases were triggered largely by production shortfalls due to bad weather, structural and cyclical factors that were at play during the 2007–2008 economic crisis, insecurity ranging from banditry and cattle rustling and COVID-19 pandemic that started in 2019, food crisis continue to have relevance, especially in the light of the strong recovery of Nigeria from the global pandemic (Food and Agricultural Organization (FAO), 2022).

Inflation is undeniably a dynamic macroeconomic problem confronting most economies and has become a leading issue of discussion in Nigerian families because of the continuous increase in price of food and other commodities as its effects penetrate deeply due to continuous increase in prices. Inflation has been apparent in Nigeria from the onset of it existence as it was propelled in 1960 through the cheap money policy, which was adopted by the Nigerian government in order to stimulate economic growth and development after independence in 1960 (Bayo, 2005). The future direction of Nigeria food price will absolutely depend on whether research and development increase agricultural productivity faster than the overall demand of food in Nigeria.

The factors influencing price of agricultural commodity ranging from the demand side to the supply side. The Consumer continue to consume the agricultural product that has inelastic nature, that is, in full employment condition, the economy reaches to its present maximum production capacity. At this point, the supply of agricultural output cannot be increased further while the demand of products and services increases rapidly after season of harvest, the total output of agricultural commodity harvested cannot be increased until the next season of farming and the product will be less available in circulation, which will trigger increase in price of farm output. Prices of agricultural output go up when supply is lower than demand the situation that triggers Supply shock in agricultural commodity market, this result in scarcity of agricultural product, which latter result to price inflation. A rapid economic growth tends to cause upward pressure on price and wages leading to higher inflation rate, with higher economic growth, the economy will start to experience inflation.

Nigeria as a country has in the past depended on the agricultural sector prior to the oil boom. During the 1950's up to the early 1970's before the discovery of crude oil in Nigeria, agriculture was the stabilizing mechanism of the economy, employing about seventy percent of the total population. Because of the oil boom, it has become more distinct that the agricultural sector could no longer perform its role of meeting domestic food requirement. Raw materials for industry also started to decline as a source of foreign exchange earner through exports due to economic, social and political problems. Furthermore, the data of bureau of statistics for the year 2020 indicate that the Nigerian economy contracted by 6.1% year on year in the second quarter of 2020, This was as a result of COVID-19 pandemics with many Nigerians becoming unemployed combined with the lower volumes of export such as in oil and this was accompanying by a steep drop in oil prices amid a drop in global demand left Nigeria extremely short of earning given it dependency on a single commodity as it biggest revenue source. This price instability threatens central bank of Nigeria (CBN) single digit inflation target, purchasing power of naira has been under treat. Following the impact on the local currency devaluation and inflation rate of too much money chasing few commodities, the detail of Nigerian economic contraction made it more urgent for Nigeria to develop and diversify to other sector of the economy by looking into Agriculture as alternative to oil (National Bureau of Statistics (NBS), 2020).

The impact of growth in Agriculture of a country is reflecting by its contribution to economy growth. Many researchers have used different methods to signify the contribution of agricultural output to economic growth although neglecting the role of inflation in agricultural productivity**.** Some scholars have tried to explain the relationship that exists between agricultural output and economic growth in Nigeria. Edeh, Ogbodo and Onyekwe (2020) evaluated the impact of government expenditure on agricultural sector output in Nigeria for the period 1981-2018. The study employed ARDL technique to investigate the relationship between government expenditure and agricultural output in Nigeria; the study reviled that, bound test cointegration indicates a long run relationship in the model, the result of the ARDL model technique analysis reveals that capital expenditure is positively related to agricultural output and it is also statistically significant. It was revealed that the impact of capital expenditure on agricultural output begins to weaken after one year. While recurrent expenditure has a negative and insignificant impact on agricultural output. Recommendation was made that the government should budget more on agricultural capital expenditure and also more incentives should be provided to famers. Although given the researchers recommendation for the Nigerian economy, government should not be left alone in provision of capital expenditure to boost agricultural productivity, rather there is need for private investment in favor of growth enhancing expenditure.

Sophie, Sunday and Rebecca (2020) examined the impact of inflation on Nigerian economic growth from (1989 to 2019). The study employed the use of Autoregressive distribution lag (ARDL) and Error correction model (ECM) the result indicated that inflation have negatively affect the Nigerian economy while interest rate on the other hand has positively contributed to Nigeria economic growth. The findings conclude that while inflation and exchange rate has negatively affected the economy, government consumption proved to be an insignificant factor in influencing Nigerian economic growth. The study suggested that the central bank of Nigeria should work on potting the inflation figure to the barest minimum.

