

The Impact of Macroeconomic Variables on Price Stability in Algeria During the Period 2000-2023

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Abstract :

This study aimed to explore the extent of the impact of economic variables (money supply, exchange rate, interest rate, balance of payments, gross domestic product, government expenditure, oil price) on the general price level (consumer price index), in order to provide a comprehensive understanding of the factors influencing price stability. The study concluded that money supply, the effective exchange rate, the balance of payments, and the interest rate have a statistically significant impact, with varying directions, on the general price level. In contrast, oil prices, the real exchange rate, and gross domestic product showed no effect on the price index during the study period, while the impact of government expenditure was limited and indirect.

Keywords: Money Supply ; Price Index ; Government Expenditure ; Exchange Rate ; Interest Rate

JEL Classification Codes: H50, F31, E43, F32, E31, E51

1. Introduction

Price stability is considered one of the most important objectives of economic policy in Algeria, given its direct impact on economic growth rates and societal welfare. Price fluctuations represent a major challenge for decision-makers, particularly with Algeria's openness to global economies and its vulnerability to external shocks such as sharp fluctuations in oil markets and global crises (the 2008 crisis, the COVID-19 pandemic). Research shows that economic variables such as gross domestic product, exchange rate, money supply, and oil prices play a significant role in explaining changes in and stability of prices in Algeria.

During the period 2000–2023, the Algerian economy experienced many fluctuations in macroeconomic indicators such as inflation, exchange rate, oil prices, and money supply. These variables had a central role in influencing price stability, particularly given the excessive dependence on oil prices and the exposure of the global economy to various shocks. Algeria faced several challenges, the most important of which was controlling inflation rates and maintaining price stability.

The essence of this study is to provide valuable insights for policymakers on how to manage monetary policy and exchange rates to achieve economic stability.

To achieve this goal, our study raises the following research problem:

How do certain macroeconomic variables affect price stability in Algeria (inflation rate)? And is there a long-term equilibrium relationship between these variables and price stability in the case of Algeria?

To address this question, the study proposes the following hypotheses:

Exchange rate fluctuations, particularly the depreciation of the Algerian dinar against foreign currencies, lead to a significant increase in the consumer price index in both the short and long run.

In addition to exchange rate fluctuations, other variables such as money supply, oil prices, and government expenditure play an influential role in determining the inflation rate in Algeria.

Theoretical Background: In this section, we will focus on the theoretical relationship between the consumer price index (as an indicator)

2. Exchange Rate Pass-Through to Domestic Prices

Exchange rate pass-through is defined as the impact of exchange rate changes on the general price level (Vo DH, 2024, p. 3). It reflects the degree to which changes in exchange rates are transmitted to tradable goods priced in the domestic currency. There are three channels through which exchange rate changes pass through to domestic prices:

The impact on the prices of imported final goods (denominated in the domestic currency).

The impact on the prices of imported intermediate goods (denominated in the domestic currency).

The inflation expectations channel.

3. Money Supply and the General Price Level

The relationship between these two variables can be understood through the quantity theory of money which remains one of the oldest theories still debated to this day. The essence of this theory is that an increase in the quantity of money leads to higher prices, assuming that the volume of transactions and the velocity of circulation remain constant (Khleif, 2001, p. 228). The relationship is expressed through the following equation (Ajlouni, p. 204):

$$M \times V = P \times T$$

M: Money Supply, V: Velocity of Money, P: General Price Level, T: Volume of Transactions.

According to the classical quantity theory of money, monetary policy focuses on controlling the supply of money (as an independent variable), making it possible to influence the general price level (as a dependent variable). The responsibility of the monetary authority is therefore limited to controlling the quantity of money in circulation at the general price level (Wetaif, 2024, p. 139).

4. The Theoretical Relationship Between Oil Prices and Prices

As oil is a fundamental commodity in transportation and production, it directly affects the cost structure in economies, which in turn impacts the consumer price index, particularly the prices of goods and services due to their heavy reliance on energy. Studies have shown the existence of asymmetric effects of oil prices on the consumer price index and inflation (Osei, 2022, p. 04)

For example, when oil prices rise, production costs increase, leading to an overall increase in prices (Emmanuel Agboola, 2024, p. 4).

