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Impact of inflation on agricultural productivity in Nigeria: Analysis of policy implication (Subsidy removal 2012-2022)

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Abstract

The study examined the impact of inflation on agricultural productivity in Nigeria. The aim was to ascertain whether or not inflation impacts agricultural productivity as measured by agricultural GDP as well as, how government policies/ intervention schemes such as subsidy removal in 2012, 2016, and 2020 impacted the economy. Quarterly time series data were used which covered a span of 11 years (2012-2022) i.e. 44 quarters. The independent variables analyzed include inflation rate, guaranteed loans from Agricultural Credit Guarantee Scheme Fund (ACGSF), exchange rate, and deposit money bank loans to the agricultural sector. Agricultural contribution to Gross Domestic Product (AGDP)stood as the dependent variable. The econometric models used in the research included the Auto Regressive Distributive Lag model (ARDL) and the Granger causality model. The result of the short and long-term coefficient and Error Correction Mechanism (ECM) also indicated that inflation had short-run convergence as the ECM was statistically significant and negative. Inflation, LACGSF (log of ACGSF), and DMB (Deposit Money Banks) loans exhibited a positive impact on agricultural productivity. Results of the Granger causality test revealed a unidirectional relationship between AGDP and INF (inflation). The recommendation therefore, is that the government and monetary authorities should stabilize the business environment in Nigeria as policy implications such as subsidy removal greatly impact these macroeconomic variables which in turn impact the real sector, ease of access to credit opportunities for farmers especially those in the rural areas and ensuring that government introduced agricultural schemes and programs get to the targeted population.

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Extended Abstract

Background

According to the CIA's World Factbook (2025), Nigeria is a West African economy with a total land area of almost a million square kilometers at exactly 923,768 sq km. It is the continent's largest market with 236,747,130 consumers. It is known as a crude oil exporter the world over, however, it is far more than that. While crude petroleum alongside natural gas are the main merchandise exports with refined petroleum the main import, Nigeria's real Gross Domestic Product (GDP) in purchasing power parity (PPP) terms is over a trillion dollars at $1.275 Trillion in 2023. Nigerians struggle to feed themselves despite the agricultural sector contributing almost a quarter to GDP; what is more, it is the relentless double-digit inflation rates.

High inflation affects the cost of agricultural inputs, commodity prices, and demand for products which creates uncertainties in the local market. A rise in the rate of interest as a tool by monetary authorities to lower inflation could hinder farmers from accessing credit, thus reducing potential output (Abubakar & Muhammad, 2023).

Analyzing the impact of inflation in a bid to improve agricultural productivity is based on the realization of the need for expansion in terms of production to other sectors of the economy to guard against shocks that have continued to rock the international oil market. There has been almost a steady decline in the estimates of Nigeria's agricultural production from the 60s to late 80s. (Etale et al., 2021). Abubakar and Muhammed (2023) stated that from 1960-70, the sectoral contribution was 55.8% of GDP but between 71 and 80, this dropped to 28.4%. Agricultural output on average in Nigeria from 1981-1990, 1991-2000, 2001-2010, and 2011-2020 was 18.2%, 24.42%, 27.39% and 21.46%, respectively (World Bank, 2020).

Aims

The aim was to ascertain whether or not inflation impacts agricultural productivity as measured by agricultural GDP as well as, how government policies/ intervention schemes such as subsidy removal in 2012, 2016, and 2020 impacted the economy.

Methodology

The methodology used for this study is quantitative research. It employs quarterly time series data on inflation rate, the agricultural performance given by the aggregate of agricultural contribution to GDP i.e. Agricultural GDP, DMB loans to the agricultural sector, ACGSF loans, and exchange rate from 2012-2022. This model design was adopted with modifications on the variables used for the study because it has been used in previous research works such as that of Adekanbi et al. (2015) who researched on the impact that inflation, exchange rate, and interest rate would have on gross domestic product. Data is from the CBN (statistical bulletin, ACGSF reports, and database), and the NBS.

Results

Table 1 presents results obtained from descriptive statistical analysis of variables used in this research, total agricultural gross domestic production (AGDP), Inflation (INF), loans to agriculture (DMBL), exchange rate (EXG), and ACGSF guaranteed loans.

