

The Impact of Fiscal and Monetary Policies on Economic Growth in Algeria: An Econometric Study Using the ARDL Model (2000–2024)

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Abstract:

This study investigates the impact of fiscal and monetary policies on economic growth in Algeria during the period 2000–2024. Adopting a descriptive-analytical approach to evaluate the theoretical framework and macroeconomic indicators, the study employs the Autoregressive Distributed Lag (ARDL) bounds testing approach and the Error Correction Model (ECM) to estimate the short- and long-run dynamic equilibrium relationships among the variables. The empirical findings confirm the existence of a robust long-run cointegrating relationship. The Error Correction Model reveals a negative and highly statistically significant error correction coefficient ($ECT = -1.12$) at the 1% level, indicating a high speed of adjustment toward long-run equilibrium following macroeconomic shocks. In the short run, government expenditure (-0.9) and broad money supply (-0.4) exert negative and statistically significant impacts on economic growth, highlighting structural challenges and efficiency bottlenecks in public spending and liquidity allocation. Diagnostic and stability tests (LM, Breusch-Pagan-Godfrey, Jarque-Bera, CUSUM, and CUSUMSQ) confirm that the estimated econometric model is robust, correctly specified, and structurally stable. The study recommends rationalizing public expenditure toward high-productivity capital investments, enhancing fiscal-monetary policy coordination, and accelerating structural diversification across non-hydrocarbon sectors.

Keywords: Economic Growth, Fiscal Policy, Monetary Policy, Government Expenditure, Money Supply, ARDL Model

JEL Classification Codes: E52, E62, O47, C22, H50.

1. Introduction

Sovereign governments deploy monetary and fiscal policies simultaneously to achieve paramount macroeconomic objectives, chief among which are sustaining robust economic growth rates, preserving monetary and price stability, curtailing inflation and unemployment, and maintaining overall national economic equilibrium. Monetary policy plays an essential stabilizing role by regulating the volume and cost of money supply and credit conditions. Concurrently, fiscal policy—through its comprehensive array of spending and taxation instruments—serves as a vital engine for accelerating socioeconomic

development, stabilizing market prices, and mitigating structural vulnerabilities that impede sustainable expansion.

The Algerian economy has experienced significant macroeconomic transformations over the past two and a half decades. Due to its intrinsic vulnerability and structural exposure to global commodity market fluctuations, the Algerian government has implemented multiple waves of fiscal and monetary reforms. These policy interventions aimed primarily at stimulating output growth, bolstering domestic productive capacity, and re-establishing fiscal and external balances amidst shifting global economic dynamics.

Against this backdrop, this research aims to rigorously examine and quantify the impact of both fiscal and monetary policies on economic growth in Algeria over the period 2000–2024, employing the Autoregressive Distributed Lag (ARDL) cointegration methodology. Consequently, the central research problem is articulated through the following main question:

“To what extent have fiscal and monetary policies influenced economic growth in Algeria during the period (2000–2024)? And can an econometric model be formulated to capture and explain the long-run and short-run equilibrium dynamics between these macroeconomic policies and economic growth?”

To systematically address this core problem, the following sub-questions are investigated:

- **1.** Have fiscal policy and monetary policy effectively contributed to fostering economic growth in Algeria throughout the study period?
- **2.** Does a statistically significant long-run equilibrium relationship exist between macroeconomic policies and economic growth under the ARDL model?
- **3.** Is there an active short-run error correction mechanism that restores the economy to its long-run equilibrium path following external or policy shocks, as formulated by the Error Correction Model (ECM)?

Methodology and Scope of the Study

The study adopts a descriptive-analytical approach to examine the theoretical literature and track historical macroeconomic trends, coupled with an inductive empirical approach utilizing modern econometric techniques. Specifically, we employ the Autoregressive Distributed Lag (ARDL) bounds testing methodology—recognized as one of the most robust frameworks for cointegration and dynamic error correction modeling. Regarding spatial and temporal boundaries, the spatial focus is Algeria, while the temporal scope spans a twenty-five-year period from 2000 to 2024, providing a comprehensive sample of modern economic cycles.

Objectives of the Study

This study seeks to empirically test and evaluate the magnitude and direction of fiscal and monetary policy impacts on Algerian economic growth in both the short and long run. By estimating a well-specified ARDL econometric model and identifying the exact elasticities and adjustment speeds, the study aims to provide policymakers in Algeria with evidence-based insights to guide future fiscal incentives, monetary guidelines, and strategic investment allocations necessary for sustainable economic development.

Structure of the Paper

To address the research questions holistically, the paper is organized into the following main sections:

- **Section 1:** Theoretical Background and Literature Review.
- **Section 2:** Evolutionary Trends of Macroeconomic Indicators and Conceptual Framework.
- **Section 3:** Econometric Analysis of the Impact of Fiscal and Monetary Policies on Economic Growth.
- **Section 4:** Conclusion and Policy Recommendations.