The literature review shows that the relationship that exists between inflation and agricultural output which is a drive to economic growth is an empirical issue that should be further investigated. Furthermore, the objective of this study is to analyze the relationship between inflation rate, agricultural output and economic growth in Nigeria. Specifically, the study aim to examine how change in inflation rate impact agricultural productivity and subsequently affect overall economic growth. By understanding this relationship, policymakers and stakeholders can make informed decision to promote sustainable economic development in the agricultural sector.

METHODOLOGY

In order to analyze the effect of inflation on agricultural output in Nigeria, from the period of 1990 to 2022, an annual time series data is sourced from the central bank of Nigeria, and World Bank development indicators database. The estimation technique was vent on Pesaran, Shin and Smith (2001), they formulated a technique for testing long run relationship between the regressed and regressors, known as the ARDL bound test. However, the ARDL bound test is applicable when a model consists of variables that are integrated at 1(0) or purely 1(1) or the mix of both that is (zero and one or order one in some cases, which is one of the most important edges it has over the conventional co-integration method. The model for objectives of this fits the conditions for the application of the Persaran, Shin and Smith (2001) technique and as such ARDL bound test was employed. When it comes to long run models with small and finite sample sizes, the ARDL bound test relatively more efficient as it provides unbiased estimates. Also the ARDL procedure can be cointegration using small sample. In addition to this, Emeka and Aham (2016) posits that irrespective of whether the underling variable are I(0) or I(1) or the combination of both, ARDL technique can be applied.

For the purpose of this study, it begins with the examinations of time series property of macroeconomic variable under consideration. Unit root test is mostly used to determine if trending data should be first differenced or rather regressed on deterministic functions of time to render the data stationary. Economic theories often suggest the existence of long run equilibrium shifts among non-stationary time series variables. Thus, the augmented Dickey fuller test of (1989) with constant term trend is as follows;

$\Delta Y_t = \alpha_1 + \alpha_2 t + \beta Y_{t-1} \sum_{t=1}^{n} yi \Delta Y_{t-1} + \varepsilon_t$……..……1

$Y_t = \alpha_0 + \alpha_1 t + \alpha_1 Y_{t-1} + \delta$……..…….2

The alternative hypothesis ($H_{1:}\beta < 0$) of ADF test, indicate the series is stationary, and the null hypothesis($H_{o:}\beta = 0$) indicate the series is non-stationary.

Model Specification

This study is anchored on the Solow Swan growth theory, the theory assumes that Savings and investment decisions are exogenous (no individual optimization) the study closely follow the Solow mode because it links how factor input determine output and economic growth. Also these research analyses closely adopt the empirical work of Edeh Ogbodo and Onyekwe (2020).

Objective one; To determine the effect of inflation on agricultural output in Nigeria.

Model one; AGRIC = f(INF, GCAP, LBR)……..…….. 3

Specifying the equation as linear function for model one and two:

$AGRIC_t = \beta_o + \beta_1 INF_t + \beta_2 GCAP_t + \beta_3 LBR_t + Ɛ_{t1..}$…….....4

In order to harmonize the variables and also interpret the resulting coefficients as elasticity the equations below are restructured in log form as thus:

$Log_{t\text{-}I}AGRIC_t = \beta_o + \beta_1 INF_t + \beta_2 Log_{t\text{-}I}GCAP_t + \beta_3 Log_{t\text{-}I}LBR_t + Ɛ_{t1}$ ..…….……5

Objective two; To determine the effect of agricultural output on economic growth in Nigeria.

Model two; RGDP = f(AGRIC, GCAP, LBR) 6

Specifying the equation as linear function:

$RGDP_t = \beta_o + \beta_1 AGRIC_t + \beta_2 GCAP_t + \beta_3 LBR_t + Ɛ_{t2}$……7

We intend to interpret the resulting coefficients as elasticity the equations below are restructured in log form as thus:

$Log_{t\text{-}I}RGDP_t = \beta_o + \beta_1 Log_{t\text{-}I}AGRIC_t + \beta_2 Log_{t\text{-}I}GCAP_t + \beta_3 Log_{t\text{-}I}LBR_t + Ɛ_{t2}$ …….…….....8

Objective three; To evaluate the causal relationship between inflation rate and agricultural output in Nigeria.

