



DO FISCAL AND MONETARY POLICIES MATTER FOR INDUSTRIAL OUTPUT IN NIGERIA? EVIDENCE FROM ARDL MODELLING

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Abstract

This study examines the impact of fiscal and monetary policy on industrial output in Nigeria using annual time-series data from 1986 to 2021. Industrial output is measured by industrial value added, while fiscal policy is proxied by government final consumption expenditure. Monetary policy is captured through real interest rate and inflation rate, with private sector industrial investment included as a control for domestic investment dynamics. The empirical strategy employs the Autoregressive Distributed Lag (ARDL) bounds testing approach, supported by Augmented Dickey-Fuller unit root tests and Granger causality analysis. The results confirm a stable long-run relationship among the variables. The long-run estimates show that private sector industrial investment has a positive and statistically significant effect on industrial output, while inflation also reports a positive long-run association. Government expenditure and real interest rate are positive but statistically insignificant. In the short run, industrial output responds strongly to its own past dynamics and inflationary changes, while the error correction term is negative and statistically significant, confirming convergence to long-run equilibrium. The causality results indicate unidirectional Granger causality from government expenditure to industrial output, suggesting that fiscal policy has predictive relevance for industrial performance. The findings suggest that Nigeria's industrial sector requires more than aggregate fiscal expansion and monetary adjustment; it requires targeted public spending, moderate price stability, lower investment-financing constraints, and stronger coordination between fiscal and monetary authorities.

Keywords: Fiscal Policy; Monetary Policy; Industrial Output; Government Expenditure; Inflation; Interest Rate; ARDL

JEL Classification : E52; E62; L60; O14; C32

1. Introduction

Industrial output is central to structural transformation, productivity growth, employment creation, export diversification, and long-term economic development. The industrial sector provides a foundation for value addition, technological learning, and productive employment, especially in economies seeking to move beyond primary commodity dependence (Kruse et al., 2022). In Nigeria, however, industrial performance has remained weak and volatile despite repeated macroeconomic reforms, a large domestic market, and substantial natural resource endowments. The challenge of weak industrial performance is closely linked to the macroeconomic policy environment. Fiscal policy affects industrial activity through government spending on infrastructure, public

services, energy, transport, security, and institutional support. Keynesian theory suggests that public expenditure can stimulate output through aggregate demand and the multiplier mechanism (Keynes, 1936). However, the effect of government spending depends on whether expenditure is productive, efficiently implemented, and directed toward sectors that reduce production costs and crowd in private investment (Onifade et al., 2022; Chandana et al., 2021).

Monetary policy also matters for industrial output because it shapes credit conditions, investment costs, inflation expectations, and macroeconomic stability. Chuku (2009) shows that monetary policy innovations have measurable real effects in Nigeria, while Ifurueze (2022) links monetary policy instruments to financial-sector performance. These

findings imply that monetary policy can influence industrial activity through the cost and availability of credit, although the strength of this transmission depends on the structure of the financial system and the responsiveness of firms to policy changes. Nigeria provides an important context for examining the joint role of fiscal and monetary policy. Since the adoption of the Structural Adjustment Programme in 1986, the economy has experienced liberalisation, exchange rate reforms, fiscal expansion, inflationary instability, episodes of monetary tightening, and several attempts to revive industrial production. Yet industrial value added has not achieved the depth required for sustained structural transformation. This raises a direct empirical question: to what extent have fiscal and monetary policy variables influenced industrial output in Nigeria?

The fiscal policy channel is especially relevant because public expenditure can either support or constrain industrial activity. Productive government spending on power, transport, logistics, security, education, and regulatory institutions can reduce production costs and expand industrial capacity. However, where public expenditure is dominated by recurrent consumption, weak project execution, corruption, or poor targeting, its industrial effect may be limited. This argument is consistent with Nigerian evidence showing that the effect of government expenditure on output varies by expenditure composition and implementation quality (Jude et al., 2021; George & Chioma, 2023; Onifade et al., 2022).

The monetary policy channel is equally important. High real interest rates can increase borrowing costs and discourage investment in plant, machinery, and working capital. Inflation can raise production costs and create uncertainty, although moderate inflation may coincide with demand expansion and higher nominal output in some contexts. These competing effects make the relationship between monetary policy and industrial output theoretically ambiguous and empirically important. Nigerian evidence suggests that monetary policy transmission is often weakened by financial-market constraints and structural bottlenecks (Chuku, 2009; Ifuruzee, 2022).

