

An Attempt to Use ARIMA Models to Forecast Inflation Rates in Algeria

Ibrir Mohamed

Department of Management Sciences, Faculty of economics commerce and management sciences, University of Saida Dr Moulay Tahar, Algeria. Email : ibrirm755@yahoo.fr

Received : 11/11/2025 ; Accepted : 13/04/2026 ; Published : 24/05/2026

Abstract:

The aim of this study is to attempt to forecast monthly inflation rates in Algeria for the period (February 2025 – January 2027), through the analysis of monthly time-series data on inflation rates in Algeria extending from January 2010 to January 2025, and to determine whether ARIMA models can be relied upon to forecast inflation rates in Algeria in the short term. By applying the Box-Jenkins methodology, the results of this study showed that these models can be relied upon to forecast the inflationary phenomenon in Algeria in the short term, and that the appropriate model among the candidate models is the ARIMA(6,1,5) model, after it passed all statistical tests and its validity for short-term forecasting was confirmed.

Keywords: inflation, consumer price index, implicit deflator, ARIMA models.

Introduction:

Inflation is considered one of the most serious economic problems facing all countries of the world, especially developing countries, in light of the absence of a definitive remedy for it so far. It comes at the forefront of the financial and monetary imbalances from which these countries suffer, and it results in many negative effects on all aspects of life, whether economic, social, or political. This has made all countries strive to establish many policies and mobilize numerous programs to mitigate or avoid inflationary pressures, with the aim of achieving economic stability, which constitutes a major challenge for all countries.

Algeria, like other countries of the world, witnessed an increasing inflationary wave, especially at the beginning of the 1990s, when prices rose significantly. It then witnessed stability at the beginning of the year 2000, before returning once again to fluctuation, which led to the deterioration of the value of the national currency and a continuous decline in purchasing power. This prompted the monetary authority to officially adopt an inflation-targeting policy since 2011. This policy was legally embodied through Order No. (10 – 04) issued in August 2010, amending and supplementing Order (11 – 03), which explicitly states that price stability has become the final objective of monetary policy, in order to curb the deterioration of the value of the national currency and support economic development. Accordingly, the Bank of Algeria prepared a dynamic model for forecasting inflation rates in the short term of the (ARIMA) type, allowing monthly forecasting of its developments over a period of 24 months starting from 2012.

Problem Statement: Based on the above, and in an attempt to study the reality of inflation in Algeria by tracing the past of this phenomenon and taking it as a basis for its future, we posed the following main problem:

Can ARIMA models be relied upon to forecast monthly inflation rates in Algeria?

Research Hypothesis:

- ARIMA models can be used to forecast the inflationary phenomenon in Algeria in the short term.

Importance of the Research:

This research derives its importance from the increasing significance of the phenomenon of inflation in the global economy in general and the Algerian economy in particular, as it is considered an economic problem that concerns economists, economic policy makers, and even international institutions, given the great importance of price stability in achieving economic balances.

Research Objectives:

Through this research, we aim to:

- Forecast inflation rates in the Algerian economy in the short term for the period (02/2025 – 01/2027).
- Shed light on the subject of inflation and its various types.

Research Methodology:

To cover the various aspects of the research and attempt to answer the posed problem, the descriptive method was used as an appropriate approach to present the theoretical concepts related to inflation. As for the applied aspect of the study, the quantitative method was adopted through the use of the Box-Jenkins methodology, with the assistance of the EViews13 program. To answer the problem, the research was divided into the following aspects:

First: The conceptual and theoretical framework of inflation.

Second: The econometric study for forecasting monthly inflation rates in Algeria.

First: The Conceptual and Theoretical Framework of Inflation

1- The Concept and Measurement of Inflation

1-1- The Concept of Inflation

There are several definitions of inflation, but in general, inflation can be defined as:

A phenomenon represented by the existence of a continuous trend toward an increase in the general level of prices of goods and services that concern a wide segment of citizens for a relatively long period of time. (Youssef, 2023)

This definition of inflation includes several elements, namely:

- Inflation means a continuous increase in prices, not a temporary or limited increase. (Souhila, 2024)
- Inflation means a continuous increase in the general level of prices and not an increase in the price of a specific commodity. An increase in the price of a specific commodity does not mean inflation, because the increase in the price of this particular commodity may be offset by a decrease in the price of another commodity. Rather, inflation is measured on the basis of a wide set of goods important to the consumer. (Al-Tabouli, 1997).