Table 1. Result of descriptive statistical analysis of variables

	LAGDP	INF	LACGSF	EXG	LDMBL
Mean	8.5566	12.9917	14.2735	280.1502	13.2518
Median	8.3377	12.26	14.2573	305.75	13.1675
Maximum	11.8772	20.77	15.0527	432.87	14.3211
Minimum	7.9394	7.8	13.1277	155.7	12.4617
Std. Dev.	0.8933	3.6915	0.5005	93.6521	0.5496
Skewness	3.0203	0.2296	-0.1925	-0.0595	0.4044
Kurtosis	10.8278	1.9026	2.1941	1.6850	2.2006
Jarque-Bera	167.0147	2.4175	1.3626	2.9785	2.2093
Probability	0	0.2986	0.5060	0.2255	0.3313

Source: Authors computation using E-views 9

To ascertain whether or not the data samples were stationary or non-stationary, unit root test was carried out (Table 2). Stationarity enables the selection of the appropriate model to be used for forecasting and analysis, to ensure the accuracy of result findings. It addresses the issue of spurious regression; this is where an unrelated time series may exhibit the existence of a relationship due to non-stationarity. The results obtained from the ADF unit root test show stationarity at 1st difference for all variables except LACGSF which is stationary at level. The variables LAGDP, INF, LDMDL, and EXG are not stationary at the level; this implies a high level of volatility in these variables. Variables are therefor of mixed integration order.

Table 2. Result of ADF unit root test

Variable	At level		At 1st difference		Order of stationarity
	T-STAT	PROB	T-STAT	PROB	
LAGDP	0.019808	0.9552	-6.498915	0	I(1)
INF	-1.380679	0.5826	-3.933564	0	I(1)
LDMBL	0.969447	0.9955	-6.544411	0	I(1)
EXG	0.122004	0.9639	-5.990006	0	I(1)
LACGSF	-3.195839	0.0302	-	-	I(0)

Source: Authors computation using Eviews 9 (2010-2022)

The result of Granger causality test indicates that the H0 that LAGDP does not granger cause INF is rejected as the probability value of 0.0368 is less than 5% LS but does not reject however that INF does not granger cause LAGDP. This result implies a unidirectional causal relationship between the LAGDP and INF and not otherwise. LACGSF,

EXG, and LDMBL all do not granger cause LAGDP as their probability values exceed the 5 percent LS.

Table 3. Results of the pairwise Granger causality test

Null hypothesis	F-statistic	Prob.	Decision
INF does not Granger Cause LAGDP.	2.6043	0.0875	Accept
LAGDP does not Granger Cause INF.	3.6149	0.0368*	Reject
LACGSF does not Granger Cause LAGDP.	0.9882	0.3830	Accept
LAGDP does not Granger Cause LACGSF.	0.8179	0.4501	Accept
EXG does not Granger Cause LAGDP.	1.5182	0.2324	Accept
LAGDP does not Granger Cause EXG.	1.1809	0.3183	Accept
LDMBL does not Granger Cause LAGDP.	2.4349	0.1019	Accept
LAGDP does not Granger Cause LDMBL.	0.2698	0.7651	Accept

Source: Authors computation using E-views 9 (2012-2022)

Conclusion

The ARDL model established short-run convergence that examined whether or not INF had an impact on AGDP in Nigeria. It also ascertained long-run cointegration implying an impact of these variables on agricultural productivity. Although the research results established this impact, the use of quarterly data for this study shows that when analyzed closely the impact is not significant but when analyzed for longer periods with the use of annual data the impact is significant as previously referenced. The impact implies that even within a matter of months the independent variables contribute to the overall sectoral performance of agriculture and therefore policymakers should pay close attention to KPIs especially those in the short run as they influence the results obtainable in the long run. Inflation can raise production costs, reducing farmers purchasing power and affecting profitability.

Conflict of interest

The authors declared no conflicts of interest.

Authors' contributions

All authors contributed to the original idea, study design.

Ethical considerations

The authors have completely considered ethical issues, including informed consent, plagiarism, data fabrication, misconduct, and/or falsification, double publication and/or redundancy, submission, etc. This article was not authored by artificial intelligence.

Data availability

The dataset generated and analyzed during the current study is available from the corresponding author on reasonable request.

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