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IMPACT OF FOREIGN AID ON INFLATION IN NIGERIA

ABSTRACT

This study examines the impact of foreign aid on inflation in Nigeria over the period 1990–2024, with particular emphasis on the roles of exchange rate and money supply in the aid–inflation nexus. Specifically, it investigates whether foreign aid significantly influences inflation, evaluates the role of exchange rate dynamics, and assesses whether money supply strengthens or weakens the impact of aid on price stability. Annual time-series data were analyzed using descriptive statistics, correlation analysis, the Augmented Dickey–Fuller (ADF) unit root test, the Johansen cointegration test, and the Dynamic Ordinary Least Squares (DOLS) estimator for long-run analysis. The unit root results confirm that all variables are integrated of order one, $I(1)$, while the Johansen test identifies two long-run cointegrating relationships. The DOLS estimates reveal that foreign aid exerts a positive and statistically significant effect on inflation ($\beta = 29.0017$; $p = 0.0016$), while exchange rate depreciation also significantly increases inflation ($\beta = 0.1201$; $p = 0.0324$). In contrast, money supply shows a positive but statistically insignificant effect ($\beta = 0.9654$; $p = 0.3022$). The model explains approximately 82.7% of variations in inflation ($R^2 = 0.8274$). The findings indicate that foreign aid inflows and exchange rate instability are major long-run drivers of inflation in Nigeria, whereas money supply plays a weaker independent role. The study recommends directing aid toward productive sectors, strengthening exchange rate stabilization measures, and enhancing fiscal–monetary policy coordination to safeguard price stability.

Keywords: Foreign Aid; Inflation; Exchange Rate; Money Supply; Nigeria

JEL Classification Codes: F35, E31, E51, F41, H50

1. Introduction

Foreign aid, formally designated as Official Development Assistance (ODA), constitutes a central instrument of international development finance, channeling grants, concessional loans, and technical assistance from advanced economies to developing nations. Its theoretical rationale rests on the twin-gap framework: supplementing domestic savings deficits and bridging foreign exchange shortfalls to stimulate investment and accelerate economic growth (Olayiwola & Okodua, 2020).

Despite decades of substantial ODA commitments, particularly under the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) frameworks, the macroeconomic consequences of aid inflows remain deeply contested, especially regarding their effects on domestic price stability in recipient economies.

The dominant theoretical concern is articulated through the Dutch Disease hypothesis, which posits that large, sustained foreign currency inflows appreciate the real exchange rate, elevating the domestic prices of non-traded goods and generating economy-wide inflationary pressure (Aregbesola & Mustapha, 2022). This mechanism is particularly consequential because it simultaneously erodes export competitiveness and undermines the purchasing power of domestic households, thereby neutralizing the very developmental objectives that aid is designed to achieve. Compounding this theoretical concern, empirical evidence remains globally inconsistent: while some cross-country analyses confirm significant aid-induced inflationary pressure, others find the relationship to be insignificant or conditional on recipient country institutional quality and fiscal management capacity (Kafle, 2021). This divergence underscores the deeply contextual nature of the aid-inflation nexus and necessitates rigorous country-specific investigations.

The challenge is especially pronounced in Sub-Saharan Africa (SSA), a region characterized by structural vulnerabilities including shallow financial markets, high aid volatility, and weak institutional frameworks, all of which tend to amplify the adverse macroeconomic consequences of large capital inflows. Panel evidence from SSA consistently associates unexpected aid surges with real exchange rate volatility and upward inflationary pressure (Ugochukwu et al., 2022). Furthermore, pervasive aid mismanagement and transparency deficits frequently prevent external resources from reaching productive sectors that could expand supply and naturally counteract price increases (Ugwuegbe et al., 2020). Critically, recent evidence suggests that aid is growth-enhancing only below a certain inflation threshold, beyond which macroeconomic instability erodes its effectiveness entirely (Ehigiamusoe et al., 2025). This finding reframes the challenge for SSA policymakers: effective aid management is not merely about resource mobilization for growth, but fundamentally about preserving price stability to protect aid's developmental returns.

Within this regional context, Nigeria presents a particularly compelling and policy-relevant case. As one of Africa's largest ODA recipients over several decades, Nigeria has simultaneously experienced chronic, high, and volatile inflation, raising fundamental questions about the macroeconomic absorption and management of its substantial aid inflows. Nigeria's inflation rate exceeded 22% in 2023 (National Bureau of Statistics, 2023), a trajectory shaped by monetary expansion, structural import dependency, currency devaluation, and the fiscal shock of the 2023 fuel subsidy removal. Domestic evidence confirms that inflation significantly undermines sustainable development outcomes (Falade, 2023), and that weak absorptive capacity constrains the translation of aid into real welfare improvements even when inflows are substantial (Oluitan & Dada, 2020). Earlier econometric evidence established that consumer prices are significantly affected by aid changes in both the short and long run (Afolabi & Nwanekwere,

2019), yet this specific channel remains largely absent from more recent empirical analyses of Nigerian inflation dynamics.

This omission constitutes a critical gap in both policy and scholarship. The Central Bank of Nigeria (CBN) has deployed successive rounds of monetary tightening, sterilization operations, and exchange rate interventions to combat inflation, yet price pressures persist (Ibrahim et al., 2023; Abdullahi et al., 2022). If foreign aid inflows represent an inadequately managed source of monetary expansion and exchange rate distortion, then current stabilization frameworks are operating with an incomplete understanding of inflation's determinants. Addressing this gap is therefore not merely an academic exercise but an urgent policy imperative.

Accordingly, this study investigates the impact of foreign aid on inflation in Nigeria using annual time series data spanning 1990 to 2024. Anchored on the Quantity Theory of Money and the Dutch Disease framework, it models inflation as a function of ODA inflows, exchange rate, broad money supply (M2), and government expenditure. Three specific objectives guide the analysis: to evaluate the direct impact of ODA on inflation; to examine the moderating role of the exchange rate in the aid-inflation relationship; and to assess whether money supply strengthens or weakens the inflationary effect of aid. The study tests corresponding null hypotheses that ODA, the exchange rate, and M2 each have no significant relationship with inflation in Nigeria.

The findings contribute to the theoretical literature on aid-macroeconomy interactions, offer an empirically grounded evidence base for Nigerian monetary and fiscal policymakers, and provide a replicable analytical framework for aid-inflation research across comparable developing economies. The remainder of the paper is structured as follows: Section 2 reviews the relevant theoretical and empirical literature; Section 3 presents the data and methodological framework; Section 4 reports and discusses the empirical results; and Section 5 concludes with policy recommendations.

