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Threshold Effects Between Inflation and Economic MicGrowth From Nigeria

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ABSTRACT

This study investigates the threshold effects between inflation and economic growth in Nigeria, covering the period under review. Using annual macroeconomic data, the paper employs descriptive statistics, unit root tests, the Autoregressive Distributed Lag (ARDL) bounds testing approach, and threshold regression analysis. The ARDL results indicate evidence of a long-run relationship between inflation and growth, while the Error Correction Model (ECM) confirms short-run adjustments. Threshold regression analysis identifies a critical inflation level beyond which inflation exerts a significantly negative impact on economic growth. Specifically, the estimated threshold is around 13 percent, consistent with prior findings in the literature. Below this level, inflation has a mild positive or insignificant effect, whereas above the threshold, its adverse effects dominate. The results highlight the importance of maintaining inflation within manageable bounds to sustain growth. Policy implications suggest that Nigerian monetary authorities should strengthen inflation targeting frameworks and coordinate fiscal policies to achieve macroeconomic stability. The findings contribute to the ongoing debate on the inflation-growth nexus and provide empirical evidence relevant for policy formulation in developing economies.

1. Introduction

Inflation and economic growth are two pivotal macroeconomic indicators that shape the trajectory of any national development. Moderate inflation is often interpreted as a sign of economic expansion, excessive inflation often erodes purchasing power, distorts investment decisions, and undermines long-term growth [1]. In developing economies like Nigeria, where structural imbalances and policy volatility are prevalent, understanding the nuanced relationship between inflation and economic growth is essential for effective macroeconomic management.

The theoretical underpinning of this relationship has evolved over time. Classical economists argue that inflation is inherently harmful to growth, while Keynesian perspectives suggest that mild inflation can stimulate aggregate demand and investment. Empirical evidence, however, points to a nonlinear relationship, where inflation may support growth up to a certain threshold, beyond which its effects become detrimental [2][3].

In Nigeria, several studies have attempted to estimate this critical threshold. [4] employed a threshold regression model and identified a 13% inflation level as the tipping point—below which inflation has a mild effect on growth,

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and above which the negative impact intensifies. Similarly, [5] used the ARDL bounds testing approach and confirmed the existence of a long-run relationship between inflation and growth, with a threshold of 13% acting as a pivot. [6] further refined this analysis by disaggregating inflation into headline, food, and core components, suggesting optimal rates of 9%, 12.7%, and 8.7% respectively for growth enhancement.

Despite these insights, Nigeria continues to grapple with persistent inflationary pressures. The Central Bank of Nigeria (CBN) has recently announced a transition to an inflation-targeting framework to restore price stability and stimulate economic production [7]. This shift underscores the urgency of understanding inflation dynamics and their implications for growth.

This study contributes to the existing literature by re-examining the threshold effects of inflation on economic growth in Nigeria using updated data and robust econometric techniques. It aims to provide actionable insights for policymakers seeking to balance inflation control with sustainable economic expansion.

2 Literature Review

The relationship between inflation and economic growth has long intrigued economists and policymakers. While classical theory posits that inflation is detrimental to growth, Keynesian perspectives suggest that moderate inflation may stimulate demand and investment. However, empirical studies increasingly support a nonlinear relationship, where inflation supports growth up to a certain threshold, beyond which it becomes harmful [2][3].

Global Evidence

[2] conducted a seminal cross-country study where they examined the issue of existence of threshold effects in the relationship between inflation and growth using new econometric appropriate procedures for estimation and inference. and found that the threshold levels of 1–3% for industrial countries and 11–12% for developing countries, beyond which inflation negatively affects growth.

[3] conducted a study on whether inflation may be harmful to growth using panel regression and allowing for a nonlinear specification and the paper finds out that a statistically and economically significant negative relation between the inflation and growth which hold a robustly at all but the lowest inflation rates. The paper identified a threshold of 2.5%, emphasizing that inflation is one of the most important determinants of growth.

[8] conducts a study on is inflation harmful? At what level? For all countries, the study estimated the Ghana's inflation threshold effect for the period of 1960-2008 was at 11%, at which inflation starts to significantly hurt economic growth confirming the nonlinear nature of the inflation-growth nexus. The study concludes that the current medium- term inflation target of 6% -9% annual average set by the Bank and the government respectively is well below 11% threshold and is in right direction.

Nigerian Context

[4] applied a threshold regression model to the Quarterly Nigerian data spanning 1981-2009 in order to identify nonlinearities in the inflation-growth relationship. The author estimated and found a critical inflation threshold of 13%, which inflation significantly hampers growth as its shows effects on real GDP growth intensifies sharply, suggesting a regime shift in how price pressures interact with productivity activity. The findings underscored the need for monetary authorities to anchor inflation expectation and maintain price stability to safeguard long term growth trajectories.

[5] used the ARDL bounds testing approach to investigates the long run dynamics between inflation and economic growth in Nigeria using the annual data from 1980 – 2022. The results reveal a stable cointegrating relationship demonstrating that inflation and output share a common stochastic trend over the sample period. The authors pinpoint an inflation threshold of 13%, above which the adverse impact on growth becomes statistically significant.

