

Re-evaluating the Determinants of Inflation in Algeria Under Unconventional Monetary Policy: A Dynamic ARDL Analysis

إعادة تقييم محددات التضخم في الجزائر في ظل السياسة النقدية غير التقليدية:

تحليل ديناميكي باستخدام نموذج ARDL

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Received: 24/01/2026

Accepted: 10/06/2026

Published: 12/06/2026

Abstract:

This study aims to re-evaluate the determinants of inflation in Algeria under unconventional monetary policy using the ARDL model over the period 2013Q1-2024Q2 to estimate both short- and long-run effects of macroeconomic variables on inflation, including main variables such as real GDP excluding hydrocarbons, nominal exchange rate, oil prices, and a dummy variable representing unconventional monetary financing. The results confirm a long-term equilibrium relationship between inflation and its determinants. Exchange rate movements and oil prices emerge as the main drivers of long-term inflation, while real GDP excluding hydrocarbons shows a negative but statistically insignificant impact. In the short term, unconventional monetary policy has a statistically significant negative impact on inflation, indicating a limited immediate price effect. Overall, the results highlight the structural nature of inflation in Algeria and emphasize the importance of exchange rate stability, economic diversification, and improved coordination between monetary and fiscal policies to contain inflationary pressures in Algeria.

Keywords: inflation; unconventional monetary policy; exchange rate; oil prices; Algeria; ARDL

JEL Classification Codes: E31, E52, F31, Q43, C32.

ملخص:

تهدف هذه الدراسة إلى إعادة تقييم محددات التضخم في الجزائر في ظل السياسة النقدية غير التقليدية باستخدام نموذج الانحدار الذاتي للفجوات الزمنية الموزعة ARDL خلال الفترة من الربع الأول من عام 2013 إلى الربع الثاني من عام 2024، وذلك لتقدير آثار المتغيرات الاقتصادية الكلية على التضخم على المدى القصير والطويل، حيث تشمل المتغيرات الرئيسية: الناتج المحلي الإجمالي الحقيقي خارج المحروقات، سعر الصرف الاسمي، أسعار النفط، إلى جانب متغير وهمي يمثل التمويل غير التقليدي، وتؤكد النتائج وجود علاقة توازن طويلة الأجل بين التضخم ومحدداته. كما تبرز تحركات سعر الصرف وأسعار النفط باعتبارها محركين رئيسيين للتضخم في المدى الطويل، بينما يُظهر الناتج المحلي الإجمالي الحقيقي خارج المحروقات تأثيراً سلبياً ومعنوي احصائياً. أما في المدى القصير، تظهر السياسة النقدية غير التقليدية تأثيراً سلباً ومعنوياً إحصائياً على التضخم، مما يشير إلى تأثير سعري فوري محدود. بشكل عام، تُبرز النتائج الطبيعة الهيكلية للتضخم في الجزائر، وتؤكد على أهمية استقرار سعر الصرف، والتنويع الاقتصادي، وتحسين التنسيق بين السياسات النقدية والمالية لاحتواء الضغوط التضخمية في الجزائر.

كلمات مفتاحية: تضخم، سياسة نقدية غير تقليدية، سعر صرف، أسعار نفط، الجزائر، نموذج ARDL.

تصنيفات JEL : C32, Q43, F31, E52, E31

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INTRODUCTION:

Inflation is a central issue in macroeconomic analysis due to its direct effects on economic stability and purchasing power, especially in developing and emerging economies. Recent shifts in monetary frameworks have led to increased interest in inflation determinants, which are now viewed as the product of interactions between monetary, real, and external factors rather than purely conventional monetary forces. In Algeria, inflation dynamics have gained increasing attention over the past decade due to declining oil revenues, widening fiscal deficits, and the adoption of unconventional monetary policy tools.

Following the decline in oil revenues since 2014 and the widening fiscal deficit, Algeria adopted unconventional monetary financing in late 2017 under Article 45 bis of the Monetary and Credit Law, as amended by Law No. 17-10 (Bank of Algeria, 2017). It is important to distinguish between unconventional monetary policy and unconventional monetary financing. Unconventional monetary policy is a broad concept that includes non-standard monetary instruments such as quantitative easing, forward guidance, and negative interest rates. In contrast, unconventional monetary financing refers specifically to the direct monetization of the fiscal deficit by the Bank of Algeria under Article 45 bis of the Monetary and Credit Law No. 17-10. This policy shift sparked debate over its inflationary implications, with some arguing that monetary expansion fuels inflation, while others emphasize the role of structural constraints and weak monetary transmission. The empirical literature provides mixed evidence on the determinants of inflation in resource-based economies, highlighting the roles of exchange rates and oil prices, while offering inconclusive results regarding real activity and unconventional monetary policy in Algeria, particularly in a dynamic econometric framework.