2. Theoretical Background and Literature Review

Fiscal and monetary policies represent complementary macroeconomic management tools designed to stimulate economic activity and ensure aggregate stability. The transmission mechanism linking fiscal and monetary tools to economic growth relies on structural channels that convert quantitative instruments—such as government spending, tax structures, and the money supply—into drivers of aggregate demand and production. Keynesian theory posits that expansionary fiscal expenditure exerts a substantial multiplier effect, expanding aggregate demand and gross domestic product (GDP). In contrast, Monetarist theory underscores the primacy of money supply regulation, asserting that excessive monetary expansion fuels inflationary pressures and destabilizes interest rates, while generating crowding-out effects on private investment. In developing and oil-dependent economies such as Algeria, policy coordination between fiscal and monetary authorities is doubly crucial. The absence of synchronized fiscal-monetary policies can create structural bottlenecks, inflationary spikes, and distorted growth paths, necessitating empirical verification via dynamic econometric modeling.

2.1 Conceptual Definitions

. **Definition of Fiscal Policy** .Fiscal policy is defined as the set of adopted policies and measures governing the level and pattern of state public expenditures on the one hand, and the structure and volume of public revenues on the other (Philips, 1973, p. 176). It is also conceptualized as encompassing all deliberate adjustments in government spending and taxation aimed at enhancing societal welfare (Josep & David, 2004, p. 132).

. Definition of Monetary Policy

Monetary policy is defined as a macroeconomic strategy aimed at maintaining favorable monetary and credit conditions that foster high employment levels, robust economic growth, and exchange rate stability (Bouzarour, 2015, p. 95). Furthermore, it is recognized as a policy mechanism designed to regulate the money supply in an economy to achieve sustainable economic development, eliminate unemployment, maintain balance of payments equilibrium, and ensure general price stability (Al-Mousawi, 2014, p. 73).

. Definition of Economic Growth

Economic growth is defined as the expansion in per capita real national product or the sustained increase in aggregate real output (Naji & Khalifa, 1999, p. 7). It also denotes the growth in an individual's average share of total societal income. Thus, economic growth transcends a mere aggregate rise in national income or total production; it reflects tangible improvements in living standards represented by an increased per capita income (Abdelkader, 1999, p. 18). In addition, it is characterized as the continuous increase in per capita production of goods and services within a specific economic environment (Arroux,

1999, p. 9), as well as an expansion in national product driven by greater factor utilization and enhanced productive efficiency (Yousri, 2000, p. 149).

2.2 Literature Review

Previous economic literature constitutes a fundamental pillar for framing the analytical and empirical framework of the impact of macroeconomic policies on economic growth, and for comprehending the dimensions of interaction between fiscal and monetary policy tools and their effectiveness in directing economic activity. This section reviews the most prominent research studies that addressed this topic.

In a study conducted by Kretzmer (1992) comparing monetary policy with fiscal policy in the US economy relying on quarterly data during the period (1952–1991) using a Vector Autoregression (VAR) model, it was found that monetary policy is less effective than fiscal policy. The author also indicated that the effects of both money and interest rates on output have decreased over the years.

In a study by Chibi, Benbouziane, and Chekouri (2021) analyzing the dynamic interaction between monetary and fiscal policies in Algeria during the period (1963–2017), the researchers relied in the first stage on a Structural Vector Autoregression (SVAR) model to test the nature of fiscal policy. The results found the existence of a non-Ricardian fiscal policy, which proves the validity of the Fiscal Theory of the Price Level (FTPL) in the Algerian economy. In the second stage, the researchers applied a Markov-switching State-space model to estimate time-varying parameters. The results showed that monetary and fiscal policies interacted in an uncooperative manner during most of the study period. Accordingly, the study concluded the existence of an economic game in which the fiscal authority exercises an active or leadership role, while the monetary authority is characterized by passive behavior, which favors the hypothesis of fiscal dominance in Algeria.

In a study by Sehli and Mili (2026) on the effectiveness of fiscal policy in Algeria during the period (1990–2023) using the ARDL model, the results showed that fiscal policy follows a pro-cyclical pattern. Despite the confirmed existence of a cointegration relationship and a temporary stimulation of growth in the short run, the multipliers of fiscal policy in the long run were statistically insignificant, reflecting the limited impact of expansionary spending in achieving sustainable growth under reliance on oil rents.

Sawan (2019) also studied the effectiveness of monetary and fiscal policies on economic growth in Algeria using the ARDL model. The study found a positive relationship between both government spending and the budget balance with economic growth, against a negative impact of exchange rate, inflation, and interest rates on economic growth in both the short and long terms, which reflects the expansionary and inflationary nature of the Algerian economy.

In addition, many of these studies stopped at earlier time periods, making them non-comprehensive of the major transformations witnessed by the Algerian economy, especially the impacts resulting from the oil price decline shock in late 2014, the COVID-19 crisis, and the economic reforms that followed these two crises.

Therefore, this study provides a scientific contribution by integrating fiscal and monetary policy tools into a unified econometric model (such as the ARDL model) to analyze the nature of the relationship and the impact on economic growth in Algeria during the period (2000–2024).