The granger causality test assumes that the information relevant to the prediction of respective variables, X and Y, is contained solely on the time series data on these variables the test involves the following pair of regression;

Model 3; Let X_t = AGRO and Y_t = INF,

$X_t = \beta_0 + \sum_{i=1}^{p} \beta i \, X_{t-i} + \sum_{j=1}^{p} \varphi j \, Y_{t-j} + U_{1t}$……..…… 9

$$Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha i\, Y_{t-i} + \sum_{j=1}^{p} \omega j\, X_{t-j} + U_{2t} \quad \ldots\ldots 10$$

Where,

AGRIC, is Agricultural output, which is the index of aggregate agricultural output, (billions naira),

INF, is Inflationary trend given by inflation rate (percentage rate, %),

GCAP, is Capital Formation, which is the market value of capital goods at a given point in time given by (billions naira),

$LBR_{t,}$ is Labor Force, given by (sum number of working age group).

$\beta_{O,}$ is the constant term or intercept of the model

β_1-$\beta_{3,}$ are regression coefficient of the explanatory variables in the model

$\mathcal{E}_{t,}$ is the stochastic term or error term

$Log_{t\text{-}I,}$ is log of present time minus past or previous.

RESULT AND DISCUSSIONS

Correlation Matrix

A correlation matrix is a table which displays correlation, the measure is best use in variable that demonstrate a linear relationship between each other. The signs in a correlation tell us what direction the variable move, a positive correlation means the two variables move in the same direction that is, as one variable increases the other also increases, a negative correlation on the other hand, mean the variable move in an opposite direction that is, as the variable goes up, the other variable comes down. The number in a correlation will always be between zero and one.

Table 1: Results of Correlation Matrix

	AGRIC	RGDP	INF	GCAP	LBR
AGRIC	1				
RGDP	0.8586	1			
INF	-0.3736	-0.4139	1		
GCAP	0.9631	0.7403	-0.3416	1	
LBR	0.9421	0.8623	-0.5005	0.8909	1

Source; computed by the researcher using E-views version 10 (2023).

In each cell of the table shows a correlation between two specific variables. Variable such as Gross Capital Formation and Labour Force productivity have a strong positive correlation with agricultural output of 0.9631 and 0.9421. While a negative correlation of -0.3736 exists between Agricultural Output and Inflation. On the other hand, objective two indicate Real Gross Domestic Product, Agricultural Output, Gross Capital Formation and Labour Force have a strong positive correlation of 0.8586, 0.7403 and 0.8623 respectively.

Unit Root

The study employed the use of Augmented Dickey Fuller in order to test for the presence of unit root or otherwise in both the dependent and explanatory variables in the study. In both Tables 2 and 3, the unit root test suggests five (4) variables were used namely; agricultural output, gross

capital formation, inflation rate and labour force. The aim here is not only to test the stationarity process of the variable but to also determine the order of integration either at level or at first difference. The unit root statistics reported are for the level and first difference series in Table 2 and Table 3, respectively.

Table 2: Results of Augmented Dickey-Fuller Unit Root Tests in Level

Variables	Calculated Statistics	Probability value	Status	Order of integration
AGRIC	2.928026	0.9986	Not stationary	Unknown
RGDP	0.377650	0.7868	Not stationary	Unknown
INF	-1.208457	0.2024	Not stationary	Unknown
GCAP	2.961772	0.9986	Not stationary	Unknown
LBR	6.440178	1.0000	Not stationary	Unknown

Source; computed by the researcher using E-views version 10 (2023).

The results of the unit root test in the Table 2 above suggest that there is strong evidence that the null hypothesis of the presence of unit roots cannot be rejected in level form for all the variables. In other words, the results suggest all the series in level are non-stationary. This is not surprising, because it is noted in econometric literature that macroeconomic variables in essence are not stationary.

Table 3: Results of Augmented Dickey-FullerUnit Root Tests in First Difference

Variables	Calculated Statistics	Probability value	Status	Order of integration
AGRIC	1.445373	0.0097	Stationary	I(1)
RGDP	-8.475693	0.0000	Stationary	I(1)
INF	-4.510753	0.0001	Stationary	I(1)
GCAP	-0.273209	0.0088	Stationary	I(1)
LBR	-0.622944	0.0359	Stationary	I(1)

Source: Computed by the researcher using E-views version 10 (2023).