This study reassesses the determinants of inflation in Algeria under an unconventional monetary policy during the period from 2013Q1 to 2024Q2 using the ARDL model. The model includes non-oil GDP, the nominal exchange rate, oil prices, and a dummy variable representing the unconventional monetary financing, allowing for the analysis of inflation dynamics in both the short and long term. The main hypothesis of this study is that inflation in Algeria is a structural and multidimensional phenomenon resulting from the complex interaction between monetary factors, specifically unconventional monetary financing, and real factors represented by non-hydrocarbon GDP, external and financial shocks such as oil prices, and exchange rate fluctuations. The paper is organized as follows: Section 2 presents literature reviews; Section 3 presents background developments; Section 4 describes the data and methodology; Section 5 discusses the empirical results; and Section 6 presents conclusions and recommendations.

1- Literature Review:

Inflation has garnered increasing attention in economic literature as a complex macroeconomic phenomenon, recognized for its pivotal role in determining economic stability and purchasing power in various developing and emerging economies. Recent literature has focused on investigating inflation determinants in conjunction with other macroeconomic variables such as economic growth, exchange rates, oil prices, and monetary policy. This review seeks to survey recent studies on inflation determinants under unconventional monetary policies, to identify the research gap in the Algerian context.

1-1 Inflation Determinants in Developing and Resource-Based Economies

Oil prices were identified as a major driver of inflation volatility in oil-dependent economies. (Deluna et al., 2021) highlighted the dominant role of global oil price shocks, while (Al-Amatullah et al., 2025) showed that oil prices exert significant short-run inflationary effects. Using an ARDL bounds testing approach, (Abonazel et al., 2021) found that exchange rate movements, GDP, and money growth significantly affect inflation in Nigeria in both the short and long run. A recent study on Saudi Arabia (Albahouth, 2025) also found that inflation is positively affected by the money supply, the exchange rate, and global uncertainty in the long run, while oil price shocks affect inflation asymmetrically in the short run.

1-2 Unconventional Monetary Policy and Inflation

Several recent studies have focused on assessing the effects of unconventional monetary policy on macroeconomic variables, including inflation. (Churm et al., 2021) evaluated quantitative easing in the United Kingdom and found a positive impact on inflation, reaching a peak of 0.6 percentage points. In contrast, (Taghizadeh-Hesary et al., 2022) showed that unconventional monetary policy in Japan increased income inequality through rising financial asset prices. (Abongile Bom & Alwyn Khumalo, 2021) found that unconventional monetary policy instruments, such as forward guidance, contributed to lowering inflation expectations in South Africa, with asymmetric effects in the short and long run.

1-3 Algeria-Specific Studies

Recent studies on Algerian inflation highlight various determinants. (Lecheheb, 2024) identified money supply, public expenditure, and import volumes as key drivers. (Bouziane & Chaibi, 2018) found long-run inflation influenced by national income, output gap, interest and exchange rates, import prices, public debt, wages, and unemployment, with money supply and budget deficit being insignificant. Short-run inflation responded to income and money supply growth, exchange and interest rate fluctuations, wage growth, and past inflation, suggesting a largely structural nature. Regarding unconventional monetary policy, (Benheddi, 2021) concluded that its adoption in Algeria since 2017 directly caused increased inflation, reduced purchasing power of the dinar, and rising budget deficits. Furthermore, (Ramdani & Rimi, 2020) used an ARIMA model to forecast inflation under unconventional financing (2018-2022), warning of its escalating risk in fueling inflation.

Despite extensive literature on inflation determinants, a research gap persists in the Algerian context. Most studies address the relationship broadly without in-depth Algerian analysis. Including specific variables such as oil prices, exchange rates, and non-hydrocarbon GDP, alongside a dummy variable for unconventional monetary policy within an ARDL model represents a significant contribution to understanding inflation dynamics in Algeria and providing evidence-based policy recommendations.

2- Overview of Inflation and Unconventional Monetary Financing in Algeria:

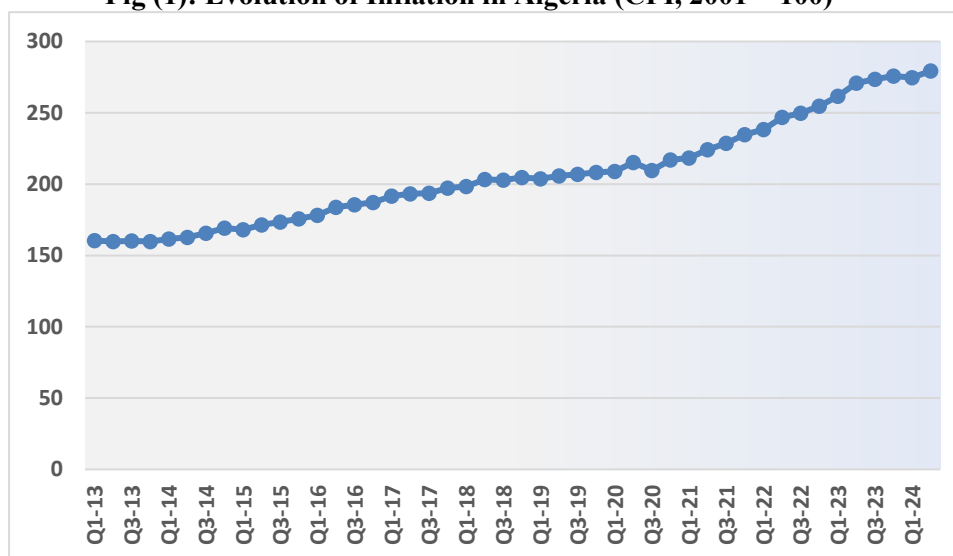
2-1 Inflation Developments in Algeria (2013–2024)