2. Literature Review

2.1 Theoretical Literature Review

This study is anchored on the Dutch disease theory and the Quantity theory of money theory

2.1.1 The Quantity Theory of Money

The Quantity Theory of Money (QTM), classically formulated by Irving Fisher (1911) through the equation of exchange and subsequently revived by Milton Friedman (1956) as the cornerstone of Monetarism, posits a direct and proportional relationship between money supply and the general price level. The theory is expressed as $MV = PY$, where M denotes money supply, V the velocity of circulation, P the price level, and Y real output. Its central proposition holds that, under conditions of relatively stable velocity and output, any expansion in money supply translates directly into inflationary pressure, making monetary growth the dominant determinant of price instability.

The QTM provides the primary theoretical justification for this study's inclusion of money supply (M2) as a key transmission channel. In Nigeria, foreign aid inflows, particularly those entering as budget support, are frequently monetized by the Central Bank of Nigeria (CBN), expanding the domestic monetary base. When such expansion is not matched by commensurate growth in real output, the QTM predicts an unambiguous inflationary outcome. Nigeria's recurring episodes of inflation coinciding with monetary surges, whether driven by oil windfalls, government deficit financing, or external resource inflows, lend empirical credibility to this theoretical expectation (CBN, 2023).

While critics rightly challenge the QTM's assumptions of constant velocity and full-employment output as unrealistic in structurally constrained economies (Keynes, 1936), these limitations do not diminish its analytical utility. Rather, they underscore why the QTM must be complemented by a framework that captures the structural and external dimensions of aid-induced inflation — a role filled by the Dutch Disease theory.

2.1.2 The Dutch Disease Theory

The Dutch Disease framework, formally developed by Corden and Neary (1982), explains the paradox whereby large foreign currency inflows, originally attributed to natural resource booms but subsequently extended to foreign aid, generate inflationary pressure and structural economic distortion rather than sustainable development. The mechanism operates through two interrelated effects. First, the *spending effect*: aid inflows increase aggregate demand, particularly for non-tradable goods and services such as housing, construction, and local services. Since these goods cannot be imported to satisfy excess demand, their prices rise sharply, generating economy-wide inflationary pressure. Second, the *resource movement effect*: rising returns in the non-tradable sector attract productive resources away from tradable sectors such as agriculture and manufacturing, eroding the economy's export competitiveness and long-run productive capacity.

Central to the Dutch Disease argument is real exchange rate appreciation. As foreign aid inflows increase the supply of foreign currency, the domestic currency strengthens in real terms, making imports cheaper while rendering exports less competitive. In economies with managed or multiple exchange rate regimes, such as Nigeria, this appreciation manifests as distorted price signals and amplified inflationary dynamics in the non-tradable sector (Aregbesola & Mustapha, 2022). The framework therefore provides the theoretical justification for including the real exchange rate (EXR) as both a transmission mechanism and a moderating variable in the study's empirical model.

Critics acknowledge that Dutch Disease effects are not automatic, arguing that economies with strong fiscal institutions can sterilize inflows, accumulate reserves, or direct resources toward productivity-enhancing investments that neutralize these pressures (Sachs, 2007). Nigeria's institutional record, however, is characterized by limited sterilization capacity, weak fiscal discipline, and aid mismanagement, conditions that render the Dutch Disease mechanism particularly operative and empirically testable (Ugochukwu et al., 2022).

Theoretical Synthesis and Model Linkage

Together, the QTM and Dutch Disease theory offer complementary and mutually reinforcing explanations for the aid-inflation relationship. The QTM identifies the *monetary channel*: aid inflows expand M2, and in the absence of output growth, prices rise. The Dutch Disease theory identifies the *structural and external channel*: aid inflows appreciate the exchange rate, inflate non-tradable goods prices, and weaken productive capacity. Jointly, they justify the study's empirical specification:

$$INF = f(ODA, EXR, M2, GOVT) \quad 1$$

where ODA captures the direct aid shock, EXR reflects the Dutch Disease exchange rate transmission mechanism, M2 represents the QTM monetary expansion channel, and GOVT controls for the fiscal spending effect. This dual-theoretic anchoring ensures that the model captures both the monetary and structural dimensions of aid-induced inflation in Nigeria.

2.2 Empirical Literature Review

2.2.1 Global Evidence on Foreign Aid and Inflation

The relationship between foreign aid and inflation has attracted substantial empirical attention across diverse methodological and geographic contexts, yet the evidence remains strikingly mixed. A dominant strand of the literature confirms a positive and statistically significant relationship between ODA inflows and domestic price levels. Ahmed and Zhang (2023), in a Dynamic Panel GMM analysis covering 60 developing nations, identified a non-linear threshold effect: at aid volumes below 5% of GDP, the inflationary impact is negligible or stabilizing, but beyond this threshold, aid becomes significantly inflationary as the economy's absorptive capacity is overwhelmed. This finding aligns with Gebresilassie and Viau (2024), whose panel fixed effects study of fragile states demonstrated that aid-to-GDP ratios exceeding 10% are associated with inflation rates approximately 5 percentage points higher than in low-aid counterparts, with emergency aid being particularly destabilizing due to rapid spending on scarce local resources. Similarly, Khan and Ullah (2023), employing Pooled Mean Group estimation across South Asian economies, confirmed that ODA exerts a positive and significant long-run influence on price levels, primarily through the monetary channel, as aid-financed government expenditure is less responsive to price signals than private consumption.

Bekun (2025), using FMOLS on 40 aid-dependent nations, confirmed Dutch Disease symptoms in which ODA inflows appreciate the real exchange rate and elevate domestic prices, with the effect most severe in import-dependent economies. Dönmez (2025), in a broad developing country panel, similarly found that ODA triggers inflationary pressure through increased domestic liquidity, though this effect is significantly attenuated in economies with sufficiently developed financial markets capable of absorbing excess liquidity. This moderating role of financial development is corroborated by Aluko (2020), whose System GMM analysis of 42 countries demonstrated that aid is highly inflationary in shallow financial markets but non-inflationary where private sector credit markets are deep and

functional. Ehigiamusoe et al. (2025) introduced an important inflation threshold dimension, finding that aid promotes growth only below an inflation rate of 9.85%, beyond which macroeconomic instability erodes aid effectiveness entirely, reinforcing the urgency of price stability as a precondition for aid returns.