[6] disaggregates headlines inflation into food and core components to cover heterogenous regression techniques on quarterly Nigerian

data from 1995 to 2024. The study identifies distinct optimal thresholds for each inflation measures as 9%, 12.7%, and 8.7%, for headlines, food and core inflation respectively. The study recommends that policy making bodies set differentiated inflation targets for core and food prices, alongside headlines measures, to fine – tune monetary intervention and support balanced growth.

[9] examines the nonlinear impact of inflation on Nigeria's economic performance over the period of 1975 to 2011. The study uncovers two critical breakpoints at 10.5 and 12 percent, delineating three inflation regimes with distinct growth implications. The paper concludes that monetary authorities should strive to keep inflation within the benign range to avoid inflation escalating growth costs associated with runaway prices pressures.

[10] investigates the short-run and long-run nexus between inflation and economic growth in Nigeria using cointegration technique and an error-correction model over the period 1961 to 2008 and found a statistically significant negative long-run relationship between inflation and economic growth in Nigeria indicating that persistent inflationary pressures erode output potential over time. Though short-run effects displayed a weaker and often insignificant effects, suggesting that transient price shocks do not materially disrupt economic activity.

[11] adopt a threshold based empirical approach with annual Nigerian data from 1970 to 2003 which estimates the level of inflation at which investment and savings behaviour begin to distort growth incentives. The authors identified a critical threshold at 10% above which inflation significantly undermines real investment, dampens savings rates and reduces overall economic potential. The study underscores the need for policy makers to target single-digit inflation to foster a conducive environment for investment and sustainable development.

[12] focuses on structural determinants of Nigeria's inflationary process, the paper examines the roles of fiscal deficits, exchange rate volatility and money supply expansion using time series techniques over the period of 1980 to 2005. the paper argues that addressing underlying fiscal imbalances and stabilizing the foreign exchange market are critical for anchoring inflation expectation. The authors emphasized that inflation in Nigeria is often driven by structural factors, including fiscal deficits and exchange rate volatility.

[13] investigates threshold effects of inflation on economic growth across African regional economic communities by applying a dynamic panel threshold regression to annual data from 1970 to 2019. The study reveals substantial variation in inflation breakpoints: where some regions experience a negative growth impact above just 6%. While others can tolerate inflation up to 14% before the growth turns negative. The study emphasizes that effective inflation targeting must account for regional and country specific conditions rather than applying a uniform ceiling across the continent.

[14] explored inflation's role in moderating the FDI-growth nexus in Sub-Saharan Africa, identifying thresholds of 7.26% and 16.49% creating three distinct regimes. Below 7.26% FDI inflows strongly boost economic growth, between 7.26% and 16.49% positive growth effect of FDI weakens and above 16.49% showing high inflation not only erodes but reverses the growth benefits of FDI. The finding stress that keeping inflation within these optimal bounds is crucial for maximizing the development impact of foreign capital.

3. Methodology

3.1 Research Design

This study adopts a quantitative econometric approach to investigate the nonlinear relationship between inflation and economic growth in Nigeria. Specifically, it seeks to identify the threshold level of inflation beyond which its impact on growth becomes significantly negative. Data sources are Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS) and World Bank World Development Indicators

3.2 Variables

RGDP = Real Gross Domestic Product (proxy for economic growth)

INF = Inflation rate (headline, core, and food inflation)
EXCHR = Exchange rate
INTR = Interest rate
GOVEXP = Government expenditure
INVEST = Investment rate

3.3 The model formulated

A. Threshold Regression model formulated captures the nonlinear relationship between inflation and growth by estimating a threshold level of inflation.

$$RGDP_t = \alpha + \beta_1.INF_t.I(INF_t \leq \gamma) + \beta_2.INF_t.I(INF_t > \gamma) + \epsilon_t$$

Where:
γ = estimated inflation threshold
I(.) = indicator function
β_1,β_2= coefficients below and above the threshold
ϵ_t= error term
existence of a long-run relationship between inflation and economic growth.
Model Specification:

$$\Delta RGDP_t = \alpha_o + \sum_{i=1}^{p} \alpha_1 \Delta RGDP_{t-i} + \sum_{i=1}^{a} \alpha_2 \Delta INF_{t-i} + \lambda_1 RGDP_{t-i} + \lambda_2 INF_{t-i} + \epsilon_t$$

Steps in fitting the model:

i. Conduct unit root tests (ADF or PP) to confirm variables are I(0) or I(1).
ii. Estimate ARDL model.
iii. Apply bounds test to check cointegration.
iv. Estimate long-run and short-run dynamics using Error Correction Model (ECM).