The evolution of the Consumer Price Index in Algeria (CPI, 2001 = 100) from Q1 2013 to Q2 2024 shows a clear upward trend, reflecting the persistence of long-term inflationary pressures, as illustrated in Figure 1. The period 2013–2015 was characterized by relative price

Re-evaluating the Determinants of Inflation in Algeria Under Unconventional Monetary Policy: A Dynamic ARDL Analysis

stability, followed by a marked acceleration during 2016–2018 driven by increased liquidity. In contrast, the period 2019–2020 witnessed a relative slowdown accompanied by short-term fluctuations. Starting from 2021, inflation accelerated sharply to reach elevated levels during 2022–2023, while data from the first half of 2024 indicates continued increase at a slower pace without effective abatement of inflationary pressures. (Bank of Algeria, 2024)

Fig (1): Evolution of Inflation in Algeria (CPI, 2001 = 100)

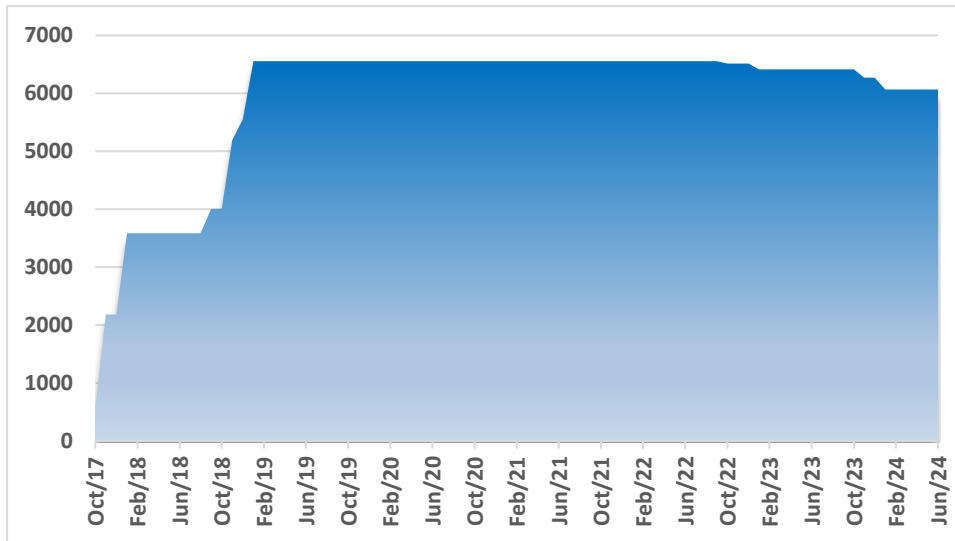


Source: Author's own elaboration based on Bank of Algeria statistical bulletins

2-2 Evolution of Unconventional Monetary Financing in Algeria (2017–2023)

Algeria adopted an unconventional financing policy starting in 2017 to address declining oil revenues and a widening budget deficit, based on Article 45 bis of Ordinance 03-11 on Money and Credit, as amended by Law No. 17-10, which authorized the Bank of Algeria, on an exceptional and temporary basis, to directly finance the public treasury. (Bank of Algeria, 2017) This policy has gone through three main phases: the first phase consisted of monetary injection and expansion (Nov 2017 - Feb 2019), during which financing started at 570 billion dinars in November 2017 and rapidly increased to peak at DA 6,556.2 billion in February 2019, reflecting significant expansion of the monetary base to finance the budget deficit. This was followed by a second phase of freeze and stabilization (Mar 2019 – Dec 2021), characterized by a constant financing level at its peak due to rising inflationary and sustainability concerns. The third phase, absorption and gradual decline (Jan 2022 – Sep 2023), shows a progressive reduction in financing from 6,516.2 billion dinars to about 6,069.2 billion dinars, reflecting partial repayments by the Treasury aimed at absorbing excess liquidity, a downward trend clearly depicted in the figure 2. (Bank of Algeria, 2024)

Fig (2): Monthly unconventional monetary financing in Algeria (billion DZD), 2017–2024



Source: Author's elaboration based on Bank of Algeria data, Situation de la Banque d'Algérie,

