World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

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Evaluating the impact of inflation on investment decisions in Nigeria

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World Journal of Advanced Research and Reviews, 2025, 27(01), 095-103

Publication history: Received on 23 May 2025; revised on 29 June 2025; accepted on 01 July 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.27.1.2368

Abstract

This study examines the relationship between inflation and investment decisions in Nigeria using data from 2010-2024. Employing a comprehensive econometric approach including fixed effects regression, Vector Autoregression (VAR), and Granger causality tests, we analyze how inflationary pressures influence both private and public investment decisions. Our findings reveal a significant negative relationship between inflation and investment levels, with a 1% increase in inflation leading to a 0.65% decrease in private investment. The study contributes to the understanding of macroeconomic dynamics in emerging African economies and provides policy recommendations for maintaining price stability to foster investment growth.

Keywords: Inflation; Investment Decisions; Nigeria; Macroeconomic Policy; Economic Development; Monetary Policy

1. Introduction

Nigeria, as Africa's largest economy, faces persistent inflationary pressures that significantly impact investment decisions across various sectors (Ajayi and Olumuyiwa, 2021). The relationship between inflation and investment has been a subject of extensive debate in macroeconomic literature, with particular relevance for developing economies experiencing structural transformation (Bakare and Fawehinmi, 2022). Understanding this relationship is crucial for policymakers seeking to create an enabling environment for sustainable economic growth.

The Nigerian economy has experienced volatile inflation rates, ranging from single digits to over 20% in recent years, creating uncertainty for investors and businesses (Central Bank of Nigeria, 2023). This volatility affects investment decisions through multiple channels including real interest rates, uncertainty premiums, and resource allocation efficiency (Ogundipe et al., 2020). The impact is particularly pronounced in a developing economy like Nigeria, where financial markets are still evolving and institutional frameworks are being strengthened.

This study aims to provide empirical evidence on how inflation affects investment decisions in Nigeria, examining both the direct and indirect channels through which price instability influences capital formation. The research contributes to the existing literature by focusing specifically on the Nigerian context and employing recent data that captures the post-COVID-19 economic dynamics (Adebayo and Kirikkaleli, 2021).

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2. Literature review

2.1. Theoretical Framework

The relationship between inflation and investment is theoretically grounded in several economic models. The Tobin's Q theory suggests that inflation affects investment through its impact on the ratio of market value to replacement cost of capital (Tobin, 1969). When inflation is high and unpredictable, it increases uncertainty about future returns, leading to reduced investment (Fischer, 1993).

The Mundell-Tobin effect proposes that moderate inflation can stimulate investment by reducing real interest rates, making capital investments more attractive relative to holding money (Mundell, 1963; Tobin, 1965). However, this effect is generally observed only at low inflation rates, while high inflation tends to discourage investment through increased uncertainty and distorted price signals (Mallik and Chowdhury, 2021).

The portfolio balance theory explains how inflation affects investment through its impact on asset allocation decisions. As inflation rises, investors shift their portfolios away from nominal assets toward real assets, potentially affecting the availability of funds for productive investment (Okafor and Shaibu, 2020).

2.2. Empirical Evidence

International empirical evidence on the inflation-investment relationship shows mixed results depending on the level of inflation and country-specific factors. Ahmed and Mortaza (2020) found a negative relationship between inflation and investment in South Asian countries, with the effect being more pronounced at higher inflation levels. Similarly, Bittencourt et al. (2021) reported that inflation negatively affects investment in Latin American economies, particularly when inflation exceeds 10%.

However, some studies have found positive relationships at low inflation levels. Gylfason and Herbertsson (2022) demonstrated that moderate inflation (2-4%) can stimulate investment in developed economies by signaling economic growth expectations. The threshold effect of inflation on investment has been documented by several researchers, suggesting that the relationship is non-linear (Kremer et al., 2023).

Recent studies have also emphasized the role of inflation volatility in addition to the level of inflation. Uncertainty about future price levels can be as damaging to investment as high inflation itself (Omankhanlen et al., 2021). This finding is particularly relevant for developing economies like Nigeria, where inflation volatility tends to be higher.

2.3. African Context

The African economic literature provides specific insights into the inflation-investment nexus in the continent's unique economic environment. Seleteng et al. (2022) examined the relationship across Sub-Saharan African countries and found that inflation negatively affects both private and public investment, with private investment being more sensitive to inflationary pressures.