1-2- Measuring Inflation:

Price indices are used to measure the inflation rate and judge its severity in a given year. It is known that there are a number of price indices, such as the consumer price index, the producer price index, the gross domestic product index (the implicit deflator or gross domestic product price deflator), and others. The estimation of the inflation rate using one of these indicators generally differs from its estimation using other indicators. The consumer price index is

considered one of the most important indicators used to calculate the inflation rate due to its direct relationship with agreements between labor unions and employers' unions. However, this indicator includes the prices of many goods and services that do not fall within the scope of international trade, which makes international comparisons between inflation rates difficult. Therefore, the indicator widely used to measure the inflation rate is the GDP price deflator. (Youssef, 2023)

1-2-1- Consumer Price Index (CPI):

It is a statistical means for measuring changes occurring in the general level of prices of final consumer goods and services consumed by the various groups of society in their daily lives during a period of time (the current period) relative to a period of time called the base period, through retail sales operations. (Taha, 2021)

The consumer price index is measured through the following steps:

- Determining the group of goods and services most consumed by members of society, representing the basket of goods and services purchased by the average consumer.
- Finding the prices of the goods and services included in the basket at a specific point in time.
- Calculating the cost of the basket of goods and services using price data during different periods of time.
- Determining one year as the base year, as a standard for comparison with other years.
- Calculating the consumer price index by dividing the price of the basket of goods and services in a specific year by the price of the same basket in the base year, multiplied by 100. This means that weighting is based on the quantities of the base year.

Its formula is as follows:

$$CPI = \frac{\sum_{i=1}^n Q_{i0} P_{ij}}{\sum_{i=1}^n Q_{i0} P_{i0}} \times 100$$

Accordingly, the inflation rate is measured by the following relationship: (Hadia and Hamida, 2020)

$$INF = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \times 100$$

1-2-2- The Implicit Deflator or Gross Domestic Product Price Deflator (DPIB):

This index is based on an assumption that differs from that of the consumer price index, namely that individuals consume, in the current period of time (the comparison period) and under changing prices, a new set or quantities of goods different from those consumed in the base year. That is, prices are weighted using the quantities of the comparison year. (Ahmed, Ben Kaddour, and Zitouni, 2022)

This means that this index uses the quantities of the comparison year as weighted weights, and it expresses the change in prices as if the quantities consumed in the comparison period were the same quantities consumed in the base period. (Keddi, 2006)

Its formula is:

$$DGDP = \frac{\sum_{i=1}^n Q_{ij} P_{ij}}{\sum_{i=1}^n Q_{ij} P_{i0}} \times 100 = \frac{PIB_N}{PIB_R} \times 100$$

Accordingly, the inflation rate is measured by the following relationship:

$$INF = \frac{DPIB_t - DPIB_{t-1}}{DPIB_{t-1}} \times 100$$

The difference between the consumer price index and the gross domestic product deflator lies in the following points:

- The gross domestic product deflator measures all prices of goods and services produced during the year, whereas the consumer price index measures only the prices of goods and services purchased by consumers.
- The gross domestic product deflator includes the prices of goods and services produced within the country only, whereas the consumer price index includes the prices of goods and services demanded by consumers, including the prices of imported goods.
- The fundamental difference between them lies in the method of calculating each of them, as the consumer price index is calculated on the basis of a fixed commodity basket representing the quantities demanded in the base year, whereas the gross domestic product deflator is calculated on the basis of a variable commodity basket representing the quantities produced in the current year (the comparison year). (Youssef, 2023).

The inflation rate expresses the percentage change in the general level of prices from one period to another, and the inflation rate is considered an important indicator of economic performance, as changes in inflation rates are usually linked to fluctuations in real gross domestic product.