3- Theoretical Framework and Inflation Transmission Channels

The selection of macroeconomic variables used in this study real non-hydrocarbon GDP (GDP_x), nominal exchange rate (EXR), and oil prices (OILP) is based on a theoretical framework that reflects the structural characteristics of the Algerian economy. The inflationary process in Algeria is analyzed through three main transmission channels:

3-1 The imported inflation channel

The imported inflation channel is based on the exchange rate pass-through theory, which posits that fluctuations in the nominal exchange rate are a major determinant of domestic prices in import-dependent economies such as Algeria. The Algerian economy relies heavily on imports of manufactured goods, food, and production inputs to meet domestic demand (Lacheheb & Sirag, 2019). Therefore, a depreciation of the Algerian dinar increases the domestic currency cost of both final and intermediate imported goods, thus transmitting external inflationary pressures to the domestic economy (Oladunni, 2020).

3-2 Fiscal and Oil revenue channel

In hydrocarbon-dependent economies such as Algeria, oil price fluctuations primarily affect inflation through fiscal and monetary channels. Rising oil prices increase government revenues, often leading to increased public spending and liquidity in the economy, thereby stimulating demand and generating inflationary pressures (Mehibel et al., 2024; ZENAGUI, 2026). Conversely, declining oil prices can lead to reduced fiscal revenues, prompting the government to rely on central bank financing to cover budget deficits. According to the fiscal dominance theory of Sargent and Wallace (1981), such monetary financing increases money supply and liquidity, ultimately contributing to inflation (Sargent, 1981).

3-3 The real activity channel (supply side):

Real non-hydrocarbon GDP represents domestic productive capacity and the supply side of the economy. Theoretically, growth in this output should help curb inflation by absorbing excess liquidity and balancing the money supply (IMF, 2023), however, in Algeria this

Re-evaluating the Determinants of Inflation in Algeria Under Unconventional Monetary Policy: A Dynamic ARDL Analysis

relationship is often weakened by structural constraints, limited economic diversification, and an underdeveloped private sector, which limits the ability of domestic production to mitigate inflationary pressures, particularly during periods of substantial liquidity injections (IMF, 2018, 2023).

Furthermore, the inclusion of unconventional monetary financing (D_UMF) as a dummy variable captures the shift in the monetary regime toward fiscal dominance. Under Article 45 bis of the Monetary and Credit Law of 2017, the direct financing of the public treasury by the Bank of Algeria constituted a substantial monetary expansion aimed at covering fiscal deficits.

4- Data and methodology

4-1 Data

This study examines the determinants of inflation in Algeria under the unconventional monetary policy, using quarterly data covering the period 2013Q1–2024Q2. The data was collected from reliable official sources, including the Bank of Algeria and the World Bank. This period covers significant economic and monetary developments, particularly the 2014 oil price shock and the adoption of unconventional monetary policy tools from 2017Q4.

Table (1): Description of variable and data source

Variables	Acronymes	Description	Source
Consumer Price Index	CPI	Consumer Price Index for Algiers (2001=100).	Bank of Algeria (BA)
Real GDP ex-hydrocarbons	GDPx	Real Gross Domestic Product excluding hydrocarbons (constant 2001 DZD billions).	Bank of Algeria (BA)
Nominal Exchange Rate	EXR	Quarterly average exchange rate (USD/DZD).	Bank of Algeria (BA)
Oil Price	OILP	Quarterly average price of Brent crude oil (US\$ per barrel).	World Bank database (2025)
unconventional monetary financing	D_UMF	Dummy variable: 1 for 2017Q4 onwards, 0 otherwise.	Author's construction based on Bank of Algeria's legal framework

Source: Compilation by Author

Table (1) shows the variables used and their sources. The Consumer Price Index (CPI) serves as the dependent variable. variable to measure inflation. The explanatory variables include real Gross Domestic Product excluding hydrocarbons (GDPx), The nominal exchange rate (EXR) is defined as the number of Algerian dinars required to purchase one US dollar (USD/DZD). Therefore, an increase in EXR represents a depreciation of the Dinar, while a decrease represents an appreciation, as well as oil prices (OILP) as a control variable. A dummy variable (D_UMF) was also included to capture the effect of unconventional monetary financing. It takes the value (1) starting from Q4 2017, based on Order No. 17-10 of 2017 on Money and Credit (Bank of Algeria, 2017).