As observed from the results obtained in Table 4, it seemed necessary to test the stationarity of the variables at their first difference since the variables were not stationary at levels. The results of these difference series is presented in the unit root tests in Table 3. The results suggests after differencing the series, the null hypothesis of non-stationarity in each of the series can be rejected at 1% and 5% level of significance Thus, the series are now integrated of order 1, that is they are I(1). These results are consistent with the general notion that most macroeconomics variables are non-stationary at level, but are mostly stationary after first difference. It is therefore possible to conclude that these series follow a stochastic trend and can be cointegrated as well.

ARDL Bound Co-Integration Test for relationship between Inflation and Agricultural Output in Nigeria

The result obtained from the unit root test shows that the variables of the model was formulated to provide answer to research question one, the ARDL bound test was conducted to ascertain the nature of relationship between inflation and agricultural output as stated in objective one. The decision rule for ARDL bound test is that; do not accept the null hypothesis that no relationship exists if F- statistics value is greater than critical value of upper bound 1(1) at the 5% chosen level of significance of this study. The null hypothesis that no long relationship exists is accepted if the F-statistics value is lower than the critical value of lower bound 1(0). The result of the test is said

to be inconclusive when the value of F-statistics falls between the upper and lower bound. The result is represented below

Table 4: Bounds Test Cointegration for Relationship between Inflation and Agricultural Output in Nigeria

F- statistic	lower bound	Upper bound	K(n-1)	Sign.lev	Remarks
	2.72	3.59	3	10%	
3 . 8 7 1 7 0 4	3.23	3.77		5%	Cointegration
	3.69	4.89		2.5%	
	4.29	5.61		1%	

Source: Researcher's Computation Using Eviews 10 (2023).

From Table 4, it can be seen that the value of F-statistic is 3.871704, the value is greater than the lower and upper bounds t-statistic at 5% level of significance. This justifies the rejection of the null hypothesis against the alternative hypothesis that a cointegration relation exists among the variables in the model. This implies that the null hypothesis of "no Cointegration" among the variables of interest was rejected. Hence, we concluded that there exists a long-run or cointegrating relationship among all the variables in the study. As such, the ARDL cointegration approach was applied to estimate the individual long-run relationship among the variables.

Table 5: Long run Coefficient Estimation for Relationship between Inflation and Agricultural Output in Nigeria

Variable	**Coefficient**	**Std. error**	**t-statistics**	**Prob**
C	-7.250850	5.042345	-1.437992	0.1628
LAGRIC(-1)	0.824761	0.126070	6.542080	0.0000
INF(-1)	-0.001971	0.000732	-2.692391	0.0125
LGCAP(-1)	0.047484	0.0194691	0.243895	0.8093
LLBR(-1)	0.956689	0.811826	1.178441	0.2497
ECM	-0.246020			

Source: Researcher's Computation Using Eviews 10 (2023).

Table 5 presents the long run relationship among the variable under consideration -0.001971 implies that given an increase of Inflation rate by 1%, Agricultural Output will on average decrease by -0.001971% keeping all other variables constant. Hence, there is significant negative relationship between Inflation and Agricultural Output. Again, 0.047484 implies that a unit increase in Gross Capital Formation will increase Agricultural Output by 0.047484% keeping other variables constant. As such, there is a significant positive relationship between Gross Capital Formation and Agricultural Output. Similarly, 0.956689 implies that 1% increase in Labour will lead to on average an increase of Agricultural Output by 0.956689% holding other variables constant. This implies there is a significant positive relationship between Labour and Agricultural Output. However, the most important is the coefficient of the Error Correction Term (-0.246020) which represents the speed of adjustment towards the long-run equilibrium. The value is negative and statistically positive. This implies that the model is converging to the long run equilibrium adjustment process. In addition to this, the ECM which is -0.246020, and it is statistically significance at 0.0558 which is at 5% significant level, the R square shows the goodness of fit of the model, while the F statistics shows the overall significant of the result

which is less than 5% significant level. The coefficient of Inflation is in line with apriori expectation of negative sign also log of Gross Capital Formation, log of Labour are in line with apriori expectation of positive sign.