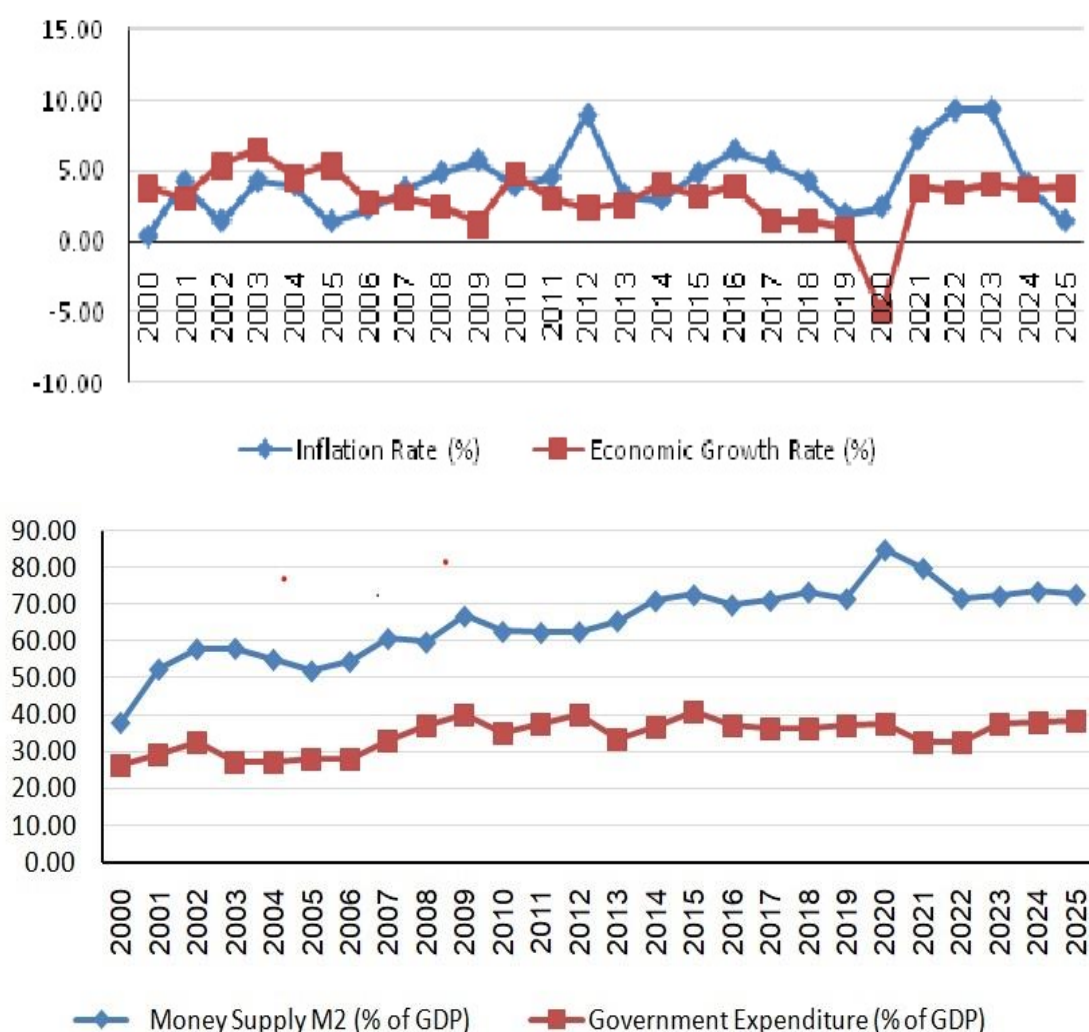
3. Evolutionary Trends of Macroeconomic Indicators and Conceptual Framework

Economic growth serves as the primary aggregate indicator reflecting national economic performance, productive efficiency, and capacity for sustainable development. During 2000–2024, the Algerian economy exhibited pronounced fluctuations in growth rates, governed by oil market developments, government capital spending programs, broad money supply growth, domestic inflation, and international macroeconomic conditions.

3.1 Trends in Economic Growth, Fiscal Policy, and Monetary Policy (2000–2024)

An analysis of the historical trajectories of economic growth, public expenditure, money supply (M2), and inflation highlights critical shifts across distinctive economic sub-periods:

Figure 1: Evolution of Key Macroeconomic Variables in Algeria (2000–2024)



Source: Prepared by the authors based on World Bank data.

Figure 1 illustrates the evolutionary paths of four core macroeconomic indicators: the economic growth rate (%), government expenditure (% of GDP), broad money supply M2 (% of GDP), and inflation (%). The temporal trajectory reveals five distinct phases:

- **1. 2000–2008 (Oil Boom & Expansionary Cycle):** Characterized by high economic growth rates peaking at 6.9% in 2003, driven by surging international oil prices, robust hydrocarbon revenues, and aggressive multi-year public investment programs (Economic Recovery Support Program and Complementary Growth Support Program).
- **2. 2009–2014 (Global Crisis Spillovers & Counter-Cyclical Support):** Economic growth experienced a moderate slowdown following the 2008 global financial crisis. However, the Algerian government sustained high public spending financed by accumulated fiscal reserves in the Revenue Regulation Fund (FRR), while the Bank of Algeria maintained accommodating liquidity conditions.
- **3. 2015–2019 (Oil Price Shock & Structural Fiscal Deficits):** Following the mid-2014 oil price collapse, government expenditure and money supply continued to expand (the latter supported by unconventional monetary financing / quantitative easing during 2017–2019), yet economic growth decelerated noticeably. This divergence underscores the diminishing marginal returns of public spending in the face of structural hydrocarbon dependence.
- **4. 2020 (The COVID-19 Shock):** Economic growth contracted sharply to -5.0%, representing the deepest economic recession in modern Algerian history due to global lockdowns, supply chain disruptions, and collapsed energy demand.
- **5. 2021–2024 (Post-Pandemic Rebound & Inflationary Pressures):** Economic growth recovered steadily, supported by higher hydrocarbon prices and renewed government support. However, inflation surged to 9.0% in 2022 and remained elevated in 2023, reflecting imported inflation and expanded domestic liquidity.