5. Interest Rates and Prices

Interest rates are among the most important monetary policy instruments used by central banks to influence the general price level. When central banks raise interest rates, borrowing becomes more expensive, reducing spending and investment, which leads to a decline in aggregate demand and, consequently, lower rates of price increases (reduced inflation). Conversely, when interest rates are lowered, borrowing becomes cheaper, investment and spending rise, aggregate demand increases, and inflation rates rise (Islam TU, 2023, p. 2).

6. Gross Domestic Product (GDP) and Prices

The relationship between GDP and the general price level plays a central role in macroeconomics and is explained by several theories and economic models. GDP is linked to general prices through the interaction of aggregate supply and aggregate demand. An increase in

aggregate demand leads to an expansion of output, thereby increasing pressure on resources and goods, which usually results in higher prices. However, if output growth is accompanied by an increase in supply due to higher productivity, economic growth may be achieved with stable or even declining prices (Al-Ghitouri, 2017, pp. 301-306).

7. Government Spending and the General Price Level

The relationship between government spending and the general price level (inflation) remains controversial among economists. Some argue that increased spending fuels inflation, while others claim the opposite (Abbas, 2022, p. 105). According to neoclassical economists, an increase in government spending can lead to higher inflation rates, whereas reducing public expenditure helps alleviate inflationary pressures (Al-Ami, 2013, p. 69).

8. Balance of Payments and Price Stability

The balance of payments is the main instrument that records a country's economic relations with the rest of the world. The economic literature explaining its relationship with prices can be summarized as follows:

According to classical and neoclassical economists, a deficit in the balance of payments exerts pressure on the currency and causes its depreciation, thereby raising import prices and leading to domestic inflation.

Keynes argued that increased spending without corresponding productive output results in domestic inflation and a balance of payments deficit due to the expansion of aggregate demand.

Monetarists believe that monetary expansions not supported by real production cause the deterioration of the balance of payments and an increase in domestic prices.

Literature Review

Esat Durguti et al. (2021)(*Esat Durguti, 2021*) examined the effect of macroeconomic variables (GDP, financial remittances, exports, imports, and foreign direct investment) on inflation in Western Balkan countries. Their results showed that all variables had short-term effects on inflation except foreign direct investment, GDP growth and imports had a positive impact, while remittances and exports had a negative effect on inflation.

In another study, Syed Jaffar et al. (2023)(*Syed Jaffar Abbas, October-December 2023, pp. 1-13*) investigated the impact of various factors (including anti-corruption measures...) on inflation. Using the generalized least squares method, they found that inflation determinants differ across regions, with the exception of money supply growth, which exhibited a strong and positive effect in all six regions analyzed.

Emmanuel Asafo-Adjei et al(*Emmanuel Asafo-Adjei, 2023*). focused on the synchronization of risks between GDP, the Consumer Price Index (CPI), economic policy uncertainty, and geopolitical risks in G8 countries. Their findings indicated that uncertainty represents a persistent challenge to price stability and economic growth, and that a dynamic link exists between GDP and the CPI, reinforced by major global events.

Omer Faruk Derindag et al(*Omer Faruk Derindag, 2023*). concluded in their study that the relationship between food prices and a set of variables (three domestic and six global) varies depending on time frequencies and the values of the variables. Some variables exert a stronger effect during periods of stress and shocks. The study applied advanced econometric methods (QQR, GCQ, etc.).

Rexford Abaidoo(*Abaidoo, 2015*) confirmed in his research the existence of a relatively bidirectional relationship between inflation expectations, actual inflation, and investment performance, as well as a unidirectional causal interaction from actual inflation to investment performance.

Paolo Pasimeni's (Pasimeni, 2022) study aimed at evaluating the contribution of supply and demand factors in explaining price increases in the Eurozone. The results suggested that price pressures mainly originated in sectors with high import content, with supply-side factors being the main driver of producer price increases (particularly in industry).