The R-Square (R) value of 0.994424 as shown by the result implies that 99% variation in Agricultural Output is accounted for by Inflation rate, Gross Capital Formation and Labour Force in Nigeria. The Durbin Watson is used for presence of autocorrelation among the error terms. The acceptable Durbin –Watson range is between 0 and 2.4. The model also indicates that there is no autocorrelation among the variables as indicated by Durbin Watson (DW) statistic of 1.693773. This demonstrates that the estimates are unbiased and can be relied upon for economic decisions. In addition, the R square is less than the Durbin Watson statistics, 0.994424 <1.693773, which indicate that the regression is not a spurious regression.

Post –Estimation Diagnostic CUSUM Test for Relationship between Inflation and Agricultural Output in Nigeria

As for diagnostic tests, the model passes through the tests. It shows there is no evidence of serial correlation and the model is normally distributed. The stability of the model was tested. The technique applied was cumulative sum (CUSUM) test proposed by Brown et al. (1975). If the plot of the CUSUM remains within the critical limits of 5percent significance level, the null hypothesis that all the coefficients are stable cannot be rejected. However, if one or another of the parallel line crosses, then the null hypothesis of parameters stability is rejected at 5% significance level. Figure 1 shows the result of CUSUM test. It indicates evidence of stability of the model as the critical line remains within the boundary, at 5% significance level.

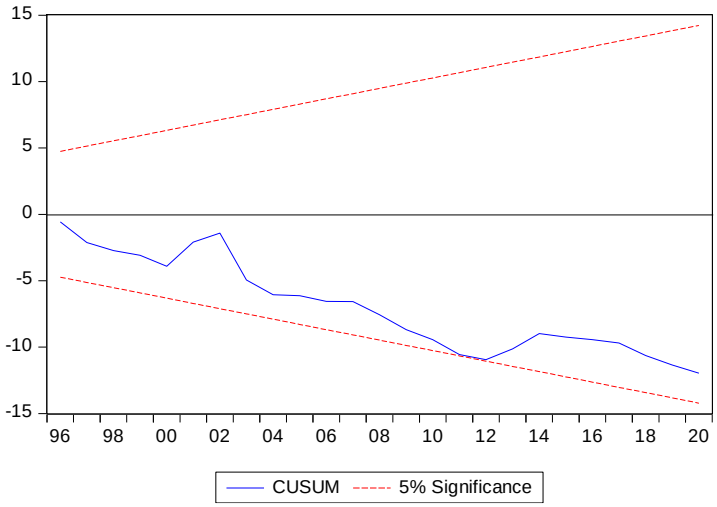

Figure 1: CUSUM Test for Relationship between Inflation and Agricultural Output in Nigeria

ARDL Bound Co-Integration Test for Relationship between Agricultural Output and Economic Growth in Nigeria

The result obtained from the unit root test shows that the variables of the model was formulated to provide answer to research question two, the ARDL bound test was conducted to ascertain the nature of relationship between agricultural output and economic growth in Nigeria as stated in

objective two. The decision rule for ARDL bound test is that; do not accept the null hypothesis that no relationship exists if F- statistics value is greater than critical value of upper bound 1(1) at the 5% chosen level of significance of this study. The null hypothesis that no long relationship exists is accepted if the F-statistics value is lower than the critical value of lower bound 1(0). The result of the test is said to be inconclusive when the value of F-statistics falls between the upper and lower bound. The result is represented below.

Table 6: Bounds Test for Cointegration for Relationship between Agricultural Output and Economic Growth in Nigeria

F- statistic	lower bound	Upper bound	K(n-1)	Sign.lev	Remarks
	2.72	3.77	3	10%	
4.5367773	3.23	4.35		5%	Cointegration
	3.69	4.89		2.5%	
	4.29	5.61		1%	

Source: Researcher's Computation Using Eviews 10 (2021).

From the Table 6, it can be seen also that the value of F-statistic is 4.5367773, the value is greater than the lower and upper bounds t-statistic at 5% level of significance. This justifies the rejection of the null hypothesis against the alternative hypothesis that a cointegration relation exists among the variables in the model. This implies that the null hypothesis of "no Cointegration" among the variables of interest was rejected. Hence, we concluded that there exists a long-run or cointegrating relationship among all the variables in the study. As such, the ARDL cointegration approach was applied to estimate the individual short-run and long-run relationship among the variables.