3.2 Descriptive Statistical Analysis

Table 1 presents the summary descriptive statistics for the four core variables over the sample period 2000–2024, providing initial empirical insights into their distributions, central tendencies, and historical dispersions.

Table 1: Main Descriptive Statistical Indicators of Study Variables (2000–2024)

Variable	Mean	Maximum (Year)	Minimum (Year)
Economic Growth (NGDP, %)	2.90%	6.90% (2003)	-5.00% (2020)
Government Expenditure (G, % of GDP)	31.70%	42.00% (2024)	17.00% (2000)
Money Supply (M2, % of GDP)	51.80%	75.00% (2024)	20.00% (2000)
Inflation Rate (INF, %)	4.60%	9.00% (2022)	1.70% (2000)

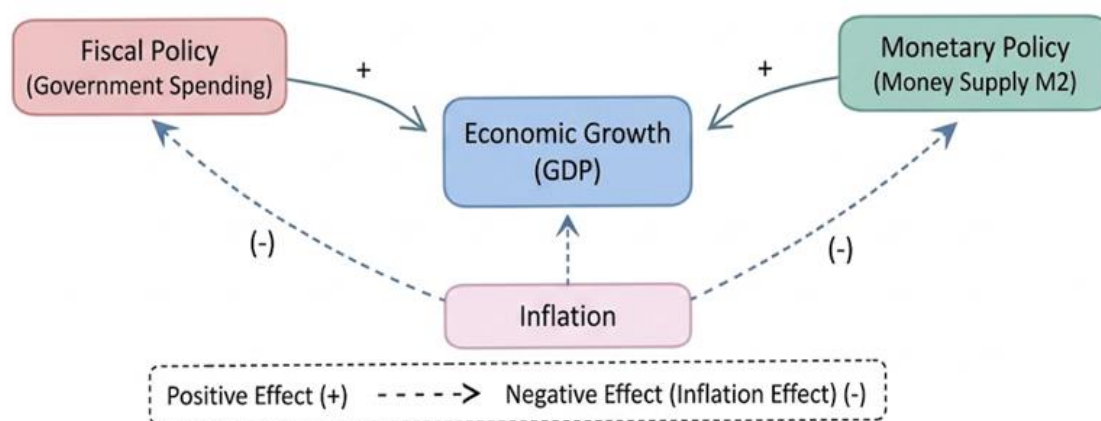
Source: Prepared by the authors based on World Bank database.

As detailed in Table 1, the average annual economic growth rate was 2.90%, with high volatility spanning from a peak of 6.90% to a trough of -5.00%. Government spending averaged 31.70% of GDP and followed an upward trend, rising from 17.00% in 2000 to over 42.00% in recent years. Similarly, broad money supply (M2) expanded from 20.00% of GDP in 2000 to 75.00% by the end of the period, reflecting monetary expansion and liquidity injections. Inflation averaged 4.60%, reaching its maximum of 9.00% in 2022.

3.3 Conceptual Framework of Macroeconomic Policy Interaction

The conceptual model outlines the hypothesized transmission channels connecting fiscal policy, monetary policy, inflation, and economic growth. Economic growth represents the dependent variable, while government spending (fiscal policy) and money supply (monetary policy) serve as the primary explanatory variables, with inflation incorporated as a control/mediating variable.

Figure 2: Conceptual Framework of the Relationship Between Macroeconomic Policies and Economic Growth



Source: Prepared by the authors.

As conceptualized in Figure 2, fiscal policy affects economic growth directly through government capital and current spending, which stimulates aggregate demand, infrastructure expansion, and job creation. Monetary policy influences growth by regulating money supply, credit availability, and investment conditions. Meanwhile, inflation operates as a critical mediating and control variable: excessive inflationary pressure erodes real purchasing power, escalates production costs, creates uncertainty for private capital, and dampens the positive stimulus of macroeconomic policies. Hence, sustaining high economic growth requires not only expanding fiscal and monetary resources but also preserving price stability.

4. Econometric Study of Fiscal and Monetary Policy Impacts on Economic Growth

4.1 Variable Specification and Unit Root Testing

This study utilizes annual time series data covering 2000–2024 retrieved from the World Bank Development Indicators (WDI) and official national statistical publications. The Autoregressive Distributed Lag (ARDL) cointegration framework, developed by Pesaran, Shin, and Smith (2001), is implemented. The ARDL model offers significant advantages over traditional cointegration methods: it is applicable regardless of whether variables are purely $I(0)$, purely $I(1)$, or mutually cointegrated; it yields unbiased long-run estimates in small samples; and it concurrently models short- and long-run dynamics. The variables included in the model are specified as follows:

- **NGDP:** Annual Real Economic Growth Rate (%), representing the dependent variable.
- **G:** Government Final Expenditure (% of GDP), proxying Fiscal Policy.
- **M:** Broad Money Supply M2 (% of GDP), proxying Monetary Policy.