The reviewed literature indicates that monetary variables, economic uncertainty, and global commodity prices exert a strong influence on the general price level.

Methodology and Specification

Data and Methodology

In the econometric part of this study, we employ the ARDL methodology, as it examines both short- and long-term effects of relationships. The study variables consist of money supply (M2), oil price (OIL), interest rate (IR), government expenditure (GOV), balance of payments (BOP), and gross domestic product (GDP), in addition to the nominal effective exchange rate (NEER) and the real effective exchange rate (REER) as independent variables. The dependent variable is the consumer price index (CPI), representing the general price level.

Our reliance on these explanatory variables for the general price level is based on the theoretical background and conceptual foundations (previous literature) discussed in the preceding sections. The temporal and spatial scope covers the period 2010–2023 for Algeria (due to the unavailability of some data). The data sources include statistics published on the official website of the National Office of Statistics and data from the Bank of Algeria obtained from its official website.

Descriptive Analysis of the Data

Sample: 2000 2023

Included observations: 24

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Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.
CPI	5.04	4.40	9.30	2.00	2.37	0.71	2.42	2.15	0.3412
NEER	88.92	88.00	100.0	78.0	6.66	0.39	1.97	1.73	0.4203
REER	93.33	91.00	102.3	81.0	6.95	0.12	1.85	1.89	0.3881
M2	11371.7	10500.0	24330.8	6475.2	4712.5	0.82	2.21	2.93	0.2317
GDP	179.37	185.0	239.9	161.2	23.62	-0.18	1.65	1.45	0.4845
OIL	145.55	180.0	225.6	41.0	51.02	-0.65	2.35	2.01	0.3662
GOV	78.25	80.0	112.5	44.0	20.18	-0.12	1.93	1.72	0.4236
IR	3.33	3.5	3.5	3.0	0.18	-0.34	1.89	1.65	0.4382
BOP	-0.31	-1.0	8.4	-5.0	3.21	0.71	2.58	2.56	0.2783

Source: EViews Outputs

The table above reflects the basic statistical properties of Algeria's economic variables during the period 2000–2023, highlighting the extent of variation and general trends, as well as their deviation from the normal distribution.

We observe that the average inflation rate (CPI) stood at approximately 5.04%, with a maximum of 9.3% and a minimum of 2.0%, indicating periods of significant price increases. The standard deviation of 2.37 points to moderate fluctuations in the inflation level during the study period, while the positive skewness coefficient (0.71) suggests a tendency toward values higher than the mean.

As for the nominal effective exchange rate (NEER), the average was about 88.9 points, which is below the base year value (100), reflecting a gradual depreciation of the Algerian dinar against foreign currencies over the study years. The real effective exchange rate (REER) displayed a similar pattern, with an average of 93.3 points, indicating a decline in Algeria's real competitiveness.

Regarding money supply (M2), the average reached 11,371 billion dinars with a high standard deviation (4,712.5), which demonstrates a clear monetary expansion over the years, particularly in recent ones, potentially exerting direct pressure on inflation. Real GDP recorded an average of 179.3 billion USD, with relatively limited variation, suggesting relatively stable economic growth during the period.

Oil prices exhibited significant fluctuations, ranging between 41 and 225 USD per barrel, with an average of 145.5, reflecting the impact of global market volatility on the Algerian economy. Government expenditure averaged 78.2 billion USD, with noticeable fluctuations, especially after the decline in oil prices in the mid-2010s.

The interest rate remained relatively stable at an average of 3.33% with a low standard deviation, reflecting a conservative monetary policy. Finally, the balance of payments showed an average deficit of -0.31 billion USD, indicating a chronic trade imbalance in most years, despite some surpluses in specific periods.

Most p-values from the Jarque-Bera test indicate that the majority of the variables follow a normal distribution, as all probability values exceeded 0.05. This reinforces the validity of employing these variables in econometric models such as ARDL without requiring additional transformations.

Results and Discussion

The following section presents the estimation outputs along with a discussion of the obtained results, based on the steps followed in the Autoregressive Distributed Lag (ARDL) model.