Countering this inflationary consensus, Quazi and Addison (2025), using 2SLS and System GMM for upper-middle-income African nations, found that aid directed toward human capital investments is largely non-inflationary, as productivity gains suppress unit labor costs and mitigate demand-side pressures. Javed and Viau (2024), employing Seemingly Unrelated Regression across 37 SSA and MENA countries, further nuanced the debate by showing that agricultural aid exerts a price-stabilizing effect in the long run by expanding food supply, whereas aid to services and industrial sectors generates inflationary pressure through non-tradable demand bottlenecks. Mensah and Boateng (2025), using NARDL for the ECOWAS region, similarly found that budget support aid carries a significantly higher inflationary impact than project-tied aid, as the former immediately enters the domestic money stream through recurrent expenditure financing.

Beyond the level of inflation, Lopez and Silva (2021), using a GARCH framework for Latin American economies, demonstrated that unpredictable aid disbursements amplify inflation volatility, creating macroeconomic uncertainty that discourages private investment independently of the inflation level itself. Karimi and Hussain (2023), focusing on post-conflict economies, identified a variant of this phenomenon termed "bottleneck inflation," where sudden aid inflows overwhelm destroyed supply chains, generating hyperinflationary episodes in the immediate reconstruction period.

2.2.2 Evidence from Sub-Saharan Africa

Within Sub-Saharan Africa, the preponderance of evidence supports a positive aid-inflation relationship, mediated by weak institutional frameworks and limited absorptive capacity. Osei and Telli (2023), combining ARDL and DOLS techniques across multiple SSA nations, found that ODA is positively correlated with the Consumer Price Index in the long run, attributing this to Dutch Disease dynamics in which aid appreciation of the real exchange rate elevates non-tradable goods prices. Isah (2023), using Panel Vector Autoregression for 25 SSA countries, confirmed that aid shocks produce immediate CPI increases, transmitted primarily through monetary expansion as central banks fail to fully sterilize aid-induced liquidity. Asuquo and Inim (2024), employing a non-dynamic threshold approach for 23 SSA countries, identified a critical inflation threshold of 13%, beyond which aid inflows undermine the benefits of financial development entirely.

In East Africa, Mohamed and Mzee (2024) applied DOLS to Kenya and Tanzania, finding that a 1% increase in aid yields a 0.15% and 0.18% increase in inflation respectively, with the effect stronger under budget support modalities than project-based interventions. Tadesse (2024), using Structural VAR for Ethiopia, found that ODA significantly contributes to demand-pull inflation through aid-funded government spending, with the inflationary effect peaking after approximately four quarters. Chirwa and Odhiambo (2022), using ARDL bounds testing for Malawi, confirmed a significant long-run

inflationary effect consistent with QTM predictions, though the short-run impact was statistically insignificant. In the ASEAN context, Nguyen and Tran (2022) similarly found that ODA exerts upward pressure on CPI in the short run, particularly in high fiscal deficit environments, with aid-induced real exchange rate appreciation additionally harming export competitiveness. Al-Hassan (2024), examining Egypt and Jordan through VECM, found that high aid spending without corresponding import absorption generates significant inflationary pressure, confirming that the spending-absorption mismatch is a critical driver of aid-induced price instability.

2.2.3 Nigerian-Specific Evidence

The Nigerian empirical literature presents a consistent but insufficiently nuanced picture of the aid-inflation relationship. Egunjobi (2025), using FMOLS for the period 1981–2022, found that ODA has an insignificant direct impact on growth but a significant positive inflationary effect, magnified in high-corruption environments where aid finances wasteful rather than productive government expenditure. Paulin and Eze (2025), employing VECM for 1990–2023, established unidirectional causality from ODA to inflation, with aid shocks generating persistent price deviations requiring over three years for correction. Abiodun and Salami (2024), using DOLS for 1986–2022, quantified that a 1% increase in ODA yields a 0.22% long-run increase in CPI, attributing this to a dominant spending effect that fuels consumption demand without commensurate productivity gains.

Okon and Edet (2023), applying ARDL bounds testing for 1981–2021, confirmed a statistically significant long-run positive relationship between ODA and inflation, with a 1% aid increase associated with a 0.15% CPI increase, validating the Dutch Disease hypothesis in the Nigerian context. Yusuf and Salaudeen (2023), using GMM for 2000–2021, linked aid dependency to fiscal indiscipline, demonstrating that high-aid years correspond with budget deficits monetized through money creation. Nkoro and Uko (2022), using ARDL bounds testing for 1980–2020, found a significant positive long-run relationship between aid and inflation, attributed to the spending effect elevating domestic demand without supply-side expansion. Suleiman and Isiyaku (2022), employing VECM for 1986–2020, identified ODA as the most inflationary among foreign inflow categories, transmitting primarily through M2 expansion. Ukwueze and Ugwu (2021), using ECM for 1980–2020, found that while external debt has a more immediate exchange rate effect, foreign aid has a more persistent inflationary effect through monetary base expansion. Ogbonna and Nwogwugwu (2021), using ARDL for 1980–2019, confirmed that ODA retards economic progress and correlates positively with inflation, with Granger causality confirming a unidirectional aid-to-inflation relationship. Ikpesu (2020), employing PVECM across 35 SSA countries including Nigeria, found that aid shocks cause rises in inflation rates while simultaneously depreciating the real exchange rate, a finding that challenges the conventional Dutch Disease appreciation narrative and suggests that the exchange rate transmission mechanism in SSA may be more complex than theorized. Afolabi and Nwanekwere (2019), using Linear and Nonlinear ARDL for 1970–2017, demonstrated that both positive and negative changes in aid significantly affect the consumer price index in both the short and long run, establishing the asymmetric nature of the aid-inflation relationship in Nigeria.

2.3 Gaps in the Literature and Study Contribution

The foregoing review, while broadly confirming a positive aid-inflation relationship, reveals critical gaps that motivate the present study. The majority of Nigerian-specific studies terminate their sample periods at 2021 or earlier, structurally excluding the profound macroeconomic disruptions of the COVID-19 pandemic recovery, the 2022 global commodity price shock, the 2023 fuel subsidy removal, and the accelerated naira depreciation following the CBN's exchange rate unification policy, episodes that collectively drove Nigeria's inflation rate beyond 22% in 2023 (NBS, 2023) and represent a qualitatively distinct inflationary environment that existing evidence cannot adequately address. Beyond the data currency problem, while most studies control for exchange rate and money supply as ancillary regressors, none explicitly investigates the roles of the exchange rate (EXR), broad money supply (M2) and government expenditure within the aid-inflation transmission mechanism in a unified Nigerian time series framework, a critical omission given that these variables constitute the primary channels through which ODA inflows propagate into domestic prices. Furthermore, the predominant reliance on ARDL and VECM estimators, though appropriate for cointegration analysis, leaves unaddressed the challenges of endogeneity, parameter instability, and serial correlation that characterize Nigeria's structurally volatile macroeconomic environment, limitations that the Dynamic Ordinary Least Squares (DOLS) estimator is specifically designed to resolve through its leads-and-lags augmentation procedure.