Existing studies on Nigeria have examined fiscal policy, monetary policy, private investment, and industrial performance from different angles.

However, many studies focus on aggregate economic growth rather than industrial output as a distinct sectoral outcome (Chandana et al., 2021; Onifade et al., 2022). Others examine fiscal or monetary policy separately, thereby underplaying the fact that industrial production is shaped by the joint behaviour of public spending, credit conditions, inflationary pressure, and private investment. This paper addresses that gap by examining fiscal and monetary policy effects on industrial output in Nigeria using annual data from 1986 to 2021 and an ARDL framework.

The specific objectives are to examine the long-run relationship between fiscal policy, monetary policy, and industrial output; estimate the effects of government expenditure, real interest rate, and inflation on industrial output; and determine the direction of causality among the variables. The paper is organised as follows. Section 2 reviews conceptual, theoretical, and empirical literature. Section 3 presents the methodology. Section 4 discusses the results. Section 5 concludes and presents policy implications.

2. Literature Review

2.1 Conceptual Issues

This study is organised around four core concepts: fiscal policy, monetary policy, industrial output, and private sector industrial investment. Conceptual clarity is necessary because the paper does not treat fiscal and monetary policy as abstract macroeconomic labels; it examines specific policy channels through which government expenditure, interest rate, and inflation may affect industrial performance.

Fiscal policy refers to the use of government revenue and expenditure decisions to influence aggregate economic activity. In the Keynesian tradition, government expenditure is a major fiscal instrument because it enters aggregate demand directly and can influence output, income, and employment (Keynes, 1936). Musgrave and Musgrave (1989) also explain fiscal policy through the allocative, distributive, and stabilisation functions of government, showing that public spending is not merely administrative but also developmental and macroeconomic. In this paper, fiscal policy is represented by government final consumption expenditure, which captures the role of

public spending in providing services, infrastructure support, and institutional conditions relevant to industrial production.

Monetary policy refers to the actions of the monetary authority aimed at influencing money supply, credit conditions, interest rates, inflation, and overall macroeconomic stability. Mishkin (1995) explains monetary policy transmission through channels such as interest rates, credit, exchange rates, asset prices, and expectations. Bernanke and Gertler (1995) further emphasise the credit channel, arguing that monetary policy affects real activity partly through its influence on firms' balance sheets and access to external finance. In the present paper, monetary policy is captured through real interest rate and inflation rate. Real interest rate reflects the cost-of-credit channel, while inflation captures the price-stability environment within which industrial firms make production and investment decisions.

Industrial output refers to the value added by the industrial sector, including manufacturing, mining, construction, electricity, gas, and water. Industrial output is central to structural transformation because it reflects an economy's capacity to move from primary production towards higher-productivity activities. Kaldor (1966) argues that manufacturing and industrial expansion play a strategic role in economic growth because of increasing returns and productivity spillovers. More recently, Kruse et al. (2022) show that industrialisation remains important for developing economies, although its pattern and intensity differ across regions. In this paper, industrial output is used as the dependent variable because it provides a sector-specific measure of productive performance rather than relying on aggregate GDP.

Private sector industrial investment is included as a control variable because industrial output is not determined by fiscal and monetary policy alone. Investment theory treats capital accumulation as a major driver of output expansion, while endogenous growth theory links private investment, productivity, and technological learning to long-run growth (Romer, 1986; Lucas, 1988). In the Nigerian context, private investment is especially important because public policy affects industry partly by shaping the incentives, costs, and risks faced by private firms. Thus, private sector industrial investment captures the

investment channel through which macroeconomic policy may influence industrial output.

Conceptually, the relationship among the variables is straightforward. Fiscal policy may affect industrial output by financing infrastructure, public services, and institutional support. Monetary policy may affect industrial output through borrowing costs, inflation expectations, and the stability of the macroeconomic environment. Private investment may transmit these policy effects into actual productive capacity. The empirical issue is therefore whether these fiscal, monetary, and investment channels have measurable short-run, long-run, and causal relationships with industrial output in Nigeria.