4-2 Methodology

This study aims to re-evaluate the determinants of inflation in Algeria under unconventional monetary policy, using quarterly data during the period 2013Q1–2024Q2. The

study uses the Autoregressive Distributed Lag (ARDL) model developed by (Pesaran et al., 2001), which is suitable for time series data with different integration orders I(0) or I(1). The natural logarithmic transformation was applied to all variables except the dummy variable (D_UMF) to reduce variance heterogeneity and interpret the coefficients as elasticities. The mathematical functional model is defined as follows:

$$LnCPI_t = \beta_0 + \beta_1 LnGDPx_t + \beta_2 LnEXR_t + \beta_3 LnOILP_t + \beta_4 DUMP_t + u_t \quad (1)$$

The stationarity of each variable was examined using the ADF and PP tests (Dickey & Fuller, 1979; Phillips & Perron, 1988). After confirming that no variables are integrated of order I(2), the bounds test for cointegration was used. The Unrestricted Error Correction Model (UECM) is expressed as follows:

$$\begin{aligned} \Delta LnCPI_t = & \beta_0 + \beta_1 LnCPI_{t-1} + \beta_2 LnGDPx_{t-1} + \beta_3 LnEXR_{t-1} + \beta_4 LnOILP_{t-1} \\ & + \sum_{r=1}^p \gamma_1 \Delta LnCPI_{t-r} + \sum_{r=1}^{q_1} \gamma_2 \Delta LnGDPx_{t-r} + \sum_{r=1}^{q_2} \gamma_3 \Delta LnEXR_{t-r} \\ & + \sum_{r=1}^{q_3} \gamma_4 \Delta LnOILP_{t-r} + \gamma_5 DUMP_t + u_t \quad (2) \end{aligned}$$

In Equation (2), Δ represents the first difference operator. The constant term is represented by β_0 , while the coefficients β_1 to β_4 denote the long-run relationship, and γ_1 to γ_5 represent the short-run dynamic adjustments. The terms p and q denote the optimal lag lengths, and u_t is the error term. The Error Correction Model (ECM) captures the short-term dynamics and the speed of adjustment toward the long-run equilibrium as shown in Equation (3):

$$\begin{aligned} \Delta LnCPI_t = & \sum_{j=1}^p \gamma_1 \Delta LnCPI_{t-j} + \sum_{j=1}^{q_1} \gamma_2 \Delta LnGDPx_{t-j} + \sum_{j=1}^{q_2} \gamma_3 \Delta LnEXR_{t-j} \\ & + \sum_{j=1}^{q_3} \gamma_4 \Delta LnOILP_{t-j} + \gamma_5 DUMP_t + \phi ECM_{t-1} + u_t \quad (3) \end{aligned}$$

The coefficient of the error correction (ϕ) is expected to be significantly negative. Diagnostic tests, including the Breusch-Pagan-Godfrey test for heterogeneity of variance, the Breusch-Godfrey LM test for serial correlation, the Jarque-Bera test for normality, and CUSUM and CUSUMSQ tests for parameter stability.

5- Results and discussion:

5-1 Unit root tests

To examine the stationarity of the time series and determine the order of integration of the variables included in the model, this study employs both the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test, which are widely used unit root tests in time series analysis. These tests were applied to the variables at the levels and at the first difference (Dickey & Fuller, 1979; Phillips & Perron, 1988).

Re-evaluating the Determinants of Inflation in Algeria Under Unconventional Monetary Policy: A Dynamic ARDL Analysis

Table (2): Results of the unit root test

Variables	ADF				PP			
	Levels		First Difference		Levels		First Difference	
	No Trend	Trend	No Trend	Trend	No Trend	Trend	No Trend	Trend
LnCPI	1.291439 (0.9983)	-4.225582 (0.0100)	-3.622529 (0.0092)	-3.621566 (0.0396)	1.556760 (0.9992)	-1.790824 (0.6926)	-7.838479 (0.0000)	-8.129966 (0.000)
LnGDPx	-0.699142 (0.8347)	0.024117 (0.9951)	0.792728 (0.9926)	-0.834503 (0.9529)	-5.424155 (0.0000)	-6.189374 (0.0000)	-13.07582 (0.0000)	-13.69535 (0.0000)
LnEXR	-2.338162 (0.1649)	-1.648455 (0.7570)	-3.681970 (0.0078)	-4.024077 (0.0149)	-1.945715 (0.3091)	-1.089037 (0.9197)	-3.746518 (0.0066)	-4.035521 (0.0145)
LnOILP	-1.949001 (0.3077)	-1.930050 (0.6224)	-5.842838 (0.0000)	-5.923607 (0.0001)	-2.107852 (0.6224)	-1.930050 (0.3428)	-5.842838 (0.0000)	-5.923422 (0.0001)

Source: Author's Calculation using *EViews 12*

The findings indicate that all variables are non-stationary at levels. After first differencing, the ADF test showed stationarity for LnCPI, LnEXR, and LnOILP, while LnGDPx remained non-stationary. Conversely, the PP test confirmed stationarity for all variables, including LnGDPx at first difference. This discrepancy is attributable to methodological differences. Overall, all variables are integrated of order I(0) or I(1), and none is I(2), thereby satisfying the necessary condition for the application of the ARDL bounds testing approach (Pesaran et al., 2001).