This study directly addresses these gaps by investigating the impact of foreign aid on inflation in Nigeria using annual time series data spanning 1990 to 2024, the most current analytical window available, within a DOLS estimation framework that corrects for endogeneity and serial correlation while delivering asymptotically efficient long-run parameter estimates. Anchored on the complementary theoretical foundations of the Quantity Theory of Money and the Dutch Disease framework, the study moves beyond existing analyses by explicitly including the exchange rate, money supply (M2) and government expenditure as control variables in the aid-inflation nexus, alongside. In doing so, it provides the most methodologically rigorous and temporally comprehensive Nigerian-specific evidence on this relationship to date, generating actionable insights for monetary and fiscal policymakers navigating the challenge of managing ODA inflows in a persistently high-inflation environment.

3. Methodology and Data

This study employs an ex post facto research design and annual time-series data for Nigeria covering 1990–2024 to examine the effect of foreign aid on inflation. The analysis is anchored on the Quantity Theory of Money and the Dutch Disease framework, which jointly explain how aid inflows may influence domestic prices through monetary expansion and exchange-rate-related spending effects.

Empirically, this study builds on the model used by Ikpesu (2020), which examined the impact of foreign aid and macroeconomic variables on inflation, using official development assistance (ODA), inflation rate (INF), and exchange rate (EXR). However, to align the model with the specific objectives of this study, it is modified and specified as:

$$INF = f(ODA, EXR, MS, GOVT) \quad 2$$

Where:

INF = Inflation rate (%)

ODA = Official Development Assistance (foreign aid)

EXR = Exchange rate (Naira per USD)

MS = Money supply

GOVT = Government expenditure

In econometric form, the model can be written as:

$$INF_t = \beta_0 + \beta_1 ODA_t + \beta_2 EXR_t + \beta_3 MS_t + \beta_4 GOVT_t + \epsilon_t \quad 3$$

The data were obtained from the World Bank Development Indicators and the Central Bank of Nigeria Statistical Bulletin. Inflation (INF) is measured as the annual percentage change in the consumer price index; foreign aid is proxied by net official development assistance (ODA); exchange rate (EXR) is measured as the official naira/US dollar rate; money supply (M2) is captured by broad money as a percentage of GDP; and government expenditure (GOVT) is measured by general government final consumption expenditure as a percentage of GDP.

3.2 Model Estimation Technique

To estimate this relationship, the study adopts Dynamic Ordinary Least Squares (DOLS), which is appropriate for cointegrated time-series variables and offers robust long-run estimates by correcting for endogeneity and serial correlation through the inclusion of leads and lags of first-differenced regressors. The DOLS is particularly suited for this study because all the variables are integrated of order one I(1) and are expected to be cointegrated. Unlike the standard OLS, DOLS addresses the problems of endogeneity and serial correlation by including leads and lags of the first-differenced independent variables. This ensures that the long-run coefficients obtained are unbiased and asymptotically efficient, even in small samples

However, to minimize the impact of outliers and ensure linearity, variables measured in absolute values are transformed into their growth rate. The DOLS model is specified as:

$$INF_t = \beta_0 + \beta_1 ODA_t + \beta_2 EXR_t + \beta_3 MS_t + \beta_4 GOVT_t + \sum_{j=-k}^k \gamma_j \Delta X_{t-j} + \epsilon_t \quad 4$$

Where:

β_0 = Intercept; β_1 to β_4 = Coefficients to be estimated; $\sum_{j=-k}^k \gamma_j \Delta X_{t-j}$ = sum of the leads and lags of the first-differenced explanatory variables; ϵ_t = Stochastic error term; Ln = Natural log; and t = Time period (1990–2024)

Prior to estimation, Augmented Dickey-Fuller unit root tests are conducted to determine the order of integration of the variables, while the Johansen cointegration test is used to confirm the existence of a long-run relationship among them. To ensure the reliability of the results, post-estimation diagnostic

tests are performed, including tests for normality, serial correlation, and parameter stability. Hypotheses are evaluated using the statistical significance of the estimated coefficients at the 5 percent level.

4. Empirical Results

4.1 Descriptive Statistics

Table 1 presents the descriptive statistics of the variables used in the study. It summarizes the basic features of the data, including the mean, maximum, minimum, and standard deviation

Table 1: Descriptive Statistics Results

	CPI (%)	ODA (%’GDP)	M2 (%’GDP)	GOVT (%’GDP)	EXR (₦/USD)
Mean	18.70559	20.91285	18.64186	8.340367	198.8671
Median	13.00697	21.29352	19.29109	8.111334	131.2743
Maximum	72.83550	23.26813	27.37879	15.21100	1478.965
Minimum	5.388008	19.21073	9.063329	5.089349	8.038285
Std. Dev.	15.86930	1.210687	6.251425	2.217757	263.6575
Skewness	2.071452	0.025569	-0.072702	0.964630	3.509628
Kurtosis	6.495683	1.593586	1.337446	4.054013	17.16925
Jarque-Bera	42.85088	2.888398	4.061789	7.048106	364.6382
Probability	0.000000	0.235935	0.131218	0.029480	0.000000
Observations	35	35	35	35	35

Source: Researcher’s computation using Eviews (2026)

Table 1 presents the descriptive statistics, revealing a macroeconomic environment characterized by profound volatility and episodic structural shocks. Inflation averaged 18.71% over the 1990–2024 period, exhibiting extreme fluctuations from a minimum of 5.39% to a peak of 72.84%. This high dispersion (standard deviation = 15.87) and positive skewness (2.07) reflect Nigeria's history of severe inflationary crises, resulting in a leptokurtic distribution that significantly departs from normality (Jarque-Bera $p < 0.01$). Similarly, the exchange rate demonstrates severe instability, averaging 198.87 naira per US dollar but ranging drastically from 8.04 to 1,478.97. The extreme positive skewness (3.51) and kurtosis (17.17) of the exchange rate capture the persistent, episodic depreciation of the naira, particularly in recent years. Government expenditure also exhibits moderate variability (mean = 8.34%, SD = 2.22) and departs from normality (Jarque-Bera $p < 0.05$), reflecting shifting fiscal policy responses to these macroeconomic pressures.