2.2 Theoretical Framework

Our paper is anchored on a fiscal-monetary transmission framework that combines Keynesian demand-side reasoning, monetary transmission theory, and endogenous growth theory. The logic is that industrial output responds not only to private investment decisions, but also to the fiscal and monetary conditions under which firms produce, borrow, invest, and expand.

From the Keynesian perspective, government expenditure influences output through aggregate demand. Keynes (1936) formalises this relationship through the national income identity:

$$Y = C + I + G + (-M) \dots\dots\dots (1)$$

Where Y is output, C is consumption, I is investment, G is government expenditure, X is exports, and M is imports. Since government expenditure enters aggregate demand directly, a rise in productive public spending can raise output through the multiplier process. The simple expenditure multiplier is expressed as:

$$k = \frac{1}{(1 - MPC)} \dots\dots\dots (2)$$

Where k is the multiplier and MPC is the marginal propensity to consume. For industrial output, this implies that government spending may stimulate production either directly through public procurement and infrastructure provision or indirectly through income, demand, and investment effects. However, the strength of this channel depends on the

productivity of expenditure and the domestic economy's capacity to respond to higher demand.

Monetary transmission theory explains how monetary policy affects real economic activity through interest rates, credit availability, inflation expectations, exchange rates, and balance-sheet conditions. Mishkin (1995) identifies the interest-rate channel as a core mechanism, while Bernanke and Gertler (1995) emphasise the credit channel through which monetary policy affects firms' access to external finance. In simplified form, the interest-rate channel can be expressed as:

$$M \uparrow \rightarrow r \downarrow \rightarrow I \uparrow \rightarrow Y \uparrow$$

Where M represents monetary conditions, r is the real interest rate, I is investment, and Y is output. Applied to industrial production, lower and stable real interest rates can encourage investment in machinery, technology, and working capital, while high borrowing costs may constrain industrial expansion. Inflation also matters because price instability affects production costs, expectations, profitability, and long-term planning.

Endogenous growth theory extends the analysis by emphasising productive capacity rather than demand alone. Romer (1986, 1990), Lucas (1988), and Barro (1990) show that long-run output growth can be driven by capital accumulation, human capital, technology, and productive public expenditure. A simplified production relationship may be stated as:

$$Y = A F(K, L, G) \dots \dots \dots (3)$$

Where Y is output, A is technology or total factor productivity, K is private capital, L is labour, and G is productive government expenditure. In this framework, public expenditure can raise industrial output when it improves infrastructure, logistics, human capital, energy supply, and institutional quality. Private sector industrial investment is also central because fiscal and monetary policies ultimately affect industry by shaping the incentives and constraints faced by firms. Overall, these theories justify the empirical specification of industrial output as a function of government expenditure, real interest rate, inflation rate, and private sector industrial investment. Fiscal policy captures the public-spending channel, monetary policy captures the cost-

of-credit and price-stability channels, and private investment captures the productive-capacity channel through which policy conditions are translated into industrial performance.

2.3 Empirical Review

The empirical literature on fiscal policy, monetary policy, and industrial output may be organised around three connected strands. The first examines the role of public expenditure in industrial and aggregate output performance; the second investigates monetary policy transmission through interest rate and inflation channels; while the third links private investment and industrialisation to the broader policy environment. Taken together, these strands suggest that industrial output is not determined by a single policy instrument, but by the interaction between public spending, financing conditions, price stability, and investment incentives.

The fiscal-policy strand generally argues that government expenditure can stimulate output when it improves infrastructure, lowers production costs, and expands aggregate demand. In the Nigerian context, Ozuzu and Isukul (2021) examined government expenditure and the industrial sector and found that public spending can influence industrial performance, although the effect depends on the type and productivity of expenditure. This evidence is relevant because the present paper treats government expenditure not merely as aggregate spending, but as a fiscal-policy channel through which the state may support industrial production. Similarly, Chandana, Adamu, and Musa (2021) found that government expenditure has implications for economic growth in Nigeria, with the effect varying between capital and recurrent components. Their findings support the view that the growth effect of fiscal policy depends on expenditure composition rather than expenditure size alone.