Table 7: Long run coefficient estimation for Relationship between Agricultural Output and Economic Growth in Nigeria

Variable	**Coefficient**	**Std. error**	**t-statistics**	**Prob**
C	-7.432363	11.72329	-0.633983	0.1319
LRGDP(-1)	0.063650	0.199718	0.318698	0.0026
AGRIC(-1)	0.207337	0.293074	0.707454	0.0158
LGCAP(-1)	-0.301802	0.454848	-0.663522	0.5131
LLBR(-1)	2.296116	1,956844	1.173377	0.0017

Source: Researcher's Computation Using Eviews 10 (2021).

Table 7 presents the long-run relationship among the variables under consideration. 0.207337 implies that given an increase of Agricultural Output by 1%, Real Gross Domestic Product will on average increase by 0.207337% keeping all other variables constant. Hence, there is insignificant positive relationship between Agricultural Output and Real Gross Domestic Product. Again, -0.301802 implies that a unit increase in Gross Capital Formation will decrease Real Gross Domestic Product by -0.301802% keeping other variables constant. As such, there is significant negative relationship between Gross Capital Formation and Real Gross Domestic Product. Similarly, 2.296116 imply that one percentage increase in Labour Force participation will increase Real Gross Domestic Product by 2.296116% holding other variables constant. This implies there is significant positive relationship between Labour Force and Real Gross Dometic Product. However, the most important is the coefficient of the Error Correction Term (-1.318680) which represents the speed of adjustment towards the long-run equilibrium. The value is negative and statistically positive.

This implies that the adjustment process from the short-run deviation is very fast. Thus, the model adjusts itself towards equilibrium by -1.318680%. In addition to this, the ECM which is, -1.318680 and it is statistically significance at 0.0225 which is at 5% significant level, the R square shows the goodness of fit of the model, while the F statistics shows the overall significant of the result which is less than 5% significant level.

The R-Square (R) value of 0.700617 as shown by the result implies that 70% variation in Real Gross Domestic Product is accounted for by Agricultural Output, Gross Capital Formation and Labour Force in Nigeria. The Durbin Watson is used for presence of Autocorrelation among the error terms. The acceptable Durbin –Watson range is between 0 and 2.4. The model also indicates that there is no autocorrelation among the variables as indicated by Durbin Watson (DW) statistic of 2.078515. This demonstrates that the estimates are unbiased and can be relied upon for economic decisions. In addition, the R square is less than the Durbin Watson statistics, 0.700617<2.078515, which indicate that the regression is not a spurious regression.

Post –Estimation Diagnostic

The histogram normality, auto and serial correlation, heteroscedasticity, CUSUM stability post estimation tests were conducted to assess to behavior of residuals, appropriateness and stability of the model and result is summarized below.

CUSUM Test for Relationship between Agricultural Output and Economic Growth in Nigeria

As for diagnostic tests, the model passes through the tests. It shows there is no evidence of serial correlation and the model is normally distributed. The stability of the model was tested. The technique applied was cumulative sum (CUSUM) test proposed by Brown et al. (1975). If the plot of the CUSUM remains within the critical limits of five percent significance level, the null hypothesis that all the coefficients are stable cannot be rejected. However, if one or another of the parallel line crosses, then the null hypothesis of parameters stability is rejected at 5% significance level. Figure 4.1 shows the result of CUSUM test. It indicates evidence of stability of the model as the critical line remains within the boundary, at 5% significance level.

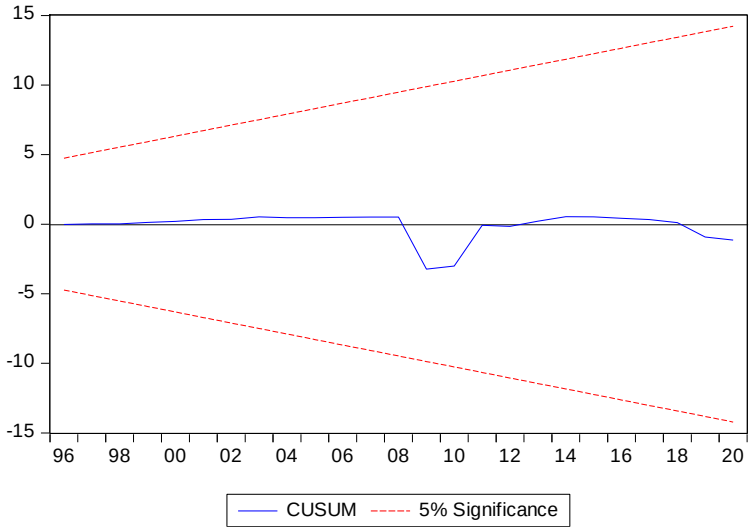

Figure 4.2 CUSUM test for Relationship between Agricultural Output and Economic Growth in Nigeria