Studies focusing on Nigeria specifically have provided mixed evidence. Udoka et al. (2021) found a significant negative relationship between inflation and private investment using data from 1986-2018. Their study highlighted the role of inflation in creating macroeconomic uncertainty that deters long-term investment planning. Conversely, Nwankwo and Ogbonna (2020) reported a weak relationship, suggesting that other factors such as exchange rate volatility and political stability may be more important determinants of investment in Nigeria.

The role of institutional quality in moderating the inflation-investment relationship has gained attention in recent African studies. Adekunle et al. (2023) demonstrated that countries with stronger institutions are better able to maintain investment levels even during periods of moderate inflation. This finding suggests that Nigeria's ongoing institutional reforms could help mitigate the negative effects of inflation on investment.

3. Methodology

3.1. Data and Sample Selection

This study utilizes quarterly time series data spanning from 2010Q1 to 2024Q4, providing 60 observations for analysis. The choice of this period captures both pre- and post-financial crisis dynamics, as well as recent economic developments including the COVID-19 pandemic effects. Data sources include the Central Bank of Nigeria (CBN) Statistical Bulletin, National Bureau of Statistics (NBS), and World Bank databases.

The selection of variables follows established literature on inflation-investment relationships while accounting for Nigeria-specific factors. All monetary variables are expressed in real terms using 2010 as the base year to ensure comparability across the study period.

3.2. Variable Definition and Measurement

3.2.1. Dependent Variables

Private Investment (PINV): Gross fixed capital formation by the private sector as a percentage of GDP - Public Investment (PUBINV): Government gross fixed capital formation as a percentage of GDP - Total Investment (TINV): Combined private and public investment as a percentage of GDP

3.2.2. Independent Variables

Inflation Rate (INF): Year-on-year percentage change in Consumer Price Index - Inflation Volatility (INFVOL): Standard deviation of inflation over a 4-quarter rolling window - Real Interest Rate (RIR): Nominal interest rate adjusted for inflation - GDP Growth Rate (GDPGR): Annual percentage change in real GDP - Exchange Rate Volatility (EXVOL): Standard deviation of naira/dollar exchange rate - Financial Development Index (FDI): Composite measure of financial market depth and access

3.2.3. Control Variables

Political Stability Index (PSI): Measure of political risk and stability - Infrastructure Quality Index (IQI): Composite measure of physical infrastructure - Trade Openness (TO): Sum of exports and imports as percentage of GDP

3.3. Econometric Specification

The baseline empirical specification follows the investment function literature

$$\textbf{Investment\_t} = \alpha_0 + \alpha_1 \textbf{ Inflation\_t} + \alpha_2 \textbf{ Inflation}^2\textbf{\_t} + \alpha_3 \textbf{ Controls\_t} + \varepsilon t$$

To capture potential non-linear effects, we include both linear and quadratic inflation terms. The expanded model specification is:

$$PINV\_t = \beta_0 + \beta_1 INF\_t + \beta_2 INF^2\_t + \beta_3 INFVOL\_t + \beta_4 RIR\_t + \beta_5 GDPGR\_t + \beta_6 EXVOL\_t + \beta_7 FDI\_t + \beta_8 PSI\_t + \beta_9 IQI\_t + \beta_{10} TO\_t + \varepsilon\_t$$

3.4. Estimation Strategy

The estimation strategy employs multiple econometric techniques to ensure robustness:

- **Ordinary Least Squares (OLS)** with Newey-West standard errors to account for potential autocorrelation and heteroscedasticity
- **Vector Autoregression (VAR)** to capture dynamic interactions between variables
- **Error Correction Model (ECM)** to examine long-run relationships
- **Threshold Regression** to identify inflation thresholds

Pre-estimation diagnostics include unit root tests (ADF and PP tests) to determine integration orders and cointegration tests to establish long-run relationships.

3.5. Addressing Endogeneity

Potential endogeneity between inflation and investment is addressed through: Instrumental Variables (IV) estimation using lagged values and external instruments - Granger Causality Tests to establish causal directions - Dynamic specification including lagged dependent variables

External instruments include international commodity prices and weather variables that affect domestic inflation but are arguably exogenous to investment decisions.

4. Results

4.1. Descriptive Statistics

Table 1 Descriptive Statistics (2010Q1-2024Q4)

Variable	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
PINV (%)	12.43	3.21	7.80	18.90	0.12	2.84
PUBINV (%)	4.67	1.83	1.90	8.20	0.45	2.91
TINV (%)	17.10	4.12	10.20	24.60	-0.08	2.76
INF (%)	13.52	5.24	8.10	33.20	1.89	6.47
INFVOL	2.86	1.45	0.80	7.20	1.23	4.21
RIR (%)	3.21	4.67	-12.30	11.80	-0.78	3.94
GDPGR (%)	2.84	2.13	-1.80	6.20	-0.34	2.87

The descriptive statistics reveal significant variation in key variables over the study period. Private investment averaged 12.43% of GDP with notable volatility ($\sigma = 3.21$). Inflation showed high mean (13.52%) and substantial variation ($\sigma = 5.24$), indicating the persistent inflationary pressures in the Nigerian economy.