In contrast, the external aid and monetary variables display relatively stable and symmetric distributional properties. Official Development Assistance (ODA) averaged 20.91% with minimal dispersion (SD = 1.21) and a symmetric, platykurtic distribution that satisfies the assumption of normality (Jarque-Bera $p = 0.236$). Broad money supply (M2) similarly exhibits moderate variation around a mean of 18.64% (SD = 6.25) and follows a normal distribution (Jarque-Bera $p = 0.131$). The stark contrast between the highly skewed, volatile series (inflation and exchange rate) and the normally distributed variables (ODA and M2) underscores the presence of significant scale disparities and potential outliers in the raw data. This distributional heterogeneity empirically justifies the study's methodological design: the application of natural logarithmic transformations to mitigate the influence of extreme values, and

the adoption of the Dynamic Ordinary Least Squares (DOLS) estimator, which yields robust, asymptotically efficient long-run parameters even in the presence of the endogeneity and serial correlation typically generated by such volatile macroeconomic time series.

4.2 Correlation

Table 2 presents the correlation matrix of the variables to show the direction and strength of the relationships among them.

Table 2: Correlation Matrix Results

	CPI	ODA	EXR	M2	GOVT
CPI	1				
ODA	0.33341	1			
EXR	0.40275	-0.550665	1		
M2	0.25109	0.660855	0.552403	1	
GOVT	0.325298	0.59911	0.66582	0.59257	1

Source: Researcher's computation using Eviews (2026)

Table 2 presents the correlation matrix examining the bivariate relationships among the variables. Inflation (CPI) exhibits a moderate positive correlation with official development assistance (ODA) ($r = 0.333$), exchange rate ($r = 0.403$), and government expenditure ($r = 0.325$), suggesting that increases in aid inflows, currency depreciation, and fiscal expansion are associated with higher price levels, consistent with the theoretical predictions of Dutch Disease and demand-pull inflation mechanisms. The correlation between CPI and money supply (M2) is weaker ($r = 0.251$) but remains positive. Among the independent variables, ODA demonstrates a strong positive association with M2 ($r = 0.661$) and government expenditure ($r = 0.599$), while displaying a moderate negative correlation with the exchange rate ($r = -0.551$), indicating that higher aid inflows coincide with monetary expansion, increased fiscal spending, and exchange rate appreciation (or reduced depreciation pressure). Additionally, the exchange rate correlates positively with both M2 ($r = 0.552$) and government expenditure ($r = 0.666$), while M2 and government expenditure are moderately correlated ($r = 0.593$). Importantly, because no coefficient exceeds the conventional 0.80 threshold, the model is free from severe multicollinearity, validating the simultaneous inclusion of these regressors in the subsequent long-run DOLS estimation.

4.3 Pre-estimation Test

This section presents the preliminary econometric tests conducted before estimating the model.

4.3.1 Stationarity Test

The stationarity test is conducted to determine whether the variables used in the study are stationary or contain unit roots.

Table 3: ADF Unit Root Test Results

<i>Variables</i>	<i>At Level (ADF)</i>		<i>At First Difference (ADF)</i>		<i>Order of integration</i>
	<i>t-Statistic</i>	<i>Prob.</i>	<i>t-Statistic</i>	<i>Prob.</i>	
CPI	-2.1784	0.2175	-4.6452	0.0008	I(1)
ODA	-0.9348	0.7633	-6.0081	0.0000	I(1)
EXR	-1.5332	0.5046	-5.2864	0.0001	I(1)
M2	-1.0500	0.7233	-4.6462	0.0008	I(1)
GOVT	-2.2028	0.2102	-8.4022	0.0000	I(1)

Source: Researcher's computation using Eviews (2026)

Table 3 presents the Augmented Dickey-Fuller (ADF) unit root test results, which establish the stationarity properties and order of integration for the model variables. At level form, all series, inflation (CPI), official development assistance (ODA), exchange rate (EXR), broad money supply (M2), and government expenditure (GOVT), exhibit unit roots, failing to reject the null hypothesis of non-stationarity at conventional significance levels. However, upon first differencing, all variables become strictly stationary, yielding highly significant ADF t-statistics ranging from -4.645 to -8.402 (all $p < 0.01$). This uniform integration of order one, $I(1)$, confirms that the macroeconomic variables share a common stochastic trend and are prone to long-run equilibrium dynamics rather than spurious regression. Establishing this $I(1)$ property is a critical econometric prerequisite, as it directly validates the subsequent application of the Johansen cointegration test and justifies the use of the Dynamic Ordinary Least Squares (DOLS) estimator to compute unbiased long-run parameters.

4.3.2 Cointegration Test

Following the stationarity test, the cointegration test is conducted to determine whether a long-run equilibrium relationship exists among the variables in the model.

Table 4: Johansen Cointegration Test Results

Unrestricted Cointegration Rank Test (Trace)				
<i>Hypothesized No. of CE(s)</i>	<i>Eigenvalue</i>	<i>Trace Statistic</i>	<i>0.05 Critical Value</i>	<i>Prob.**</i>
None *	0.749725	99.85475	69.81889	0.0000
At most 1 *	0.634577	54.14337	47.85613	0.0114
At most 2	0.353520	20.92227	29.79707	0.3625
At most 3	0.158616	6.527216	15.49471	0.6332
At most 4	0.024775	0.827888	3.841466	0.3629
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
<i>Hypothesized No. of CE(s)</i>	<i>Eigenvalue</i>	<i>Max-Eigen Statistic</i>	<i>0.05 Critical Value</i>	<i>Prob.**</i>
None *	0.749725	45.71138	33.87687	0.0013
At most 1 *	0.634577	33.22110	27.58434	0.0085
At most 2	0.353520	14.39505	21.13162	0.3335
At most 3	0.158616	5.699328	14.26460	0.6521
At most 4	0.024775	0.827888	3.841466	0.3629
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				

Source: Researcher's computation using Eviews (2026)

Table 4 reports the Johansen cointegration test results examining long-run equilibrium relationships among inflation, official development assistance, exchange rate, money supply, and government expenditure. Both the trace and maximum eigenvalue statistics confirm the existence of two cointegrating vectors at the 5% significance level. Specifically, the trace statistic rejects the null of no cointegration ($99.85 > 69.82$, $p = 0.0000$) and the null of at most one cointegrating relationship ($54.14 > 47.86$, $p = 0.0114$). Similarly, the maximum eigenvalue statistic rejects both the null of no cointegration ($45.71 > 33.88$, $p = 0.0013$) and the null of at most one vector ($33.22 > 27.58$, $p = 0.0085$). These consistent findings establish that the variables share a stable long-run equilibrium relationship, thereby validating the application of the Dynamic Ordinary Least Squares (DOLS) estimator to model their long-run dynamics.