1-3- Types of Inflation:

A distinction is usually made between three types of inflation according to the severity of each, and these types are:

- **Moderate or creeping inflation:** This type is characterized by a slight and slow increase in the general level of prices, and its annual rate usually does not exceed 10%. Therefore, this type does not have clear negative effects on the national economy. (Al-Hajjar, 2006)
- **Accelerating inflation:** This type represents a continuous and compounded increase in the general level of prices over short periods of time, and its annual inflation rate usually exceeds 10% and does not exceed 50%.
- **Hyperinflation:** This is represented by a large and massive increase in the general level of prices, and its annual inflation rate usually exceeds 50% and may reach 200% or more annually. Therefore, it is considered one of the most harmful types of inflation to the national economy, given the effects it leaves behind, which may make it difficult for government authorities to intervene to limit their increase. (Mohammed and Moussa, 2006)

1-4- Effects of Inflation:

The effects resulting from the phenomenon of inflation are divided into two types:

1-4-1- Economic Effects: (Al-Issa and Ibrahim Suleiman, 2006)

- Weak saving and an increased tendency toward consumption due to weak confidence in the national currency.
- A decline in productive investment and capital flight.
- A deficit in the balance of payments due to the rise in the prices of domestic goods compared to foreign goods. (Al-Issawi and Mahmoud Hassan, 2007)
- Major difficulties in the planning process due to the continuous change in the prices of production factors.

1-4-2- Social Effects:

- Deterioration of the purchasing power of limited-income groups.

- The spread of bribery and administrative corruption, and the emigration of competencies abroad.
- Poor distribution of national income, and the emergence of class stratification in society, poverty, and unemployment. (Al-Saeed, 2021)

1-5- Causes of Inflation:

- **Inflation resulting from demand conditions:** This is explained on the basis that the increase in aggregate demand exceeds the increase in commodity supply, especially when the economy operates at or approaches the level of full employment. Due to the unavailability of productive resources, production cannot be increased in the short term, which is continuously reflected in rising prices. This represents the essence of Keynesian theory. (Adboub and Lesbaa, 2021)
- **Inflation arising from increased expenditures:** This occurs due to rising production costs, especially the increase in workers' wages. When workers are able to raise the level of wages through the pressure of their unions, this leads to higher production costs and higher product prices, and the rise in prices leads to renewed demands for wage increases, and so on. (Majlakh and Walid, 2021)
- **Structural inflation:** In this case, the causes of inflation are not due to purely monetary factors, but rather to the economic structure of the state, as inflation is linked to the capitalist mode of production and the laws regulating economic activity. (Saliha and Shashoui, 2021)

Second: The Econometric Study

1- Steps for Preparing the Consumer Price Index in Algeria (Mouloud, 2024)

- The consumer price index is estimated monthly in Algeria according to the Laspeyres formula, which relies on measuring the monthly change in prices, considering that the quantities consumed by Algerian households are the same as those consumed in the base year, so that each good is weighted according to its share of total consumer expenditure in that year.
- The index consists of 261 items and is represented by 791 categories selected on the basis of criteria such as categories of annual expenditure, their frequency, and their usefulness. The weights of the categories are based on annual expenditures for the year 2000, derived from the national survey on household consumption, and the coverage rate of the index in terms of consumer expenditure is 95%.
- The classification of consumed goods and services into subgroups and items is similar to the recommendations of the United Nations in the 1970 System of National Accounts.
- The national index is calculated by monitoring prices for a sample of 17 cities and villages representing the national territory, distributed according to geographical strata through the consumer expenditure survey.
- All fresh fruits and vegetables are subject to special treatment due to the seasonal nature of marketing through a monthly seasonal basket.
- The raw index is calculated and compared with the cost index of the same basket monthly between the current month and the same month of the reference year 2001.
- The price survey is carried out periodically on a sample of sales outlets according to a fixed survey program for each product group.
- The formula for calculating the index is: (ONS, 2025)

$$CPI_{m/2001} = \sum_i (W_i / \sum_i W_i) (P_i^m / P_i^{2001})$$

Where:

W_i : Weight of item i .

P_i^m : The average current price for month m of item i .