Moving from aggregate expenditure to infrastructure-specific spending, Jude, Richard, Adamu, and Aisha (2021) reported that government infrastructure expenditure matters for economic growth in Nigeria. Their result is important for the present paper because industrial firms depend heavily on public infrastructure such as electricity, transport, logistics, and water systems. George and Chioma (2023) reached a related conclusion in their study of transport

and communication expenditure, showing that sectoral public spending can support output where it reduces transaction costs and improves connectivity. These studies imply that fiscal policy is most likely to affect industrial output when expenditure is channelled into productivity-enhancing infrastructure rather than administrative consumption. However, the fiscal-policy evidence is not uniformly positive. Onifade, Çevik, Erdoğan, Asongu, and Bekun (2022) found that the impact of government expenditure on economic growth in Nigeria is mixed and depends on the structure and efficiency of spending. This finding introduces an important qualification: government expenditure may fail to stimulate output where fiscal leakages, corruption, delayed implementation, or abandoned projects weaken the productivity of public spending. This qualification is consistent with the present paper's empirical result, where government expenditure shows policy relevance through Granger causality but does not produce a statistically significant long-run coefficient.

The second strand of literature focuses on monetary policy transmission. Chuku (2009), using a structural vector autoregressive approach, showed that monetary policy innovations have measurable macroeconomic effects in Nigeria. His study is useful because it demonstrates that monetary policy shocks can influence real economic activity, although the strength of transmission depends on the structure of the economy and the financial system. Ifurueze (2022) similarly examined monetary policy instruments and financial-sector performance in Nigeria, finding that monetary policy variables are linked to financial-sector outcomes. The implication for industrial output is direct: where monetary policy affects credit conditions and financial-sector behaviour, it can also influence firms' ability to finance working capital, machinery, and expansion.

Within the monetary-policy channel, interest rate is particularly important because industrial production is capital-intensive. High real interest rates may discourage investment by raising borrowing costs, while lower rates may support industrial expansion by improving access to credit. Yet Nigerian evidence often suggests that the interest-rate channel is weak because many firms face credit rationing, collateral constraints, and structural financing barriers. This helps explain why the present paper finds a positive

but statistically insignificant long-run coefficient for real interest rate. The result should not be read as evidence that interest rates are irrelevant; rather, it suggests that interest-rate policy alone may be insufficient where the financial system does not transmit monetary impulses effectively to productive sectors.

Inflation represents another monetary-policy channel. In theory, high inflation can damage industrial performance by raising input costs, increasing uncertainty, and reducing real purchasing power. At the same time, moderate inflation may coincide with rising demand and output expansion in some developing economies. The empirical ambiguity of inflation is therefore unsurprising as it may be associated with demand-side price dynamics.

The third strand links industrial output to private investment and structural transformation. Kruse, Mensah, Sen, and de Vries (2022) show that manufacturing and industrialisation patterns in developing countries differ sharply across regions, with many low-income economies facing persistent informality and weak industrial upgrading. Their evidence is relevant to Nigeria because industrial output depends not only on macroeconomic policy but also on private investment, productivity, and structural change. In the Nigerian literature, studies on private-sector participation and industrial performance, including Adisa, Adefabi, and Sheu (2020), Omede and Ichide (2022), and Okedina and Bada (2023), suggest that private participation can improve productive performance where the policy environment supports investment and efficiency.

This investment-centred evidence provides a bridge between fiscal and monetary policy. Fiscal policy can crowd in private investment by providing infrastructure and institutional support, while monetary policy can encourage investment by maintaining stable prices and reasonable financing conditions. Conversely, weak public infrastructure, high borrowing costs, and unstable macroeconomic conditions can discourage private industrial investment. This explains why private sector industrial investment is retained in the model as a control variable: it captures an important channel through which fiscal and monetary policies may ultimately affect industrial output.

The reviewed literature reveals three gaps. One, many Nigerian studies examine government expenditure and economic growth at the aggregate level rather than industrial output as a distinct sectoral outcome. Two, monetary-policy studies often focus on inflation, financial-sector performance, or aggregate GDP, with less attention to industrial production. Finally, few studies jointly examine fiscal policy, monetary policy, and private investment within a single ARDL framework for Nigeria's industrial sector. This paper addresses these gaps by estimating the short-run, long-run, and causal relationships among government expenditure, real interest rate, inflation, private sector industrial investment, and industrial output in Nigeria from 1986 to 2021.