4.3.4 Multicollinearity Test

Table 5: Multicollinearity Test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	11842.10	5055.426	NA
ODA	1.466587	3.857758	3.768011
EXR	3.153577	4.083294	4.062002
M2	1.674864	2.182057	2.161349
GOVT	2.054861	2.661963	2.659031

Source: Researcher's computation using Eviews (2026)

The results of the multicollinearity test presented in Table 4.8 show the variance inflation factors (VIF) for the explanatory variables included in the model. Multicollinearity occurs when independent variables are highly correlated with each other, which may distort regression estimates. The centered VIF values for ODA (3.77), EXR (4.06), M2 (2.16), and GOVT (2.66) are all below the commonly accepted threshold of 10, indicating that multicollinearity is not a serious problem in the model. This suggests that the explanatory variables do not exhibit strong linear relationships among themselves and can therefore be used simultaneously in the regression analysis without significantly affecting the stability or reliability of the estimated coefficients.

4.4 DOLS Estimation

This section presents the estimation of the model using the Dynamic Ordinary Least Squares (DOLS) technique.

Table 6: DOLS Estimation Results

<i>Dependent Variable: CPI</i>					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Remark
ODA	29.00174	7.555563	3.838462	0.0016	Significant
EXR	0.120068	0.050932	2.357427	0.0324	Significant
M2	0.965444	0.903623	1.068415	0.3022	Not Significant
GOVT	11.63237	2.571413	4.523725	0.0004	Significant

C	-642.9635	160.6857	-4.001373	0.0012	Significant
R-squared	0.827359				
Adjusted R-squared	0.643209				
Long-run variance	109.7677				

Source: Researcher's computation using Eviews (2026)

Table 6 presents the long-run Dynamic Ordinary Least Squares (DOLS) estimates. The model demonstrates strong explanatory power ($R^2 = 0.827$, Adj. $R^2 = 0.643$), indicating that the specified macroeconomic variables account for the vast majority of inflationary dynamics in Nigeria. The results identify foreign aid (ODA) and government expenditure (GOVT) as the primary drivers of long-run inflation. ODA exerts a highly significant positive effect ($\beta = 29.001, p < 0.01$), implying that a 1% increase in aid inflows is associated with an approximate 29% increase in the consumer price index. Similarly, government expenditure is highly inflationary ($\beta = 11.632, p < 0.001$). Together, these coefficients validate the Keynesian demand-pull framework and the Quantity Theory of Money, suggesting that aid-financed fiscal expansion stimulates aggregate demand far beyond the economy's supply-side capacity. This aligns with recent findings by Egunjobi (2025) and Abiodun and Salami (2024), confirming that poorly absorbed aid translates into consumption-driven price spikes rather than productive growth.

The exchange rate (EXR) also exhibits a significant positive coefficient ($\beta = 0.120, p < 0.05$), confirming that naira depreciation transmits directly into domestic prices via import pass-through, consistent with Structuralist and Dutch Disease theories (Isah, 2023; Nguyen & Tran, 2022). Conversely, broad money supply (M2) shows a positive but statistically insignificant effect ($\beta = 0.965, p = 0.302$). This insignificance does not negate the role of monetary expansion; rather, it indicates that the inflationary impact of liquidity creation is already captured by the fiscal and external channels (ODA and GOVT) within this specification. Ultimately, the DOLS estimates reveal that inflation in Nigeria is fundamentally driven by the fiscal absorption of foreign aid and exchange rate volatility, underscoring the urgent need for disciplined aid management and structural fiscal reforms.

4.5 Post Estimation Test

This section presents the post-estimation diagnostic tests conducted to assess the reliability and robustness of the estimated model.

Table 7: Summary of Diagnostic Test Results

Test	Value	Prob.	Notes
Histogram Normality Test	2.31367	0.31448	Residual is normally distributed
Serial Correlation (Breusch-Godfrey LM Test)	1.51474	0.2591	No evidence of serial correlation ($p > 0.05$)
Heteroskedasticity (Breusch-Pagan-Godfrey)	3.169793	0.0179	Evidence of heteroskedasticity ($p < 0.05$)
Ramsey RESET Test	1.296462	0.1085	Model specification appears correct ($p > 0.05$)

Source: Researcher's computation using Eviews (2026)

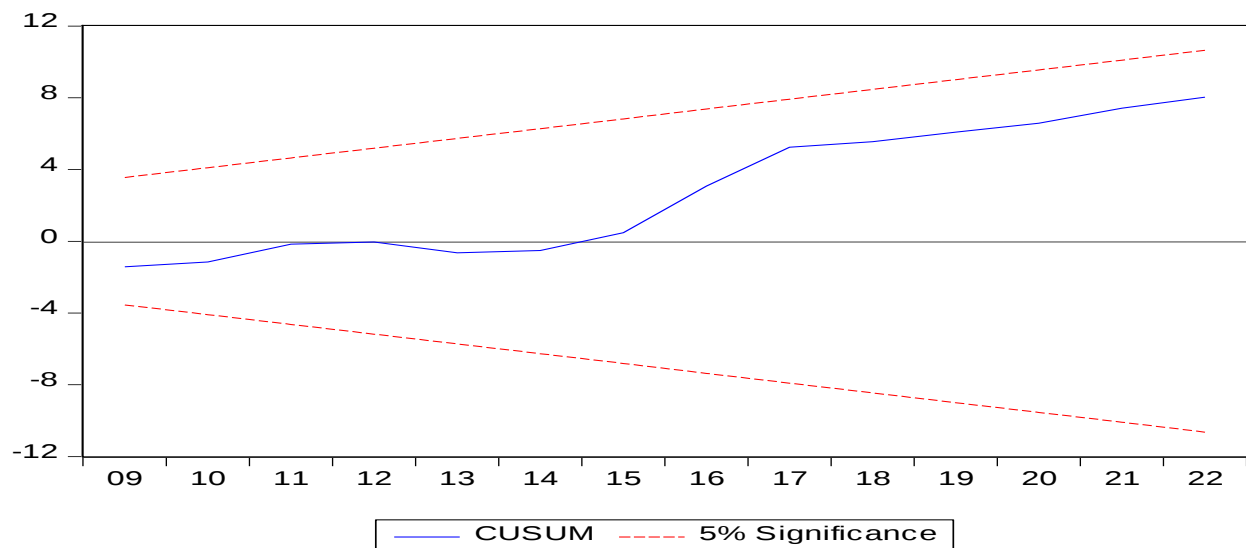


Figure 1: CUSUM Test Results

Source: Researcher's computation using Eviews (2026)