5-2 Cointegration results

After confirming that all variables are integrated of order I(0) or I(1) and that none are integrated of order I(2), the ARDL Bounds Testing approach was employed to examine the existence of a long-term equilibrium relationship among the model variables (Pesaran et al., 2001).

Table (3): Bounds test results

Test Statistics	Value	Significance	I(0)	I(1)
F-statistic	8.3714483	10 %	2.37	3.2
		5 %	2.79	3.67
		2.5 %	3.15	4.08
		1 %	3.65	4.66

Source: Author's Calculation using *EViews 12*

Table 3 presents the Bounds Test results, showing a calculated F-statistic of 8.371 that exceeds the upper critical bound I(1) at all conventional significance levels. At the 5% level, the upper bound critical value is 3.67, which is well below the calculated F-statistic. Accordingly, the null hypothesis of no cointegration is rejected. These results confirm the existence of a long-run equilibrium relationship between inflation and its determinants in Algeria during the study period.

5-3 Long-run estimations

Table 4 presents the long-run coefficients derived from the ARDL model, providing insights into the long-run equilibrium relationship among key variables, particularly the determinants of inflation in Algeria during the study period under the unconventional monetary policy framework.

Table (4): Long-run ARDL estimation findings

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LnGDPx	-0.082954	0.099041	-0.837577	0.4087
LnEXR	1.927888	0.722599	2.667991	0.0120
LnOILP	0.381279	0.171160	2.227622	0.0333
C	-4.371863	3.218183	-1.358488	0.1841
EC = LnCPI - (-0.0830*LnGDPx + 1.9279*LnEXR + 0.3813*LnOILP - 4.3719)				

Source: Author's Calculation using EViews 12

The coefficient on real non-hydrocarbon GDP (LnGDPx) is negative (-0.083) but statistically insignificant, suggesting that domestic productive capacity in the non-oil sector remains insufficient to effectively counteract inflationary pressures or balance the money supply in the long run. In contrast, the exchange rate coefficient LnEXR shows a significant positive impact of 1.9278 at the 5% level (p-value = 0.0120), reflecting a strong exchange rate pass-through to domestic prices in an import-dependent economy. The oil price coefficient LnOILP is positive at 0.3812 and significant at 5% (p-value = 0.0333), reflecting the influence of oil revenues on domestic prices through fiscal spending and liquidity channels.

5-4 Short-run estimations

The short-run dynamics of the ARDL model are presented in Table 5, illustrating the immediate interplay between changes in inflation determinants in Algeria.

Table (5): Short-term ARDL estimation findings

Variables	Coefficient	Std. Error	t-Statistic	Prob.
D(LnCPI(-1))	-0.338606	0.125121	-2.706234	0.0110
D(LnEXR)	0.322496	0.072366	4.456446	0.0001
D(LnEXR(-1))	-0.263779	0.075495	-3.493990	0.0015
D(LnOILP)	0.016657	0.009713	1.714978	0.0963
D(LnOILP(-1))	0.005423	0.009705	0.558797	0.5803
D(LnOILP(-2))	-0.021095	0.009605	-2.196346	0.0357
D_UMF	-0.019067	0.004915	-3.879453	0.0005
CointEq(-1)*	-0.070034	0.010188	-6.874458	0.0000

Source: Author's Calculation using EViews 12

The results show that the lagged change in inflation D(LnCPI(-1)) is a negative and statistically significant coefficient (-0.3386) at the 5% level, indicating self-correction of inflation in previous periods. The nominal exchange rate exerts a positive and highly significant immediate impact (0.3224) at 1% (p-value = 0.0001), indicating that contemporaneous changes in the exchange rate have an immediate impact on inflation, while D(LnEXR(-1)) shows a negative and significant effect (-0.2637), reflecting a partial corrective effect after one period. Oil prices exhibit a weakly significant positive contemporaneous effect but a negative and significant impact at the second lag D(LnOILP(-2)), implying that oil price shocks generate temporary inflationary pressures.

Most notably, the unconventional monetary financing dummy (D_UMF) exhibits a negative and highly significant coefficient (-0.019) at the 1% level (p-value = 0.0005). This counter-intuitive result suggests the policy coincided with an immediate, modest reduction in inflation, possibly due to restored confidence in government financing, unobserved deflationary factors, or a time lag before the full inflationary impact of the injected liquidity becomes evident.

Re-evaluating the Determinants of Inflation in Algeria Under Unconventional Monetary Policy: A Dynamic ARDL Analysis

Finally, the error correction term $CointEq(-1)$ is negative and strongly significant (-0.0700), indicating that approximately 7% of the disequilibrium in inflation is corrected within each period, reflecting relatively slow adjustment speed but confirming model stability.

5-5 Diagnostic and stability test

To ensure the robustness and statistical validity of the estimated ARDL model, a series of diagnostic and stability tests were conducted, as presented in Table 6.