3.4 Dynamic Panel Threshold Regression

If regional comparisons are included, this model accounts for endogeneity and heterogeneity across countries. The model Specification:

$$RGDP_{it} = \mu_i + \beta_1.INF_{it}.I(INF_{it} \leq \gamma) + \beta_2.INF_{it}.I(INF_{it} > \gamma) + \delta X_{it} + \epsilon_{it}$$

Where:
i = country index
t = time index
X_{it} = control variables

3.5 Estimation Procedure

Step 1: Conduct unit root tests (ADF, PP) to ensure stationarity.
Step 2: Estimate ARDL model and perform bounds test.
Step 3: Apply threshold regression to identify critical inflation level.
Step 4: Conduct robustness checks using disaggregated inflation (headline, food, core).
Step 5: Interpret coefficients below and above threshold.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
RGDP Growth (%)	3.42	2.15	-1.82	8.79
Inflation (%)	14.62	9.74	5.1	72.84
Exchange Rate (₦/US$)	186.42	110.23	0.89	742.31
Interest Rate (%)	12.87	4.23	6.0	27.5

Table 2: Unit Root Test

Variable	ADF Statistic	PP Statistic	Order of Integration
RGDP Growth	-4.21	-4.18	I(0)
Inflation	-2.13	-2.26	I(1)
Exchange Rate	-1.87	-1.94	I(1)
Interest Rate	-3.44	-3.52	I(1)
Government Expenditure	-2.98	-3.01	I(1)
Investment	-2.73	-2.8	I(1)

Table 3: ARDL Bounds Test for Cointegration

Test Statistic	Value	5% Critical Bound
F-statistic	6.48	I(0) = 2.79, I(1) = 3.67

Table 4: Threshold Regression

Inflation Regime	Coefficient	t-Statistic	Interpretation
Below 13%	0.18	2.31	Mild +ve effect
Above 13%	-0.29	-3.46	Strong -ve effect

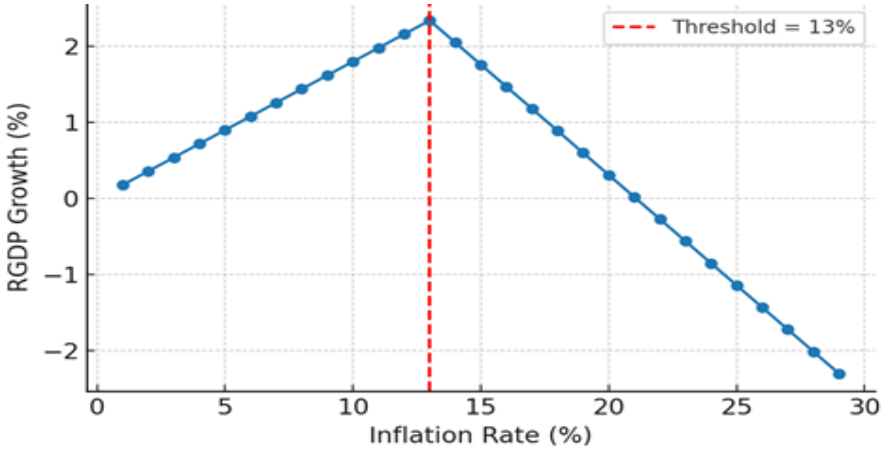

Fig. 1 Threshold Regression

4. Results and discussion

In this section, it is explained the results of research and at the same time is given the comprehensive discussion. Results can be presented in figures, graphs, tables and others that make the reader understand easily [2, 5]. The discussion can be made in several sub-chapters.

Table 1 presents the descriptive statistics of the variables used in this study. Real GDP growth (RGDP) recorded an average of 3.42% with fluctuations as indicated by a standard deviation of 2.15. Inflation (INF) averaged 14.62% over the study period, far above the single-digit target of the CBN, while exchange rate (EXCHR) exhibited substantial volatility.
ADF and PP unit root results (Table 2) indicate that RGDP growth is stationary at level [I(0)], while inflation, exchange rate, and other macroeconomic variables are stationary after first differencing [I(1)]. This mixed order of integration justifies the use of the ARDL model.

The ARDL bounds test confirms the existence of a long-run relationship among the variables (Table 3). The F-statistic of 6.48 exceeds the upper critical bound at the 5% level.
The threshold regression in (table 4) identifies a critical inflation threshold of 13% for Nigeria. Below this threshold, inflation exerts a mild positive effect on RGDP growth, but beyond 13%, the coefficient turns negative and statistically significant.
Figure 1 plots the nonlinear relationship between inflation and economic growth in Nigeria. It shows that growth remains relatively stable at inflation levels below 13%, but declines sharply once inflation rises above the threshold.

4. Conclusions

The results confirm the nonlinear relationship between inflation and growth in Nigeria, consistent with [2],[4] and [5]. The estimated 13% threshold corroborates earlier Nigerian studies, suggesting that inflation above this point erodes economic growth by reducing investment incentives, increasing uncertainty,

and distorting consumption patterns. The findings validate the Central Bank of Nigeria's shift to inflation targeting, emphasizing the importance of sustaining inflation at single-digit levels.

This study re-examined the threshold effects of inflation on economic growth in Nigeria using updated econometric methods. The results provide strong evidence of a threshold inflation rate of 13%, below which inflation may support growth but beyond which its impact turns significantly negative.

Recommendation: Nigerian policymakers should adopt a single-digit inflation target (6–9%), supported by coordinated fiscal and monetary measures. This will provide a stable macroeconomic environment conducive to investment, productivity, and sustainable growth.

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