- **INF:** Annual Inflation Rate (%), acting as a Control / Mediating variable.

The general functional relationship is formulated as: $NGDP = f(M, G, INF, e_i)$

where e_i represents the stochastic white noise error term.

Unit Root Stationarity Tests: Prior to estimating the ARDL model, it is essential to verify that none of the series are integrated of order I(2) or higher, as the presence of I(2) variables invalidates the ARDL bounds testing procedure. We conduct the Augmented Dickey-Fuller (ADF) unit root test across three standard specifications: (1) with Constant, (2) with Constant and Trend, and (3) without Constant and Trend. The lag length is automatically chosen based on Akaike (AIC) and Schwarz (SIC) criteria. Table 2 reports the results.

Table 2: Augmented Dickey-Fuller (ADF) Unit Root Test Results

UNIT ROOT TEST TABLE (ADF)					
At Level		NGDP	M	G	INF
With Const	t-Statistic	-6.1105	-2.9257	-1.7046	-3.1343
	Prob.	0.0000	0.0571	0.4164	0.0379
		***	*	n0	**
With Const	t-Statistic	-6.0662	-4.0956	-1.8780	-4.1785
	Prob.	0.0003	0.0210	0.6344	0.0164
		***	**	n0	**
Without Co	t-Statistic	-5.9983	0.9391	0.4607	-1.1609
	Prob.	0.0000	0.9020	0.8065	0.2169
		***	n0	n0	n0
At First Difference		d(NGDP)	d(M)	d(G)	d(INF)
With Const	t-Statistic	-8.1873	-4.9964	-4.2566	-4.9174
	Prob.	0.0000	0.0008	0.0032	0.0009
		***	***	***	***
With Const	t-Statistic	-4.2465	-4.3248	-4.1197	-4.7244
	Prob.	0.0156	0.0149	0.0185	0.0064
		**	**	**	***
Without Co	t-Statistic	-8.4038	-5.4632	-4.3251	-4.7844
	Prob.	0.0000	0.0000	0.0001	0.0001
		***	***	***	***

Notes: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% level.
*MacKinnon (1996) one-sided p-values.

Source: Computed from EViews 10 output.

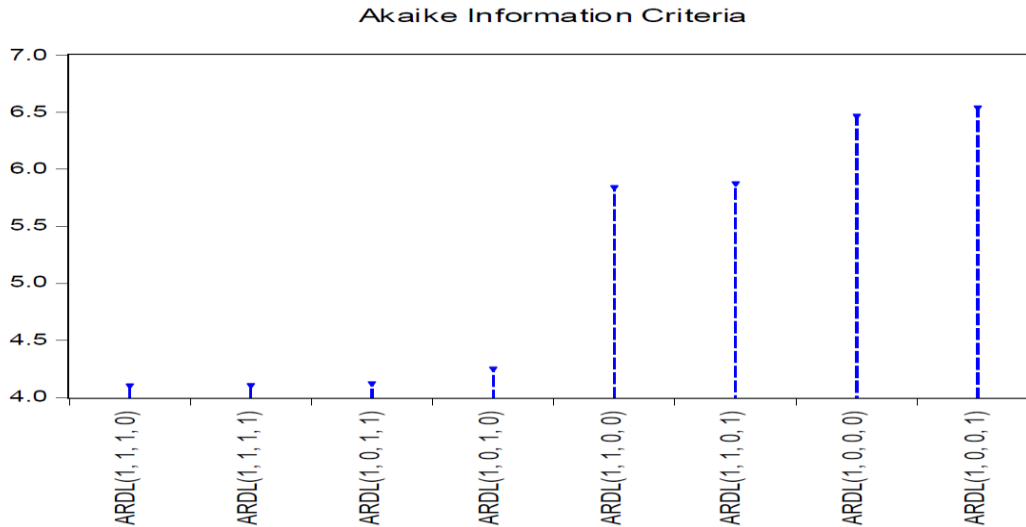
indicate statistical significance at 10%, 5%, and 1% levels, respectively. MacKinnon (1996) one-sided p-values.

The ADF unit root test results indicate a mixed order of integration: NGDP and INF are stationary at level I(0), while M and G are non-stationary at levels but become strictly stationary after taking the first difference I(1). Crucially, no variable is integrated of order I(2). This mixture of I(0) and I(1) series perfectly satisfies the prerequisites for the ARDL bounds cointegration approach.

4.2 Selection of Co-integration:

Determination of the optimal lag length: The estimated parameters in the short and long run are considered more consistent. To determine the distributed lag length (n), we usually use one of the two criteria, either the Akaike Information Criterion (AIC) or the Schwarz Criterion (SC). The lag length that minimizes the value of (AIC) has been selected, as shown in the following figure:

Figure 3: Akaike Information Criteria (AIC) for ARDL Model Lag Selection



Source: Extracted from EViews 10 output.

Table 3 presents the detailed estimation results of the selected ARDL(1, 1, 1, 0) model.