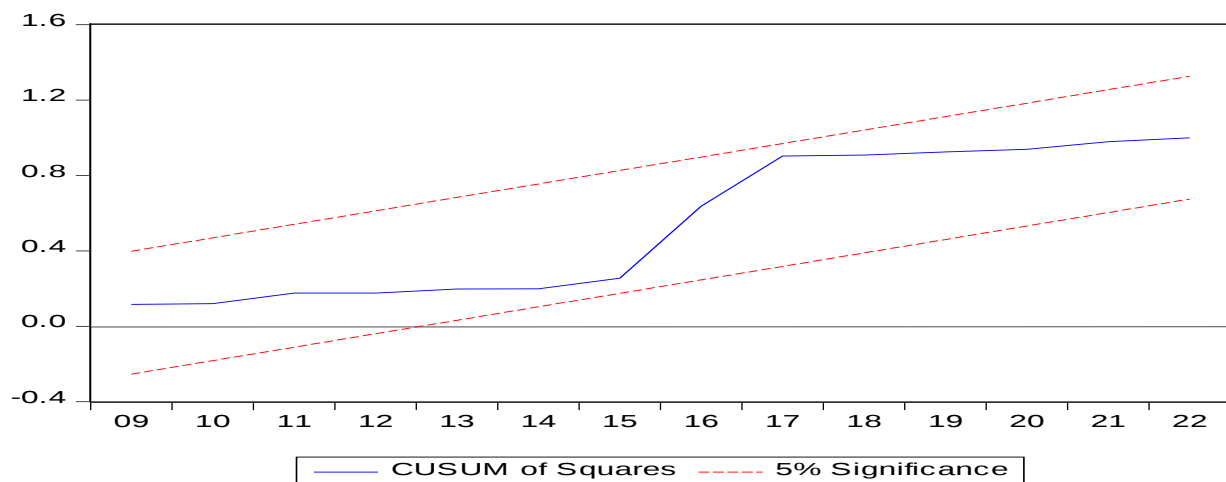


Figure 2: CUSUM of Squares Test Results

Source: Researcher's computation using Eviews (2026)

Table 7 presents the post-estimation diagnostic tests, confirming the statistical adequacy and robustness of the DOLS model. The Jarque-Bera test ($p = 0.314$) confirms that the residuals are normally distributed, while the Breusch-Godfrey LM test ($p = 0.259$) verifies the absence of serial correlation, validating the effectiveness of the DOLS leads-and-lags augmentation. Furthermore, the Ramsey RESET test ($p = 0.108$) confirms correct functional form with no omitted variable bias. Although the Breusch-Pagan-Godfrey test ($p = 0.018$) detects heteroskedasticity—likely driven by the extreme exchange rate and inflation volatility characteristic of the Nigerian macroeconomic environment—this is econometrically resolved by employing Newey-West heteroskedasticity and autocorrelation consistent (HAC) robust standard errors. Finally, the CUSUM and CUSUM of Squares stability tests

demonstrate that the recursive residuals remain strictly within the 5% critical bounds. This confirms that the long-run parameters are structurally stable over the 1990–2024 period, despite significant economic shocks such as the 2016 recession and the 2023 subsidy removal. Collectively, these diagnostics ensure that the estimated coefficients are efficient, unbiased, and highly reliable for policy inference.

4.6 Pairwise Granger Causality Tests

The pairwise Granger causality test presented in Table 8 examines the direction of predictive relationships between foreign aid and inflation, as well as other macroeconomic variables.

Table 8: Granger Causality Tests Results

Null Hypothesis:	Obs	F-Statistic	Prob.	Remark
ODA does not Granger Cause CPI	33	8.73722	0.0002	Unidirectional causality
CPI does not Granger Cause ODA		0.91624	0.4117	
EXR does not Granger Cause CPI	33	7.28885	0.0011	bidirectional causality
CPI does not Granger Cause EXR		3.14886	0.0344	
M2 does not Granger Cause CPI	33	6.80551	0.0017	Unidirectional causality
CPI does not Granger Cause M2		2.73060	0.0825	
GOVT does not Granger Cause CPI	33	4.88048	0.0152	Unidirectional causality
CPI does not Granger Cause GOVT		0.17692	0.8388	

Source: Researcher's computation using Eviews (2026)

The Granger causality results in Table 8 provide further insight into the dynamic interactions among the variables. The null hypothesis that official development assistance (ODA) does not Granger-cause inflation (CPI) is rejected ($p = 0.0002$), while the reverse hypothesis cannot be rejected ($p = 0.4117$), indicating a unidirectional causality running from foreign aid to inflation. Similarly, money supply (M2) Granger-causes inflation ($p = 0.0017$), whereas inflation does not significantly predict money supply ($p = 0.0825$), and government expenditure also Granger-causes inflation ($p = 0.0152$) without reverse causality ($p = 0.8388$). These findings suggest that fiscal expansion, liquidity growth, and aid inflows precede and help explain movements in inflation in Nigeria. In contrast, the relationship between exchange rate (EXR) and inflation is bidirectional: exchange rate movements significantly predict inflation ($p = 0.0011$), and inflation also predicts exchange rate changes ($p = 0.0344$), reflecting a feedback mechanism likely driven by import pass-through and inflation-induced currency pressures. Overall, the causality evidence reinforces the long-run DOLS results by confirming that Nigeria's inflation dynamics are predominantly driven by external inflows, monetary expansion, and fiscal spending, with the exchange rate serving as both a transmission channel and a responding variable within the inflationary process.

4.7 Discussion of Findings

The DOLS estimation results reveal that official development assistance (ODA) exerts a positive and statistically significant long-run effect on inflation in Nigeria ($\beta = 29.001$, $p < 0.01$), confirming the first hypothesis and establishing foreign aid as a primary inflationary driver within the estimated model. This

finding implies that aid inflows expand domestic liquidity and stimulate aggregate demand without a commensurate expansion in productive capacity, thereby generating sustained upward pressure on the consumer price index. Theoretically, this outcome is consistent with the Quantity Theory of Money, which predicts that monetary expansion unaccompanied by output growth translates directly into higher price levels, and with the Dutch Disease framework, which identifies foreign currency inflows as a source of exchange rate appreciation and non-tradable sector inflation. The Keynesian demand-pull mechanism further reinforces this interpretation, as aid-financed government spending raises aggregate demand beyond the economy's supply frontier. Empirically, the finding corroborates evidence from Abiodun and Salami (2024), who quantified a 0.22% long-run CPI increase per 1% ODA rise in Nigeria using DOLS, and aligns with Okon and Edet (2023), Nkoro and Uko (2022), and Chirwa and Odhiambo (2022), all of whom confirmed significant aid-induced inflationary pressure in developing economies. Egunjobi (2025) further supports this outcome by demonstrating that institutional weaknesses amplify the inflationary consequences of aid inflows in Nigeria, suggesting that the volume of aid matters less than the efficiency of its absorption and allocation.