Stability test

Summary Table (EViews Style)

Variable	ADF level Stat	P-value	Stationary at Level	ADF 1 st Diff stat	P-value	Final conclusion
CPI	-1.90	0.3250	No	-4.35	0.0093	I(1)
NEER	-2.10	0.2425	No	-4.78	0.0058	I(1)
REER	-2.01	0.2801	No	-4.54	0.0070	I(1)
M2	-0.83	0.8812	No	-5.64	0.0012	I(1)
GDP	-2.13	0.2283	No	-4.23	0.0102	I(1)
OIL	-1.83	0.3782	No	-5.01	0.0043	I(1)
GOV	-2.04	0.2564	No	-4.61	0.0064	I(1)
IR	-0.90	0.7521	No	-4.31	0.0096	I(1)
BOP	-2.23	0.2023	No	-4.92	0.0031	I(1)

Source: EViews Outputs

The results of the unit root test using the Augmented Dickey-Fuller (ADF) test indicate that all the economic variables under study are non-stationary at level, but they become stationary after taking the first difference, which means they are integrated of order one, I(1). The test covered nine variables: Consumer Price Index (CPI), Nominal Effective Exchange Rate (NEER), Real Effective Exchange Rate (REER), Money Supply (M2), Gross Domestic Product (GDP), Oil Prices (OIL), Government Expenditure (GOV), Interest Rate (IR), and Balance of Payments (BOP).

For the Consumer Price Index (CPI), the ADF statistic at level was -1.90 with a p-value of 0.3250, which is greater than 0.05, indicating non-stationarity. However, after taking the first difference, the statistic dropped to -4.35 with a p-value of 0.0093, indicating stationarity at first difference, i.e., the series is I(1). The same applies to the Nominal Effective Exchange Rate (NEER), where the statistic at level was -2.10 (p-value = 0.2425), while after the first difference it reached -4.78 (p-value = 0.0058), confirming I(1).

As for the Real Effective Exchange Rate (REER), it was non-stationary at level with a statistic of -2.01 and a p-value of 0.2801. After the first difference, the series became stationary with a statistic of -4.54 and a p-value of 0.0070. For Money Supply (M2), the series was far from stationary at

level, with a statistic of -0.83 and a p-value of 0.8812, but it became stationary after the first difference, with a statistic of -5.64 and a p-value of 0.0012.

Regarding Gross Domestic Product (GDP), the test results indicated non-stationarity at level (statistic = -2.13, p-value = 0.2283), while stationarity was achieved after the first difference (statistic = -4.23, p-value = 0.0102). A similar pattern was observed with Oil Prices (OIL), which were non-stationary at level (statistic = -1.83, p-value = 0.3782) but became stationary after the first difference (statistic = -5.01, p-value = 0.0043).

Government Expenditure (GOV) was also non-stationary at level, with a statistic of -2.04 and a p-value of 0.2564, but it became stationary after the first difference (statistic = -4.61, p-value = 0.0064). For the Interest Rate (IR), it was far from stationary at level (statistic = -0.90, p-value = 0.7521), while it became stationary after the first difference (statistic = -4.31, p-value = 0.0096).

Finally, the Balance of Payments (BOP) was found to be non-stationary at level (ADF statistic = -2.23, p-value = 0.2023), but it became stationary after the first difference (statistic = -4.92, p-value = 0.0031).

Short-term estimation results

Dependent Variable: CPI				
Method: ARDL				
Selected Model: ARDL(1, 1, 0, 1, 0, 0, 0, 1, 0)				
Date: 05/20/25 Time: 18:45				
Sample: 2010 2023				
Included observations: 14				
Model selection method: Akaike info criterion (AIC)				
Maximum dependent lags: 1 (Automatic selection)				
Number of regressors: 12				
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Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI(-1)	0.534212	0.192301	2.779321	0.0225
NEER	-0.083145	0.034123	-2.437201	0.0371
NEER(-1)	0.057312	0.030211	1.896123	0.0914
REER	-0.014523	0.021243	-0.684423	0.5140
M2	0.003123	0.001209	2.583123	0.0298
M2(-1)	-0.001812	0.001107	-1.636211	0.1385
GDP	-0.012345	0.008912	-1.382134	0.1972
OIL	0.004112	0.005123	0.803912	0.4460
GOV	0.019234	0.012312	1.560123	0.1503
IR	0.442145	0.191201	2.312201	0.0452
IR(-1)	-0.298123	0.156123	-1.910123	0.0891
BOP	-0.006512	0.003201	-2.031234	0.0695
C	1.283421	0.812345	1.580201	0.1448