Table 3: Estimation Results of the ARDL(1, 1, 1, 0) Model

Dependent Variable: NGDP Method: ARDL Date: 05/01/26 Time: 14:32 Sample (adjusted): 2001 2024 Included observations: 24 after adjustments Maximum dependent lags: 1 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (1 lag, automatic): M G INF Fixed regressors: C Number of models evaluated: 8 Selected Model: ARDL(1, 1, 1, 0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
NGDP(-1)	-0.127892	0.056200	-2.275642	0.0361
M	-0.416638	0.113491	-3.671117	0.0019
M(-1)	0.230991	0.110240	2.095347	0.0514
G	-0.908731	0.078603	-11.56103	0.0000
G(-1)	0.720451	0.076793	9.381715	0.0000
INF	0.367330	0.205720	1.785583	0.0920
C	31.40848	3.813410	8.236324	0.0000
R-squared	0.961250	Mean dependent var		1.682659
Adjusted R-squared	0.947573	S.D. dependent var		7.293346
S.E. of regression	1.669946	Akaike info criterion		4.101953
Sum squared resid	47.40826	Schwarz criterion		4.445552
Log likelihood	-42.22344	Hannan-Quinn criter.		4.193110
F-statistic	70.28481	Durbin-Watson stat		1.227239
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection.				

Source: Computed from EViews 10 output.

Sample: 2001–2024 (24 observations after adjustments). denote significance at 10%, 5%, and 1%.

The estimation output indicates strong overall explanatory power: the coefficient of determination (R^2) reaches 0.9612, with an Adjusted R^2 of 0.9476, implying that approximately 94.76% of the total variation in Algerian economic growth is explained by the model's dynamic variables. The overall Fisher F-statistic is 70.28 (p -value = 0.0000), affirming the statistical validity of the estimated regression equation.

F-Bounds Test for Cointegration: To formally test for the existence of a long-run equilibrium cointegrating relationship among NGDP, M, G, and INF, the F-bounds test is executed under the null hypothesis of no level relationship (H0: no cointegration). Results are detailed in Table 4.

Table 4: ARDL F-Bounds Cointegration Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	102.0505	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Computed from EViews 10 output. Asymptotic critical values (n=1000).

The computed F-statistic of 102.0505 substantially exceeds the upper critical bound I(1) of 4.66 at the 1% significance level (and at all conventional levels: 10%, 5%, 2.5%, and 1%). Consequently, the null hypothesis of no level relationship is conclusively rejected, confirming a robust and enduring long-run cointegrating relationship between economic growth, fiscal policy, monetary policy, and inflation in Algeria.

4.3 Long-Run Equilibrium Relationship and Error Correction Model (ECM)

Long-Run Elasticities: Having verified cointegration, the long-run levels equation is estimated under Case 2 (Restricted Constant and No Trend). Table 5 summarizes the long-run coefficients.

Table 5: Long-Run Levels Equation Coefficients (Case 2: Restricted Constant, No Trend)

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
M	-0.164597	0.066298	-2.482683	0.0238
G	-0.166931	0.050204	-3.325062	0.0040
INF	0.325678	0.175599	1.854674	0.0811
C	27.84706	2.792848	9.970850	0.0000
EC = NGDP - (-0.1646*M -0.1669*G + 0.3257*INF + 27.8471)				

Source: Computed from EViews 10 output.

indicate significance at 10%, 5%, and 1%.

$$EC = NGDP - [-0.1646 \cdot M - 0.1669 \cdot G + 0.3257 \cdot INF + 27.8471]$$

The long-run results indicate that both money supply (M) and government expenditure (G) have negative and statistically significant coefficients at the 5% and 1% significance levels, respectively.

Specifically, a 1% increase in broad money supply (% of GDP) is associated with a 0.1646% reduction in the long-run growth rate, while a 1% increase in government spending (% of GDP) decreases long-run growth by 0.1669%. These empirical findings corroborate the structural critique of rentier economies: in Algeria, massive fiscal outlays have historically suffered from absorptive capacity constraints, high recurrent/operating expenditure shares, project execution delays, and import leakages. Similarly, unsterilized monetary expansion without matching real productive capacity generates distortions, inflationary pressures, and asset misallocations that inhibit sustained long-run growth.

Short-Run Dynamics and Error Correction Model (ECM): Table 6 presents the short-run ECM estimation results.

Table 6: Short-Run Error Correction Model (ECM) Estimation Results

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(M)	-0.416638	0.077173	-5.398743	0.0000
D(G)	-0.908731	0.062196	-14.61071	0.0000
CointEq(-1)*	-1.127892	0.044925	-25.10602	0.0000

Source: Computed from EViews 10 output. Dependent variable: $D(NGDP)$.
denotes statistical significance at the 1% level.

The Error Correction Term (ECT -1) coefficient is negative (-1.127892) and highly statistically significant at the 1% level ($t = -25.106$, $p = 0.0000$). A negative and statistically significant ECT provides definitive proof of a cointegrating relationship. The magnitude (-1.1279) indicates an extremely rapid adjustment mechanism: approximately 112.8% of any short-run disequilibrium is corrected and re-aligned with the long-run steady-state growth trajectory within a single year. In the short run, first-differenced public spending $D(G)$ (-0.9087) and money supply $D(M)$ (-0.4166) also exhibit statistically significant negative coefficients, reflecting short-run adjustment costs and fiscal rigidities.