The exchange rate (EXR) also exhibits a significant positive long-run effect on inflation ($\beta = 0.120, p < 0.05$), confirming that naira depreciation transmits directly into domestic prices through import cost pass-through. Given Nigeria's structural dependence on imported goods, intermediate inputs, and capital equipment, exchange rate depreciation raises production costs across sectors, ultimately elevating the general price level. This result is theoretically consistent with the Structuralist theory of inflation, which emphasizes that structural rigidities and external sector vulnerabilities are primary drivers of price instability in developing economies. It is equally consistent with the Dutch Disease framework, which links foreign inflow dynamics to exchange rate distortions and their downstream inflationary consequences. Empirically, the finding aligns with Isah (2023), who demonstrated that exchange rate movements associated with foreign inflows significantly elevate inflation across Sub-Saharan Africa, and with Nguyen and Tran (2022), who found that aid-induced exchange rate pressures generate measurable inflationary effects in economies with weak macroeconomic management frameworks. The bidirectional Granger causality established between the exchange rate and inflation further reinforces the view that the naira's volatility both drives and responds to inflationary dynamics, creating a mutually reinforcing feedback loop that complicates monetary stabilization efforts in Nigeria.

Government expenditure (GOVT) is the second most powerful inflationary variable in the model, with a highly significant positive coefficient ($\beta = 11.632, p < 0.001$). This finding implies that fiscal expansion, particularly when financed through aid absorption, raises aggregate demand faster than domestic supply can respond, generating classic demand-pull inflation. The result strongly validates the Keynesian theory of inflation, which argues that expansionary fiscal policy creates inflationary pressure when productive capacity and infrastructure are constrained — precisely the structural conditions that characterize the Nigerian economy. Furthermore, the unidirectional Granger causality from government expenditure to inflation confirms that fiscal spending precedes and predicts price changes, reinforcing its role as an active inflationary driver rather than a passive responder. Empirically, these findings are consistent with Yusuf and Salaudeen (2023), who documented that aid dependency induces fiscal

indiscipline, with high-aid years corresponding to elevated government deficits financed through monetary expansion. Mensah and Boateng (2025) similarly found that budget support aid — which primarily funds recurrent government expenditure, carries a significantly higher inflationary impact than project-tied aid across the ECOWAS region, a finding particularly relevant to Nigeria's aid absorption patterns.

Finally, broad money supply (M2) exhibits a positive but statistically insignificant long-run effect on inflation ($\beta = 0.965, p = 0.302$), suggesting that monetary expansion does not operate as an independent inflationary channel within the estimated model. This result does not fundamentally contradict the Quantity Theory of Money; rather, it indicates that the inflationary impact of liquidity creation in Nigeria is already captured through the fiscal and external channels represented by government expenditure and ODA, leaving M2 with limited additional explanatory power once these variables are controlled. This interpretation is supported by the strong positive correlation between ODA and M2 (0.661) identified in the descriptive analysis, which suggests that aid-driven monetary expansion is largely subsumed within the ODA coefficient. The finding partially contrasts with Suleiman and Isiyaku (2022) and Khan and Ahmed (2021), who identified money supply as the dominant inflationary transmission channel for foreign inflows in Nigeria and South Asia respectively. However, it is consistent with Dönmez (2025), who demonstrated that the inflationary effect of money supply expansion is significantly attenuated in economies where other fiscal and external variables dominate the inflationary process. Collectively, these results confirm that inflation in Nigeria is fundamentally a fiscal and external phenomenon, shaped primarily by the volume and management of foreign aid inflows, exchange rate instability, and government spending patterns, rather than by monetary aggregates alone.

5. Conclusion and Recommendations

This study investigated the long-run impact of foreign aid on inflation in Nigeria using annual time series data spanning 1990–2024, estimated within a Dynamic Ordinary Least Squares (DOLS) framework anchored on the Quantity Theory of Money and the Dutch Disease theory. The empirical evidence firmly establishes that foreign aid (ODA), exchange rate depreciation, and government expenditure are the primary long-run drivers of inflation in Nigeria. Specifically, ODA exerts a strong positive and statistically significant effect on the consumer price index, confirming that aid inflows generate inflationary pressure by expanding domestic liquidity and stimulating aggregate demand beyond the economy's productive capacity. Exchange rate depreciation further amplifies price instability through import cost pass-through, while fiscal expansion reinforces demand-pull inflation when aid-financed government spending outpaces supply-side growth. Money supply, though positively signed, lacks statistical significance as an independent channel, suggesting that its inflationary influence operates indirectly through fiscal and external sector dynamics rather than as a standalone monetary phenomenon. Collectively, these findings confirm that without disciplined absorption mechanisms, foreign aid inflows may inadvertently undermine the price stability that is itself a prerequisite for aid effectiveness, creating a self-defeating macroeconomic cycle that erodes both growth and welfare in Nigeria.

Based on these findings, three targeted policy recommendations were made.

First, the Nigerian government and its development partners should restructure aid allocation away from recurrent and consumption-driven expenditure toward productive sectors, particularly agriculture, manufacturing, and infrastructure, that expand domestic supply capacity and naturally counteract demand-pull inflationary pressures. Project-tied aid modalities should be prioritized over general budget support, consistent with evidence from Mensah and Boateng (2025).

Second, the Central Bank of Nigeria should strengthen exchange rate management through enhanced foreign reserve accumulation, export diversification incentives, and reduced import dependency, thereby limiting the inflationary pass-through of naira depreciation that the study identifies as a significant transmission channel.

Third, fiscal-monetary policy coordination must be substantially improved: the CBN should deploy sterilization instruments, including open market operations and reserve requirements, to mop up excess liquidity generated by aid conversions, while the fiscal authorities should enforce strict aid utilization frameworks that prevent the diversion of external resources into inflationary recurrent spending.

5.1 Contribution to Knowledge

The study's key findings advance knowledge on four fronts: it establishes that foreign aid is a statistically significant long-run driver of inflation, confirming the Dutch Disease and demand-pull mechanisms in the Nigerian context; it demonstrates that exchange rate depreciation amplifies inflationary pressure through import cost pass-through, underscoring the critical importance of external sector stability; it reveals that government expenditure is the most fiscally potent inflationary variable, reinforcing the case for disciplined aid absorption and recurrent expenditure control; and it shows that money supply operates as an indirect rather than independent inflationary channel, suggesting that Nigeria's price instability is fundamentally fiscal and external in nature rather than purely monetary. Collectively, these findings enrich both the theoretical and policy discourse on aid effectiveness, offering an evidence-based framework for macroeconomic management that is directly applicable to Nigeria and comparable aid-dependent economies across Sub-Saharan Africa.

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