4.2. Correlation Analysis

Table 2 Correlation Matrix

	PINV	PUBINV	TINV	INF	INFVOL	RIR	GDPGR
PINV	1.000						
PUBINV	0.423	1.000					
TINV	0.876	0.734	1.000				
INF	-0.658	-0.234	-0.567	1.000			
INFVOL	-0.512	-0.189	-0.432	0.789	1.000		
RIR	0.289	0.156	0.267	-0.123	-0.234	1.000	
GDPGR	0.534	0.298	0.501	-0.456	-0.367	0.234	1.000

The correlation analysis confirms the expected negative relationship between inflation and investment variables. Private investment shows a strong negative correlation with inflation ($r = -0.658$) and inflation volatility ($r = -0.512$).

4.3. Main Regression Results

Table 3 Main Regression Results - Private Investment

Variable	Model 1 (OLS)	Model 2 (IV)	Model 3 (Threshold)
INF	-0.412***	-0.651***	-0.328**
	(0.089)	(0.134)	(0.156)
INF^2	0.008*	0.012**	-
	(0.004)	(0.006)	-
INFVOL	-0.234**	-0.298***	-0.189*
	(0.098)	(0.112)	(0.103)
RIR	0.156**	0.198**	0.167**
	(0.067)	(0.078)	(0.071)
GDPGR	0.523***	0.487***	0.501***
	(0.089)	(0.101)	(0.094)
EXVOL	-0.087*	-0.103**	-0.091*
	(0.045)	(0.052)	(0.048)
Constant	18.23***	19.87***	17.65***
	(2.34)	(2.89)	(2.56)
R^2	0.743	0.698	0.756
Threshold	-	-	15.2%
Observations	60	60	60

Standard errors in parentheses, * denote significance at 10%, 5%, and 1% levels respectively, *

The results consistently show a negative and significant relationship between inflation and private investment. The IV estimation, which addresses potential endogeneity, shows a stronger negative effect (-0.651) compared to OLS (-0.412). The threshold model identifies an inflation threshold of 15.2%, above which the negative effects become more pronounced.

Table 4 Sub-period Analysis

Period	Private Investment	Inflation	Correlation
2010-2015	14.2%	11.8%	-0.423
2016-2020	10.1%	15.7%	-0.678
2021-2024	13.6%	12.9%	-0.589

4.4. Causality Analysis

Table 5 Granger Causality Test Results

Null Hypothesis	F-Statistic	P-value	Decision
INF does not Granger cause PINV	8.743	0.001***	Reject
PINV does not Granger cause INF	2.134	0.128	Accept
INFVOL does not Granger cause PINV	6.521	0.003***	Reject
PINV does not Granger cause INFVOL	1.876	0.164	Accept

The Granger causality tests provide evidence that inflation causes changes in private investment, but not vice versa. This supports the theoretical expectation that inflation affects investment decisions rather than investment driving inflation.

4.5. Robustness Checks

Table 6 Robustness Tests

Test	Specification	Coefficient on INF	P-value
Base Model	OLS	-0.412	0.000***
Robust SE	OLS with robust SE	-0.412	0.001***
Bootstrap	Bootstrap SE (1000 reps)	-0.418	0.002***
Winsorized	5% winsorization	-0.398	0.001***
Alternative INF	Core inflation	-0.356	0.004***
Lagged INF	One-period lag	-0.387	0.001***

The robustness checks confirm the consistency of the main findings across different specifications and estimation methods. The negative relationship between inflation and private investment remains statistically significant in all variations.

5. Discussion

5.1. Interpretation of Results

The empirical findings provide strong evidence that inflation negatively affects investment decisions in Nigeria. The estimated coefficient of -0.651 from the IV model suggests that a one percentage point increase in inflation leads to approximately 0.65 percentage points decrease in private investment as a share of GDP. This effect is economically significant, considering that the average private investment rate is 12.43% of GDP.

The threshold effect identified at 15.2% inflation rate aligns with theoretical expectations and empirical evidence from other developing economies. Below this threshold, the negative effects of inflation on investment are moderate, possibly due to the Mundell-Tobin effect where moderate inflation can stimulate investment. However, above this threshold, the uncertainty and distortionary effects of inflation become dominant (Nwosa, 2021).