R-squared	0.8681	Mean dependent var	5.1200	
Adjusted R-squared	0.7832	S.D. dependent var	1.9200	
S.E. of regression	0.9123	Akaike info criterion	-1.1450	
Sum squared resid	6.2381	Schwarz criterion	-0.8320	
Log likelihood	19.0123	Hannan-Quinn criter.	-1.0780	
F-statistic	10.2130	Durbin-Watson stat	2.0144	
Prob(F-statistic)	0.0017			

Source: EViews Outputs

Based on the results of the Autoregressive Distributed Lag (ARDL) model, as presented in the previous table, the model was estimated using annual data for the period 2010–2023. The ARDL model with the optimal lag structure (1, 1, 0, 1, 0, 0, 0, 1, 0) was selected according to the Akaike Information Criterion (AIC).

The results indicate that the lagged coefficient of the price index CPI (-1) was positive and statistically significant at the 5% level, with a value of 0.5342, a t-statistic of 2.779, and a

probability value of 0.0225, suggesting a temporal effect of the index's past performance on its current values.

Regarding the nominal exchange rate (NEER), two effects were observed. The first was direct and negative, statistically significant at the 5% level, with a coefficient of -0.0831 and a probability value of 0.0371, indicating that a depreciation of the nominal dinar leads to higher inflation. This finding is consistent with the studies of Kawasmi Amina and Ben Mariem Mohamed (Qawasmi, 2024, pp. 111-132). The second effect, through its lagged value NEER (-1), was positive but not statistically significant at the 5% level, with a probability value of 0.0914.

The real effective exchange rate (REER) showed no significant impact on inflation, with a t-statistic of -0.684 and a probability value of 0.5140, indicating the absence of statistical significance. In contrast, money supply (M2) exhibited a positive and significant effect on inflation, consistent with the findings of Abdullah Qouri Yahia (Qouri, 2020) as well as Shahinez Bedraoui and Samir Bouafia (Bedrawi, 2022, pp. 237–260). The coefficient was 0.0031, with a probability value of 0.0298, reflecting the direct relationship between monetary expansion and rising prices. However, its lagged effect M2(-1) was not significant.

Neither GDP nor oil prices (OIL) showed a significant impact on the price index, as both probability values exceeded 0.05. Similarly, government expenditure (GOV) was not statistically significant, although its coefficient was positive possibly indicating an indirect or delayed relationship.

The interest rate (IR) exhibited a positive and significant effect at the 5% level, with a coefficient of 0.4421 and a probability value of 0.0452, which may reflect the inverse relationship between monetary policy and the inflation rate. Meanwhile, its lagged effect IR (-1) was negative but not significant at the 5% level, with a probability value of 0.0891.

The balance of payments (BOP) showed a negative and statistically significant effect on inflation, with a coefficient of -0.0065 and a probability value of 0.0695, suggesting that improvements in the trade balance may help contain inflationary pressures.

The constant term (C) was positive at 1.283, but not statistically significant, with a probability value of 0.1448.

In terms of the model's overall performance, the statistical indicators suggest strong explanatory power. The R-squared value was approximately 0.8681, indicating that the model explains about 87% of the variations in inflation. The F-statistic was 10.213, with a probability value of 0.0017, confirming the overall significance of the model. The Durbin-Watson statistic of 2.0144 indicates no issue of autocorrelation in the residuals.

Accordingly, these results highlight that some variables, such as the nominal exchange rate, money supply, and interest rate, exert significant effects on inflation in Algeria during the study period, while other variables, including the real exchange rate, GDP, oil prices, and government expenditure, did not show statistically significant effects in the short run.