4.4 Diagnostic and Structural Stability Tests

To ensure that the estimated ARDL model is econometrically sound, statistically valid, and reliable for policy formulation, a full battery of diagnostic and stability tests was conducted:

Table 7: Breusch-Godfrey Serial Correlation LM Test Results

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.694127	Prob. F(2,15)	0.2171
Obs*R-squared	4.422284	Prob. Chi-Square(2)	0.1096

Source: Computed from EViews 10 output.

The Breusch-Godfrey LM test confirms the absence of serial correlation: the probability values ($p = 0.2171$ and $p = 0.1096$) exceed the 0.05 significance threshold, accepting the null hypothesis of no serial correlation in the residuals.

Table 8: Heteroskedasticity Test (Breusch-Pagan-Godfrey) Results

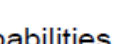
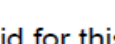
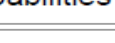
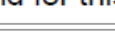
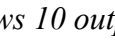
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.853115	Prob. F(6,17)	0.5475
Obs*R-squared	5.554059	Prob. Chi-Square(6)	0.4749
Scaled explained SS	1.412865	Prob. Chi-Square(6)	0.9651

Source: Computed from EViews 10 output.

The Breusch-Pagan-Godfrey test p-values ($p = 0.5475$ and $p = 0.4749$) are well above 0.05, confirming that the error variance is homoskedastic.

Table 9: Ljung-Box (LB) Q-Statistics for Residual Autocorrelation (White Noise Test)

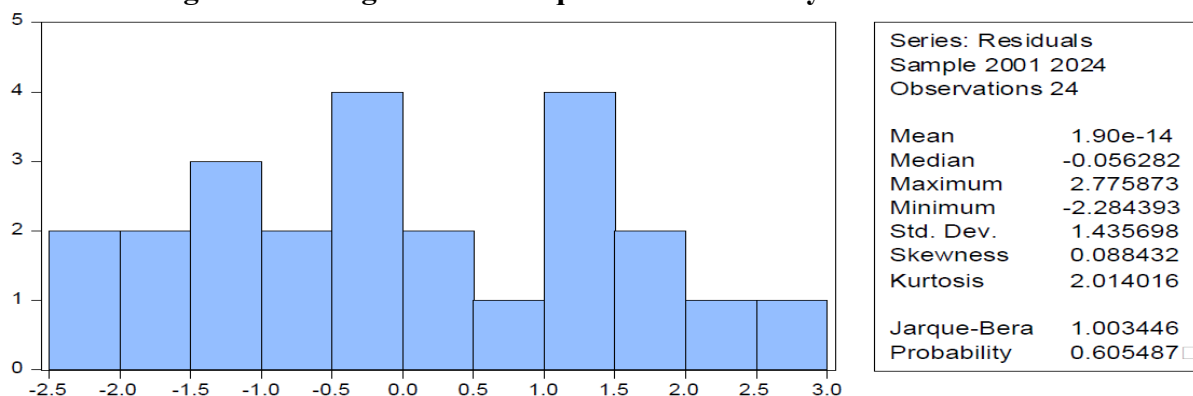
Correlogram of Residuals

Date: 05/01/26 Time: 14:36 Sample: 2000 2024 Included observations: 24 Q-statistic probabilities adjusted for 1 dynamic regressor						
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*	
		1	0.312	0.312	2.6391	0.104
		2	-0.055	-0.169	2.7261	0.256
		3	-0.112	-0.045	3.1021	0.376
		4	-0.076	-0.034	3.2800	0.512
		5	-0.238	-0.252	5.1429	0.399
		6	-0.344	-0.245	9.2540	0.160
		7	-0.113	0.014	9.7217	0.205
		8	0.173	0.126	10.892	0.208
		9	0.197	0.047	12.509	0.186
		10	-0.002	-0.133	12.510	0.252
		11	0.015	-0.018	12.520	0.326
		12	0.064	-0.022	12.733	0.389
*Probabilities may not be valid for this equation specification.						

Source: Computed from EViews 10 output. Sample: 2000–2024 (24 observations).

The Ljung-Box Q-statistics across all 12 lags yield p-values greater than 0.05, indicating that the residual autocorrelation coefficients are jointly zero and that the residuals follow a pure white-noise process.

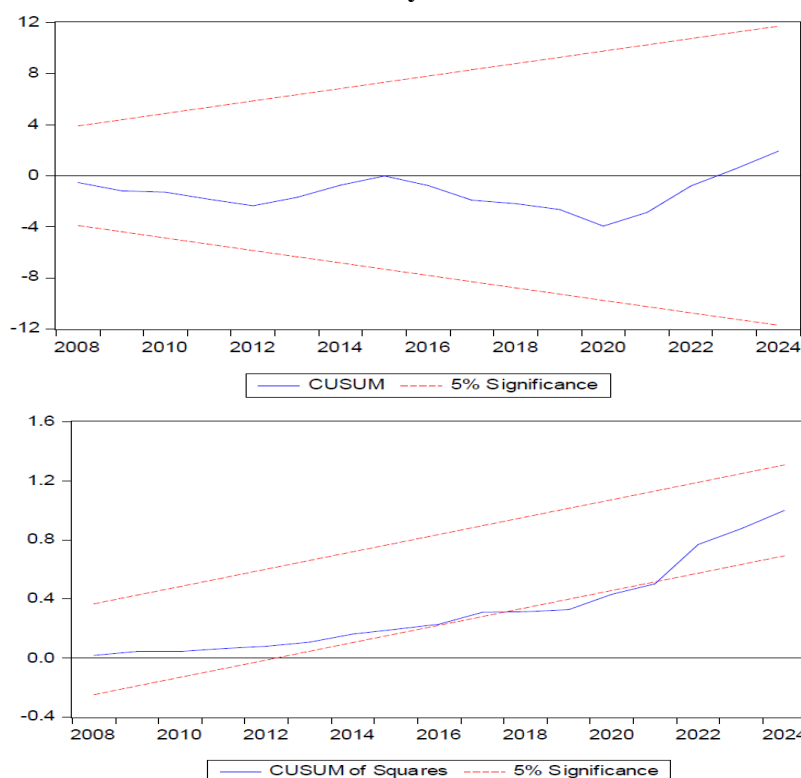
Figure 4: Histogram and Jarque-Bera Normality Test of Residuals