Table (6): Results of Diagnostic and Stability Test

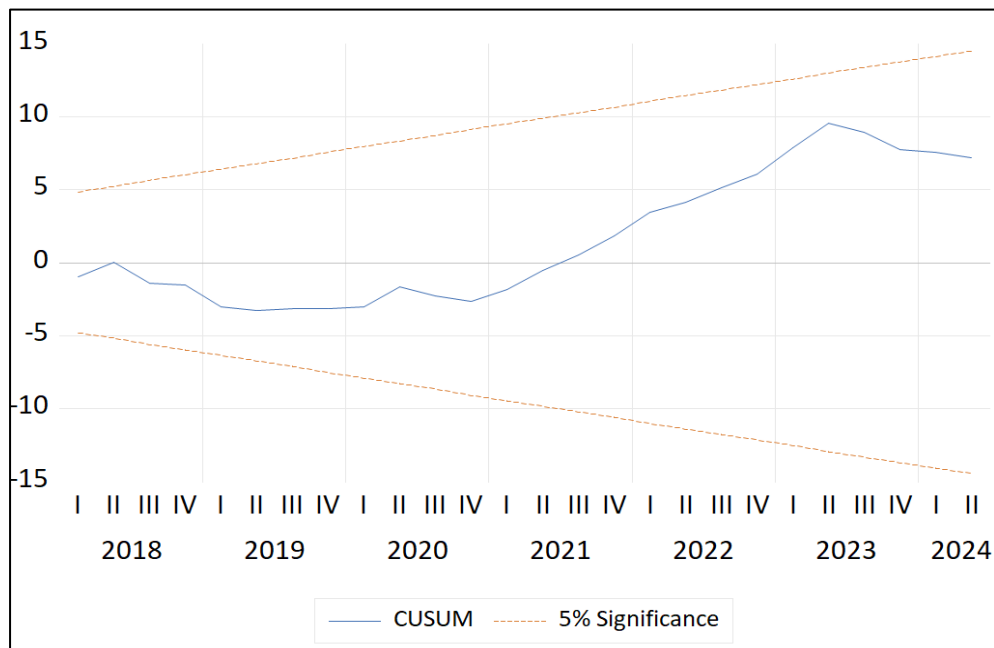
Test Type	F-Statistic	Prob	Prob. Chi-Square statistic
Heteroskedasticity	0.866325	0.5803	0.5205
Serial Correlation LM	0.159528	0.8533	0.7914
Normality	1.024833	0.5990	/
Stability (CUSUM and CUSUMSQ)	Coefficients are stable based on graphical analysis.	/	/

Source: Author's Calculation using EViews 12

The Breusch-Pagan-Godfrey heteroskedasticity test indicates an F-statistic of 0.8663 with a probability value of 0.5803, while the chi-square probability is 0.5205. Since these values exceed the conventional significance levels (1%, 5%, and 10%), we fail to reject the null hypothesis of homoskedasticity in residuals. The Breusch-Godfrey LM test for serial correlation showed an F-statistic of 0.1595 with a probability of 0.8533 and a Chi-square p-value of 0.7914, indicating the absence of serial correlation in the residuals. Moreover, the Jarque-Bera normality test showed a statistic of 1.0248 with a probability value of 0.5990, which is higher than the 5% significance level, confirming that the residuals are normally distributed.

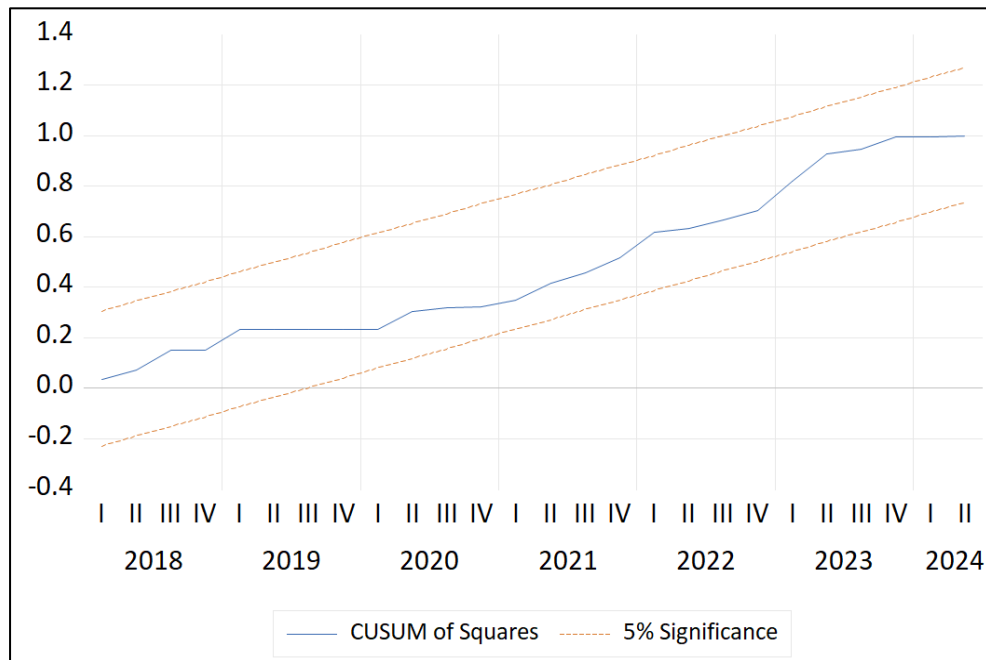
Regarding stability, the CUSUM and CUSUMSQ tests in the figures (Fig 3 and 4) show that the estimated coefficients remain within the 5% critical bounds throughout the sample period, indicating parameter stability and the absence of structural breaks in the model.