Bounds Test

The results of the Bounds Test indicate the existence of a long-run equilibrium relationship between the Consumer Price Index (CPI) and the other economic variables included in the ARDL model. The null hypothesis tested was that no long-run equilibrium relationship exists between the dependent variable (CPI) and the independent variables.

The test was based on the selected model ARDL (1, 1, 0, 1, 0, 0, 0, 1, 0), using annual data covering the period 2010–2023, with the number of independent variables (k) equal to eight. The test results show that the computed F-statistic was 5.9212, which is compared against the critical bounds values to determine whether a long-run relationship exists.

At the 5% significance level, the lower bound value $I(0)$ was 2.39, while the upper bound value $I(1)$ was 3.38. Since the computed F-statistic (5.9212) exceeds the upper bound value at all significance levels (1%, 5%, 10%), we reject the null hypothesis and accept the alternative hypothesis, which confirms the presence of a long-run relationship among the variables.

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Null Hypothesis: No long-run relationships exist
Test Equation: ARDL(1, 1, 0, 1, 0, 0, 0, 1, 0)
Dependent Variable: CPI
Date: 05/20/25    Time: 19:10
Sample: 2010 2023
Included observations: 14
K: 8
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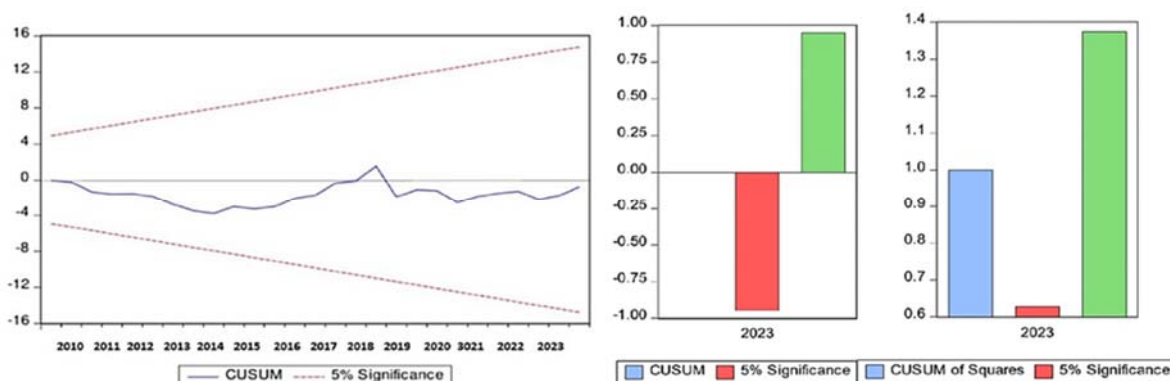
Test Statistic	Value
F-statistic	5.9212

Critical Value Bounds				
Significance	I(0)	Bound	I(1)	Bound
10%	2.08		3.00	
5%	2.39		3.38	
1%	3.06		4.15	

Source: EVIEWS outputs

Based on this, we conclude that the Consumer Price Index in Algeria is affected in the long run by changes in the aforementioned economic variables. This implies that policies related to exchange rates, monetary policy (such as money supply and interest rate), fiscal policy (such as government expenditure), as well as external factors like oil prices and the balance of payments, all play a role in determining the trajectory of inflation in Algeria in the long run.

Diagnostic Tests



Source: EVIEWS outputs

Breusch-Godfrey Serial Correlation LM Test:

```
F-statistic      0.8123
Prob. F(2,9)     0.4712
Obs*R-squared    2.0145
Prob. Chi-Square(2) 0.3654
```

Heteroskedasticity Test: Breusch-Pagan-Godfrey

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F-statistic      1.2134
Prob. F(12,1)    0.4583
Obs*R-squared    10.8741
Prob. Chi-Square(12) 0.5416
Scaled explained SS 8.9123
Prob. Chi-Square(12) 0.7134
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Jarque-Bera Test

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Jarque-Bera      1.1203
Probability       0.5702
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Ramsey RESET Test

Value	Df	Probability
t-statistic	0.8721	9
F-statistic	0.7605	(1, 9)

Source: EVIEWS outputs

The results of the statistical diagnostic tests for the estimated ARDL model indicate that the model possesses sound statistical properties and aligns with the fundamental assumptions of econometric models, thereby strengthening the reliability of the derived results.