Source: Extracted from EViews 10 output.

Figure 4 shows the histogram and descriptive statistics of the regression residuals. The Jarque-Bera test statistic is 1.0034 with an associated probability of 0.6055 ($p > 0.05$). Consequently, we accept the null hypothesis that the regression residuals are normally distributed.

Figure 5: Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) Parameter Stability Tests



Source: Extracted from EViews 10 output.

To test for structural breaks and parameter instability across the study period, the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) tests were conducted (Brown, Durbin, and Evans, 1975). As shown in Figure 5, both the CUSUM and

CUSUMSQ test statistics remain strictly within the 5% critical boundaries throughout the entire 2000–2024 period. This confirms that the estimated coefficients of the ARDL model are structurally stable and free of structural breaks, validating the model's reliability for policy forecasting and macroeconomic analysis.

5. Conclusion and Policy Recommendations

This study conducted an empirical and econometric investigation into the impact of fiscal and monetary policies on economic growth in Algeria during the period 2000–2024. Using government expenditure (% of GDP) as a fiscal indicator, broad money supply M2 (% of GDP) as a monetary indicator, and inflation (%) as a control variable, the study estimated an ARDL(1, 1, 1, 0) model along with its corresponding Error Correction Model (ECM).

The empirical findings yield the following primary conclusions:

- **1. Long-Run Cointegration:** The ARDL bounds test confirmed a robust long-run equilibrium relationship between economic growth, fiscal policy, monetary policy, and inflation (F-statistic = $102.05 > 4.66$ at the 1% significance level).
- **2. Speed of Adjustment:** The Error Correction Term (ECT_{t-1}) coefficient was negative (-1.1279) and highly statistically significant at the 1% level, demonstrating that shocks to the system are rapidly corrected, restoring long-run steady-state equilibrium at an annual adjustment rate of 112.8%.
- **3. Policy Elasticities:** Both government expenditure and money supply demonstrated statistically significant negative effects on growth in both the short and long run. This underscores that in a rentier, oil-dependent economic structure, the expansion of public spending and monetary liquidity without corresponding improvements in capital efficiency, absorption capacity, and non-oil productivity can generate structural distortions rather than sustainable growth.
- **4. Econometric Robustness:** Comprehensive diagnostic tests (LM, Breusch-Pagan-Godfrey, Ljung-Box, Jarque-Bera) and stability tests (CUSUM, CUSUMSQ) confirmed that the model is homoskedastic, free of serial correlation, normally distributed, and structurally stable over time.

The short-run results also revealed a negative and statistically significant effect of both government expenditure and the money supply on economic growth. This indicates that the effectiveness of economic policies depends not only on the volume of expenditure or monetary expansion, but also on the efficiency with which resources are utilized and directed toward investment and productive activities capable of generating added value and promoting sustainable growth. The diagnostic and stability tests further confirmed the validity of the model and the reliability of its results, thereby supporting its use in explaining the relationship between the study variables.

These findings highlight the importance of achieving coordination and integration between fiscal and monetary policy in order to strengthen macroeconomic stability, increase economic growth rates, and mitigate inflationary pressures, particularly in light of the challenges associated with fluctuations in oil prices and the Algerian economy's relative dependence on the hydrocarbons sector.

Policy Recommendations

In light of these empirical findings, the study puts forward the following strategic policy recommendations:

- Restructure government expenditure by rationalizing current/operational outlays and directing public capital investments toward productive infrastructure, technological modernization, and high-value-added sectors capable of generating direct multiplier effects on real GDP.
- The Bank of Algeria should deploy proactive monetary instruments to manage domestic liquidity levels, limit excess money growth, control inflationary pressures, and steer banking credit toward private productive enterprise.
- Strengthen institutional coordination mechanisms between the Ministry of Finance and the Bank of Algeria to harmonize budgetary targets with monetary objectives, avoiding fiscal dominance and mitigating macroeconomic imbalances.
- Accelerate structural reforms to diversify the national economic base away from hydrocarbon dependence, fostering competitive non-oil manufacturing, agribusiness, and digital services.
- Streamline regulatory frameworks, enhance administrative transparency, modernize financial markets, and encourage both domestic and foreign direct investment (FDI) to boost private capital formation and job creation.
- Continuously modernize national statistical information systems and econometric forecasting capabilities to support evidence-based macroeconomic decision-making and policy formulation.

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