3. Methodology

3.1 Data Source and Variable Description

This paper uses annual time-series data for Nigeria covering 1986 to 2021. The period is selected because it captures the post-Structural Adjustment Programme era, during which Nigeria experienced major fiscal, monetary, and industrial policy reforms. The data are sourced from the World Development Indicators.

Industrial output (IND) is the dependent variable and is measured by industrial value added. It captures the productive performance of the industrial sector, including manufacturing, mining, construction, electricity, gas, and water.

Government expenditure (LGVX) represents fiscal policy and is measured as the logarithm of government final consumption expenditure. It captures the role of public spending in providing infrastructure, services, and institutional support for industrial production.

Real interest rate (INTR) represents the monetary policy cost-of-credit channel. It captures the inflation-adjusted cost of borrowing and is expected to influence investment decisions and industrial expansion.

Inflation rate (INFL) represents the monetary policy price-stability channel. It measures annual changes in the consumer price index and captures the macroeconomic price environment facing industrial firms.

Private sector industrial investment (PRV) is included as a control variable. It captures domestic investment dynamics and private-sector participation in industrial activity. In this reframed paper, PRV is not treated as a privatisation variable; it is treated as a control for private investment in the industrial sector.

3.2 Model Specification

The baseline functional relationship is specified as:

$$IND = f(LGVX, INTR, INFL, PRV) \dots (4)$$

The econometric form is expressed as:

$$IND_t = \beta_0 + \beta_1 LGVX_t + \beta_2 INTR_t + \beta_3 INFL_t + \beta_4 PRV_t + \varepsilon_t \dots (5)$$

Where IND_t denotes industrial output, $LGVX_t$ denotes government expenditure, $INTR_t$ denotes real interest rate, $INFL_t$ denotes inflation rate, PRV_t denotes private sector industrial investment, and ε_t is the stochastic error term. The coefficient β_1 captures the fiscal policy effect, while β_2 and β_3 capture monetary policy effects. The coefficient β_4 controls for private investment dynamics.

A priori, the coefficient on government expenditure is expected to be positive ($\beta_1 > 0$) if public spending enhances industrial infrastructure, aggregate demand, and production-supporting services. The coefficient on real interest rate is expected to be negative ($\beta_2 < 0$) where higher borrowing costs constrain industrial investment and working-capital financing. The coefficient on inflation is theoretically indeterminate ($\beta_3 \geq 0$), since inflation may either reflect demand expansion that supports output or macroeconomic instability that raises input costs and weakens production incentives. The coefficient on private sector industrial investment is expected to be positive ($\beta_4 > 0$), reflecting its role in expanding productive capacity.

3.3 Estimation Technique

We employ the Autoregressive Distributed Lag approach in this paper. The ARDL framework is suitable because it can be applied when variables are integrated of order $I(0)$, $I(1)$, or a mixture of both, provided none is integrated of order $I(2)$. It is also appropriate for relatively small samples and enables the estimation of both short-run and long-run relationships.

The empirical analysis proceeds in four stages. One, Augmented Dickey-Fuller unit root tests are conducted to determine the stationarity properties of the variables. Two, the ARDL bounds test is used to examine whether a long-run relationship exists among fiscal policy, monetary policy, private investment, and industrial output. Three, the long-run and short-run ARDL estimates are obtained. Finally, Granger causality tests are conducted to determine the predictive direction among the variables.

3.4 ARDL Error Correction Representation

Once cointegration is established, we estimated the ARDL error correction model to capture short-run dynamics and long-run adjustment. The error correction term is expected to be negative and statistically significant. A negative and significant coefficient indicates that deviations from long-run equilibrium are corrected over time.

4. Results and Discussion

4.1 Unit Root Test Result

Table 1: ADF Unit Root Test

Variables	ADF statistics at Level	Critical values at level (5%)	P-values at Level	ADF statistics at first difference	Critical values at first difference (5%)	P-values at Level first difference	Order of integration
IND	-1.266408	-2.954021	0.6332	-6.305836	-2.954021	0.0000	I(1)
INFL	-3.423784	-2.951125	0.0170	-	-	-	I(0)
INTR	-3.712362	-2.948404	0.0082	-	-	-	I(0)
LG VX	-4.291043	-2.981038	0.0025	-	-	-	I(0)
PRV	-1.978916	-2.948404	0.2943	-4.653054	-2.951125	0.0007	I(1)

Source: Author's Computation (2026).