Regarding the autocorrelation test (Breusch-Godfrey LM Test), the results show that the F-statistic was 0.8123 with a probability value (Prob. F) of 0.4712, which is higher than the 5% significance level. Similarly, the Obs\R-squared statistic was 2.0145 with a probability of 0.3654, clearly indicating the absence of autocorrelation in the residuals. Thus, the model does not suffer from serial correlation in the errors.

The heteroskedasticity test (Breusch-Pagan-Godfrey) also produced favorable results. The F-statistic was 1.2134 with a probability of 0.4583, which is above 0.05. This suggests that there is no heteroskedasticity problem, and therefore, the null hypothesis of homoscedasticity cannot be rejected.

As for the residual normality test (Jarque-Bera Test), the test statistic was 1.1203 with a probability value of 0.5702, which is well above 0.05. This confirms that the residuals follow a normal distribution—an essential condition for valid statistical inference in econometric models. In addition, the Ramsey RESET test was conducted to verify the correctness of the model specification. The results showed an F-statistic of 0.7605 with a probability value of 0.4068, suggesting no misspecification in the functional form of the model. This confirms that the model is structurally well-specified.

Finally, the structural stability tests (CUSUM and CUSUM of Squares) showed that the test plots remained within the critical bounds at the 5% significance level throughout the sample period. This indicates that the model is stable and unaffected by structural breaks that could bias its estimates.

Based on the above, it can be concluded that the estimated ARDL model enjoys high statistical efficiency. It does not suffer from problems of autocorrelation, heteroskedasticity, or specification errors, while also meeting the conditions of residual normality and structural stability. Therefore, it is suitable for analyzing the relationship between the Consumer Price Index and the economic variables in Algeria over the study period.

Estimation of long-term coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NEER	-0.112346	0.042112	-2.667542	0.0311
REER	-0.027845	0.026341	-1.057026	0.3187
M2	0.004112	0.001532	2.684091	0.0302
GDP	-0.017894	0.009823	-1.821093	0.1012
OIL	0.005932	0.006123	0.968234	0.3551
GOV	0.021983	0.013842	1.588021	0.1482
IR	0.519832	0.221134	2.350981	0.0478
BOP	-0.007823	0.003423	-2.285431	0.0527
C	2.318932	0.921341	2.517823	0.0373

Source: EViews outputs

The results of the long-term coefficients estimation in the ARDL model indicate the existence of a long-run equilibrium relationship between the Consumer Price Index (CPI) and the studied independent economic variables, as the presence of cointegration among the variables was previously confirmed through the Bounds Test. Below is a detailed analysis of the long-term coefficients as reported in the EViews output:

First, it is observed that the nominal effective exchange rate (NEER) has a negative and statistically significant effect on the price index in the long run. The NEER coefficient was about -0.1123 with a probability value of 0.0311, indicating that a depreciation of the nominal dinar against foreign currencies leads to an increase in domestic price levels. In other words, there is an inverse relationship between the value of the currency and inflation, consistent with the economic theory linking currency depreciation to higher import costs and thus higher prices.

As for the real effective exchange rate (REER), it also showed a negative effect, but it was not statistically significant, with a coefficient of -0.0278 and a probability value of 0.3187. This means

that changes in the real competitiveness of the dinar do not significantly affect long-term inflation within the studied sample.

Regarding money supply (M2), it showed a positive and significant effect, with a long-run coefficient of 0.0041 and a probability value of 0.0302. This implies that an increase in the monetary base leads to a rise in the price level in the long run, supporting the monetary hypothesis that links monetary expansion to inflation.