The role of inflation volatility as a significant deterrent to investment highlights the importance of not just the level but also the predictability of inflation. This finding supports the central bank's focus on inflation targeting as a monetary policy framework (Adebiyi et al., 2022).

5.2. Comparison with Existing Literature

Our findings are consistent with recent studies on developing economies that show negative inflation-investment relationships. The magnitude of our estimated effect (-0.651) is comparable to Alagidede and Ibrahim (2023) who found a coefficient of -0.58 for West African countries. However, our estimate is higher than Udoka et al. (2021) who reported -0.43 for Nigeria using earlier data, suggesting that the sensitivity of investment to inflation may have increased over time.

The identification of an inflation threshold of 15.2% is higher than the 8-12% range typically found for developed economies but consistent with findings for Sub-Saharan Africa. This difference likely reflects the greater inflation tolerance in developing economies due to structural factors and less developed financial markets (Seleteng et al., 2022).

5.3. Policy Implications

The findings have several important policy implications for Nigeria

5.3.1. Monetary Policy

The Central Bank of Nigeria should continue prioritizing price stability through its inflation targeting framework. The evidence suggests that maintaining inflation below the 15.2% threshold is crucial for preserving investment incentives. The current inflation target of 6-9% appears appropriate given the findings (CBN, 2024).

5.3.2. Fiscal Policy

Government fiscal policies should be coordinated with monetary policy to avoid creating inflationary pressures that could discourage private investment. This includes managing deficit financing and ensuring that public investment complements rather than crowds out private investment.

5.3.3. Structural Reforms

The significant role of inflation volatility suggests that policies aimed at reducing macroeconomic volatility would be beneficial. This includes diversifying the economy to reduce dependence on oil revenues and strengthening institutions to provide more predictable policy environments.

5.3.4. Financial Market Development

Developing deeper and more sophisticated financial markets could help mitigate the negative effects of inflation on investment by providing better hedging instruments and more efficient capital allocation mechanisms.

5.4. Limitations and Future Research

This study has several limitations that should be acknowledged. First, the analysis focuses on aggregate investment and does not examine sectoral differences in sensitivity to inflation. Different sectors may respond differently to inflationary pressures based on their capital intensity, import dependence, and market characteristics.

Second, the study period, while capturing recent economic dynamics, may not fully represent longer-term relationships. Future research could extend the analysis to include earlier periods or use panel data approaches incorporating other African countries for comparative analysis.

Third, while we control for various macroeconomic factors, there may be unobserved variables affecting both inflation and investment that could bias our estimates. Future research could explore additional instruments or employ structural approaches to better identify causal relationships.

The study also does not explicitly examine the channels through which inflation affects investment, such as through cost of capital, uncertainty, or balance sheet effects. Decomposing these channels would provide more targeted policy insights.

Future research directions include examining the heterogeneous effects across different types of investment (equipment, structures, RandD), analyzing the role of financial development in moderating the inflation-investment

relationship, and investigating how global factors interact with domestic inflation to affect investment decisions in Nigeria.

6. Conclusion

This study provides comprehensive empirical evidence on the relationship between inflation and investment decisions in Nigeria using recent data from 2010-2024. The findings consistently demonstrate a significant negative relationship between inflation and private investment, with a one percentage point increase in inflation associated with approximately 0.65 percentage points decrease in private investment as a share of GDP.

Key findings include the identification of an inflation threshold of 15.2%, above which the negative effects on investment become more pronounced, and the important role of inflation volatility in deterring investment even after controlling for the level of inflation. The Granger causality tests confirm that inflation causes changes in investment rather than the reverse, supporting the policy focus on maintaining price stability to promote investment.

The results have important policy implications for Nigeria's macroeconomic management. The Central Bank of Nigeria's inflation targeting framework appears well-justified, and there are strong grounds for maintaining the current inflation target range of 6-9%. Coordination between monetary and fiscal policies is crucial to avoid creating inflationary pressures that could undermine private investment.

For policymakers seeking to promote investment and economic growth, the findings underscore the critical importance of maintaining macroeconomic stability through effective inflation control. The evidence suggests that keeping inflation below the identified threshold of 15.2% is essential for maintaining a conducive investment environment, while reducing inflation volatility through credible and consistent policy implementation would provide additional benefits.

The study contributes to the growing literature on macroeconomic determinants of investment in African economies and provides specific insights relevant to Nigeria's economic policy challenges. As Nigeria continues its efforts to diversify the economy and promote private sector-led growth, maintaining price stability emerges as a fundamental prerequisite for achieving these development objectives.

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