Fig (3): Plotting of the CUSUM test



Source: EViews 12 output

Fig (4): Plotting of the CUSUMSQ test



Source: EViews 12 output

5-6 Discussion

The study results using the ARDL approach during 2013-2024 revealed a long-run equilibrium relationship between inflation and its determinants in Algeria over the period 2013Q1–2024Q2. Real GDP excluding hydrocarbons shows a negative and statistically insignificant impact on inflation, indicating the limited role of productive activity in mitigating price pressures due to weak economic diversification, consistent with (Bouziane & Chaibi, 2018) . Conversely, the exchange rate exhibits a significant positive impact, confirming strong

Re-evaluating the Determinants of Inflation in Algeria Under Unconventional Monetary Policy: A Dynamic ARDL Analysis

pass-through effects in an import-dependent economy. Depreciation of the domestic currency directly feeds into higher consumer prices through rising import cost, a finding that aligns with (Abonazel et al., 2021). Oil prices also exert a significant inflationary effect in the long run through fiscal and liquidity channels, as higher oil revenues translate into increased public spending, aligning with (Deluna et al., 2021).

In the short run, exchange rate changes exert an immediate and significant inflationary impact, while the lagged effect reveals partial correction, reflecting the rapid response of domestic prices to exchange rate changes, Oil prices generate short-lived inflationary pressures that dissipate or reverse after a few quarters, suggesting that oil price shocks generate temporary inflationary pressures followed by delayed corrective effects. The most notable short-run result concerns the unconventional monetary policy dummy, which exhibited a negative and statistically significant effect on inflation. This counterintuitive result suggests the policy coincided with an immediate, modest reduction in inflation, possibly due to restored confidence in government financing, unobserved deflationary factors, or a time lag before the full inflationary impact of the injected liquidity becomes evident.

Furthermore, weak monetary policy transmission mechanisms, limited private sector credit expansion, and sluggish economic activity during the implementation period delayed the transmission of liquidity to prices. Therefore, the negative coefficient does not imply that unconventional monetary financing is non-inflationary, but rather that its inflationary effects are lagged and mediated by structural and institutional constraints.

Conclusion:

This study aimed to re-evaluate the determinants of inflation in Algeria in both the short and long using the ARDL model over the period 2013Q1–2024Q2, while considering the influence of key variables including real Gross Domestic Product excluding hydrocarbons, nominal exchange rate, and oil prices under unconventional monetary policy. The main hypothesis was that inflation in Algeria results from the interaction of monetary and real factors, particularly under non-conventional treasury financing.

The empirical findings confirm the existence of a long-run equilibrium relationship between inflation and its main determinants. In the long run, the exchange rate and oil prices were found to be the dominant drivers of inflation, confirming that inflation in Algeria is a structural phenomenon largely driven by external shocks and the fiscal channel linked to hydrocarbon revenues. In contrast, real GDP excluding hydrocarbons exhibits a negative but statistically insignificant impact, suggesting that real economic activity has played a limited role in alleviating inflationary pressures due to weak productive capacity and limited economic diversification. Additionally, the findings demonstrated that unconventional monetary financing exerts a negative and significant impact on inflation only in the short run, highlighting its limited role in immediate price effects, which can be explained by the existence of long-time lags before the full inflationary impact of injected liquidity materializes, or that other factors, such as subdued economic activity, constrained the conversion of excess liquidity into effective demand-pull pressures.

This study also contributes to the literature on inflation dynamics in resource-dependent developing economies by presenting an integrated ARDL based model that combines exchange

rates, oil prices, non-hydrocarbon GDP, and unconventional monetary financing in the Algerian case. To contain structural inflation in Algeria, the central bank should prioritize the managed stability of the dinar and the unification of exchange markets to mitigate the strong pass-through effect. In parallel, the government should adopt a formal exit strategy from unconventional monetary financing to avoid future inflationary risks and prioritize structural reforms in the non-hydrocarbon sector to transform its currently inconsequential effect into an effective anti-inflationary buffer.

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Re-evaluating the Determinants of Inflation in Algeria Under Unconventional Monetary Policy: A Dynamic ARDL Analysis

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