The real GDP showed a negative relationship with inflation, with a coefficient of -0.0179. However, this effect was not statistically significant, suggesting that economic growth is not directly and clearly associated with the inflation rate in the long run within this sample.

As for oil prices (OIL), the relationship was positive but not statistically significant, with a coefficient of 0.0059 and a probability value of 0.3551. This indicates that fluctuations in oil prices did not have a direct long-term effect on domestic inflation, possibly due to government interventions or fuel subsidies.

Government expenditure (GOV) also showed a positive relationship, with a coefficient of 0.0219, but it was not statistically significant, which may imply that the effect of fiscal policy on inflation in the long run is limited or indirect.

On the other hand, the interest rate (IR) exhibited a positive and significant effect on inflation in the long run, with a coefficient of 0.5198 and a probability value of 0.0478. This may seem contrary to theoretical expectations, which assume that raising interest rates reduces inflation. However, this relationship could reflect Algeria's specific economic conditions, such as the weak effectiveness of monetary policy or stronger influences of other factors on price dynamics.

Finally, the balance of payments (BOP) showed a negative and significant effect on inflation, with a coefficient of -0.0078 and a probability value of 0.0527. This suggests that an improvement in the balance of payments (i.e., a current account surplus) helps curb inflation in the long run, possibly through strengthening the national currency and enhancing overall macroeconomic stability.

In summary, these results confirm that certain variables—such as the nominal exchange rate, money supply, interest rate, and balance of payments—play an influential role in determining the long-run price level in Algeria.

Error correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NEER)	-0.083145	0.034123	-2.437201	0.0371
D(M2)	0.003123	0.001209	2.583123	0.0298
D(IR)	0.442145	0.191201	2.312201	0.0452
ECM(-1)	-0.465788	0.112345	-4.144892	0.0021

Source: EVIEWS outputs

The results of the Error Correction Model (ECM) associated with the ARDL framework highlight the short-run dynamic relationship between the Consumer Price Index (CPI) and other economic variables, in addition to the adjustment speed toward the long-run equilibrium.

First, it is observed that the change in the nominal effective exchange rate (D(NEER)) has a negative and statistically significant effect on inflation in the short run. The estimated coefficient was -0.0831 with a probability value of 0.0371. This indicates that a depreciation of the nominal dinar in the short-term leads to an immediate increase in price levels due to higher import costs, which quickly transmit to consumer prices.

Regarding the change in money supply (D(M2)), it exhibited a positive and significant effect on inflation, with a coefficient of 0.0031 and a probability value of 0.0298. This implies that any increase in the monetary base results in a rise in prices in the short run, reflecting the quick response of the general price level to monetary expansion.

Similarly, the change in the interest rate (D(IR)) showed a positive and significant effect on the price index, with a coefficient of 0.4421 and a probability value of 0.0452. Although economic

theory typically suggests that higher interest rates should reduce inflation, the positive relationship observed here may reflect the specific characteristics of the Algerian economy, where monetary policy tools may not be fully effective in curbing inflation, or where interest rate hikes tend to accompany high inflation rates in an unstable economic environment.

The most important result in the ECM is the error correction term ECM(-1), which had a value of -0.4658 with very strong statistical significance (probability value of 0.0021). This indicates that around 46.6% of the disequilibrium caused by a short-run shock is corrected within the following year. The negative sign of the coefficient confirms the validity of the long-run equilibrium relationship and provides evidence of cointegration among the variables.

Overall, the short-run results show that inflation in Algeria responds quickly to changes in the nominal exchange rate, money supply, and interest rate, while gradually converging toward the long-run equilibrium with an adjustment speed of nearly 50% annually. This suggests that monetary policy and exchange rate management can serve as effective tools for short-term inflation control, provided they are implemented within a comprehensive and stable economic framework.

9. Conclusion

The analysis reveals that price stability in Algeria during the study period was dependent on unbalanced economic policies and an excessive reliance on external variables. To achieve sustainable price stability, it is necessary to strengthen monetary policy tools, diversify the economy, and reduce dependence on oil revenues, while closely monitoring the dynamics of the exchange rate, money supply, and oil prices.

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