Impact of Government Policies and Financial Instruments on Agricultural Growth in Nigeria: A Generalized Gamma Regression Approach

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INTRODUCTION
Despite the importance of Agriculture as a cornerstone of Nigeria's economy, the sector faces tenacious challenges, including underinvestment, inadequate access to credit, and suboptimal government intervention. However, scientists have differing opinions about whether government spending and agricultural output are related. This study explores the relationship between government expenditure and the agricultural sector's gross domestic product (AGDP) in Nigeria using appropriate regression model. The expectation that the response variable should have a normal distribution is one of the presumptions for using a normal linear model which many authors do not consider. Generalized Linear Model (GLM) is a better option if the assumption that the variable is normally distributed is broken.

METHODOLOGY
Using data obtained from the databases of the National Bureau of Statistics, the Statistical Bulletin, and the Central Bank of Nigeria spanning 1981–2022, key factors such as Commercial bank loans, Agricultural Credit Guarantee Scheme Fund, Interest rates, and Government expenditure were analyzed. Preliminary diagnostic tests, including Histogram, Boxplot, skewness, and Jarque-Bera test check whether AGDP, a proxy for agricultural production output, deviates from normality.

FINDINGS
The histogram of AGDP is right skewed, the median of the boxplot is closer to the first quartile, the skewness is 1.455, and the Jarque-Bera test statistic is 18.534, with 2 degrees of freedom, and the associated p-value is approximately 9.447e-05 which is much smaller than the significance level of 0.05. These revealed that AGDPis right skewed and deviates from normality. To address this, four right skewed distributions; Weibull, Log-normal, Inverse Gaussian and Generalized Gamma distributions were fitted to AGDP to determine its distribution. Generalized Gamma (GG) distribution which has the lowest Akaike Information Criterion (AIC) (1341.592) and Bayesian Information Criterion (BIC)(1346.732) values best fit to AGDP. Therefore, GG regression model would be appropriate to model the effects of government policies and financial instruments on agricultural growth in Nigeria. Generalized Gamma Regression model and traditional multiple linear regression model were then used to model the data. The results of AIC and BIC indicated that the Generalized Gamma Regression model (AIC=1300.301 and BIC= 1312.296) outperformed the traditional multiple linear regression model. Results from the analysis revealed that commercial bank loans exert a slight negative impact on AGDP, Agricultural Credit Guarantee Scheme Fund has a marginal non-significant positive effect, while interest rates and government expenditure on agriculture demonstrate a moderately significant positive influence on agricultural output.

CONCLUSION
The results highlight the need for targeted interventions to address inefficiencies in agricultural financing and optimize resource allocation. Its important government keeps an eye on interest rates, making sure they help farmers without causing problems for the economy. Exploring interest rate subsidies for agricultural loans can make borrowing more accessible and affordable, encouraging farmers to invest in their operations. Also, Agricultural economists should not underscore the importance of employing appropriate statistical models, such as the Generalized Gamma regression model, to capture the nuances of non-normally distributed data in agricultural economics.

Keywords: Agricultural Growth, Financial Instruments, Generalized Gamma Regression, Government Expenditure, Non-normality.