The results show a mixed order of integration, with some variables stationary at level, I(0), and others after first differencing, I(1). Since none of the variables is integrated of order two, I(2), the ARDL approach is appropriate. This is important because

fiscal policy, monetary policy, private investment, and industrial output are macroeconomic series that may adjust at different speeds over time.

4.2 ARDL Bounds Cointegration Test

Table 2: Bounds Co-integration Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	7.187876	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Author's Computation (2026)

The ARDL bounds test confirms a long-run relationship among industrial output, government expenditure, real interest rate, inflation rate, and private sector industrial investment - with computed F-statistic (7.19) exceeds the upper bound critical value at the 1% significance level (I(1) = 4.37). This

suggest that Nigeria's industrial output is tied to the broader fiscal-monetary policy environment in the long run. The existence of cointegration justifies the estimation of both long-run coefficients and short-run adjustment dynamics.

4.3 Long-Run Estimates

Table 3: ARDL Long run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.384151	7.757801	0.822933	0.4254
INFL	0.145307	0.034356	4.229490	0.0010
INTR	0.402592	0.267430	1.505411	0.1561
LG VX	0.822591	0.788961	1.042625	0.3161
PRV	0.346541	0.080691	0.822933	0.0009

Source: Author's Computation (2026).

Table 3 shows that private sector industrial investment has a positive and statistically significant effect on industrial output. This is the strongest result in the model and confirms that industrial performance in Nigeria is investment-driven. Fiscal and monetary policies therefore matter most when they improve the conditions for private industrial investment.

Government expenditure has a positive but statistically insignificant effect on industrial output. This suggests that public spending moves in the expected direction but has not produced a strong long-run industrial effect. The result points to a fiscal quality problem: government expenditure must be targeted toward power, transport, logistics, security, and industrial-supporting infrastructure before it can generate a measurable industrial-output effect. Real

interest rate is positive but statistically insignificant. This weak result suggests that the interest-rate channel of monetary policy is not strong enough to explain industrial output in Nigeria. Industrial firms may be constrained less by the policy rate itself and more by credit rationing, collateral requirements, lending spreads, infrastructure deficits, and exchange-rate uncertainty.

Inflation shows a positive long-run association with industrial output. This suggest that inflation may have moved with demand expansion and nominal industrial activity during the period. Hence, the policy issue is therefore not to encourage inflation, but to maintain price stability without suppressing productive investment.

4.4 ARDL Model for Short Run Estimate

Table 4: ARDL Short run Results (ECM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IND(-1))	1.060442	0.160054	6.625510	0.0000
D(IND(-2))	0.075828	0.130847	0.579520	0.5721
D(IND(-3))	0.401562	0.126299	3.179465	0.0072
D(INFL)	0.049315	0.022004	2.241191	0.0431
D(INFL(-1))	-0.171834	0.031510	-5.453300	0.0001
D(INFL(-2))	-0.033611	0.022030	-1.525699	0.1510
D(INFL(-3))	-0.080497	0.026043	-3.090913	0.0086
D(INTR)	0.102517	0.201095	0.509791	0.6187
D(INTR(-1))	-0.128566	0.177544	-0.724137	0.4818
D(INTR(-2))	-0.203282	0.184798	-1.100023	0.2913
D(INTR(-3))	0.467090	0.163927	2.849371	0.0137
D(PRV)	-0.228661	0.123559	-1.850626	0.0871
D(PRV(-1))	-0.172581	0.105999	-1.628135	0.1275
CointEq(-1)*	-1.382423	0.178896	-7.727526	0.0000
R-squared	0.889066	Mean dependent var		-0.124509
Durbin-Watson stat	2.055466			

Source: Author's Computation (2026).