Causality Test between inflation and Agricultural Output in Nigeria

Table 8: Pairwise Granger Causality test between inflation and Agricultural Output in Nigeria

Null Hypothesis	Obs	F-Statistic	Prob
LRGDP does not Granger Cause LAGRIC	30	0.084930	0.7730
LAGRIC does not Granger Cause LRGDP	30	14.02300	0.0009
INF does not Granger Cause LAGRIC	29	6.131850	0.0121
LAGRIC does not Granger Cause INF	29	7.813370	0.0096

Source: Researcher's Computation Using Eviews 10 (2023).

Table 8 presents the result from the pairwise Granger causality test for objective three, the result reveals that there is a unidirectional causal relationship between Agricultural Output and Economic growth, as such in the long-run, Agricultural Output will granger cause Economic growth, but Economic growth cannot granger cause Agricultural Output. Also, a bidirectional causal relationship exists between Agricultural Output and Inflation that is in the long-run, agricultural output will granger cause inflation and inflation will also granger cause agricultural output in the long-run.

CONCLUSION AND RECOMMENDATIONS

In summary, this study analyzes the relationship between inflation rate, agricultural output and economic growth in Nigeria. Specifically, the study aim to examine how change in inflation rate impact agricultural productivity and subsequently affect overall economic growth, also to determine the causal relationships among variable of interest from 1990-2022 using Auto Regressive Distributive Lag econometrics method of estimation. Inflation, Gross Capital Formation and Labour are the influencing variables to Agricultural Output for objective one in Nigeria at 5% level of significant in a long run. The ARDL Bound Test revealed that a long run relationship exists between inflation and agricultural output, agricultural output and economic growth in Nigeria. Also the ARDL test revealed a negative and significant relationship between Inflation and Agricultural output, which was in line with the apriori expectation and also a negative relationship exists between Gross Capital Formation and Economic growth in Nigeria, which is not in line with the A-priori expectation. Agricultural output on the other hand has a positive relationship with economic growth in Nigeria which is in line with the apriory expectation. The granger causality also revealed that there is unidirectional causality between agricultural output and economic growth and bidirectional causality exists between inflation and agricultural output in Nigeria. However the long run result can be used to predict the effect of Inflation on Agricultural Output in a long run with R-square of 99% and adjused R-squared of 99% shows a good fit of the model. Therefore the evidence from the study backs the conclusion in favor of the argument that Inflation has a negative relationship with Agricultural Output, the higher the Inflation rate, the less the Agricultural Output, which will in turn affect Economic growth because of less Agricultural productivity. Despite the fact that the result conducted revealed a significant and negative relationship between Inflation and agricultural output which may negatively affect Economic growth, which can either be as a result of the current economic crisis which originate as a result of the global pandemic, accompanied by the growing level of insecurity in the country. Therefore, there is a need to get effective and valid policy recommendation which when implemented will guild against the high negative occurrences of inflation on agricultural productivity in Nigeria, and also bring about the expected A-Prori sign.

On the basis of the findings from the study analysis, the study offers the following recommendations, Inflation rate should be effectively monitored because of it negative significant impact on productivity. Therefore, Inflation should be closely watched and brought back to a desired single digit because of its effect on productivity. In addition, the issue of providing finance to boost Agricultural Output should not be left in hand of government alone even though it is their key responsibility, it should be a collective responsibility from both the private and public stakeholders, by providing support through various programs to boost the Agricultural sector of the economy. There should be a collective effort of stockholders and federal government in order to create a positive environment there should be an effective training center across the grass root to ensure that the past glory of Agriculture is brought back to life by pursing genuine measure geared towards achieving a good environment for productivity. Other authors have also highlighted the challenges facing Nigeria in terms of inflation, agricultural output and economic growth and offer some recommendations. For example a report by the world bank emphasized that the need for structural reforms to address the underlying issue in Nigerian agricultural sector, such as poor access to market and lack of modern farming practices. Similarly, the African development bank has called for measure to address inflation and stabilize the exchange rate in order to spur economic growth. Overall the trends in inflation, agricultural output and economic growth in Nigeria are interconnected and influenced by range of factors. Addressing these challenges will require a comprehensive approach that includes policies to stabilize the economy and promote sustainable growth.

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