Table 4 presents the short-run dynamics from the ARDL error correction model. The significance of some lagged changes in industrial output indicates short-run persistence in industrial activity, suggesting that past changes in output influence current production. The error correction term (CointEq(-1)) is negative and highly significant (-1.382, $p < 0.01$), confirming the existence of a stable long-run relationship among the variables. The short-run results show that industrial output responds to its own past movements, indicating persistence in industrial production. This is expected because industrial output depends on existing capacity, previous investment, and production continuity. Inflation also matters in the short run, confirming that price dynamics affect industrial production through input costs, demand

conditions, and expectations. Government expenditure and real interest rate do not show strong immediate effects, which is plausible because fiscal spending operates with implementation lags while monetary transmission to industry is often weak in Nigeria. The model also exhibits strong explanatory power ($R^2 = 0.889$) and no evidence of serial correlation (Durbin-Watson ≈ 2.05). These results validate the short-run responsiveness of the industrial sector and the stability of the estimated ARDL model. Overall, results suggest that short-run shocks to fiscal policy, monetary conditions, or investment do not permanently displace industrial output from its long-run path.

4.5 Granger Causality Test

Table 5: Granger Causality Test Result

Null Hypothesis:	Obs	F-Statistic	Prob.
INFL does not Granger Cause IND	34	2.33319	0.1149
IND does not Granger Cause INFL		2.90179	0.0710
INTR does not Granger Cause IND	34	0.77120	0.4717
IND does not Granger Cause INTR		0.06529	0.9369
LG VX does not Granger Cause IND	34	3.46475	0.0447
IND does not Granger Cause LG VX		0.15190	0.8598
PRV does not Granger Cause IND	34	9.02922	0.0009
IND does not Granger Cause PRV		1.18081	0.3214

Source: Author's Computation (2026).

Table 5 reports the results of the Granger causality tests. The findings indicate a unidirectional causality from government expenditure to industrial output. This strengthens the fiscal-policy argument: public spending helps predict industrial performance, even though its long-run coefficient is not statistically significant. The implication is that fiscal policy matters, but its effectiveness depends on expenditure quality and industrial targeting. Private sector industrial investment also Granger-causes industrial output, reinforcing the long-run result that investment is the central driver of industrial performance. By contrast, real interest rate and inflation do not show strong direct causal effects on industrial output. This suggests that monetary policy may affect industry

indirectly through credit conditions, expectations, and investment incentives rather than through an immediate direct channel.

5. Conclusion and Policy Implications

This paper examined the impact of fiscal and monetary policy on industrial output in Nigeria from 1986 to 2021 using the ARDL framework. Fiscal policy was captured by government expenditure, while monetary policy was represented by real interest rate and inflation rate. Private sector industrial investment was included as a control variable to account for investment dynamics. The results confirm a stable long-run relationship among the variables. The long-run estimates show that

private sector industrial investment has a positive and statistically significant effect on industrial output. Government expenditure and real interest rate are positive but statistically insignificant, while inflation shows a positive long-run association. The short-run estimates indicate that industrial output responds to its own past dynamics and inflationary changes, while the significant error correction term confirms adjustment toward long-run equilibrium. The causality results show that government expenditure and private investment Granger-cause industrial output. The paper concludes that fiscal and monetary policy matter for industrial output, but their effectiveness depends on how they shape the investment and production environment. Fiscal policy appears more relevant through its predictive relationship with industrial output, while monetary policy matters through price stability and financing conditions. However, the direct effects of government expenditure and interest rate are weak, suggesting that Nigeria's industrial challenge is structural as well as macroeconomic.

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Policy Implications

The findings imply that fiscal policy should be more deliberately targeted toward industrial-supporting infrastructure. Government expenditure should prioritise power supply, transport networks, logistics, industrial parks, security, and regulatory institutions rather than broad expenditure expansion with weak productive content. Monetary policy should support industrial production by maintaining moderate inflation and reducing uncertainty in the investment environment. Price stability remains important, but monetary tightening should be carefully balanced against the need for affordable credit to productive sectors. The weak interest-rate effect suggests that Nigeria must strengthen monetary transmission. This requires improving access to long-term industrial finance, reducing credit frictions, deepening financial markets, and expanding development-finance channels for manufacturing and industrial firms. Finally, fiscal and monetary authorities should improve policy coordination. Industrial output cannot be strengthened by isolated policy actions. Public spending, interest-rate policy, inflation management, credit allocation, and private investment incentives must be aligned toward a coherent industrial development strategy.

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