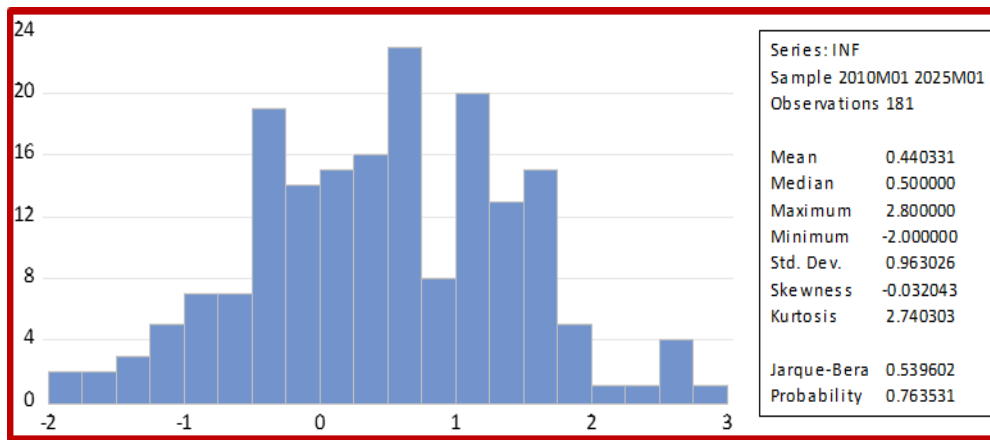
P_i^{2001} : The base price (average in 2001) of item i .

Accordingly, the monthly inflation rate in Algeria is measured through the monthly change in the consumer price index according to the following formula:

2- Descriptive Study of the Data of the Monthly Inflation Rates Series INF

The data used in this study consist of a series of monthly inflation rates in Algeria, with 181 observations covering the period extending from January 2010 to January 2025, based on data from the National Office of Statistics. This is as shown in the following figure:

Figure (01): Descriptive Indicators of the Monthly Inflation Rates Series during the Period: (January 2010 – January 2025).



We observe from Figure (01) that the monthly inflation rates in Algeria recorded their highest value during the study period in January 2012, reaching (2.8%), while they recorded their lowest value in July 2018, reaching (-2%), with an overall average of (0.44%) and a dispersion from the mean of (0.96%).

3- Study of the Stationarity of the Monthly Inflation Rates Series in Algeria

To verify the stationarity of the series, we conduct unit root tests.

3-1- Augmented Dickey-Fuller (ADF) Test for the Inflation Rates Series in Algeria:

In this test, to study the stationarity of the time series, we rely on estimating the following models: (Bourbonnais, 2009)

$$\left\{ \begin{array}{l} \Delta INF_t = \lambda INF_{t-1} - \sum_{j=1}^P \phi_{j+1} \Delta INF_{t-j} + \mu_t \quad \dots \dots \dots (1) \\ \Delta INF_t = \lambda INF_{t-1} - \sum_{j=1}^P \phi_{j+1} \Delta INF_{t-j} + c + \mu_t \quad \dots \dots \dots (2) \\ \Delta INF_t = \lambda INF_{t-1} - \sum_{j=1}^P \phi_{j+1} \Delta INF_{t-j} + c + bt + \mu_t \quad \dots \dots \dots (3) \end{array} \right.$$

Based on the EViews13 program, we obtained the estimation of the three formulas using the time-series data for the period January 2010 – January 2025, as shown in the following table:

Table (01): Augmented Dickey-Fuller (ADF) Test for the Inflation Rates Series in Algeria.

ADF Test for the Series INF_t							
$H_0: c = 0$		$H_0: b = 0$		$H_0: \lambda = 0$			
$t_c^{0.05}$	t_c^*	$t_b^{0.05}$	t_b^*	Prob	$\tau_{tabulé}^{5\%}$	$\tau_{\hat{\phi}_1}$	
-	-	-	-	0.2603	-	-	Model (1)
2.83	6.541258	-	-	0.0000	-	-	Model (2)
3.38	3.709593	3,11	0.235700	0.0000	-	-	Model (3)
					1.942722	1.060494	
					2.877636	10.23600	
					3.435269	10.21034	

From the results of Table (01) above, we conclude the following:

In model (3): We have the calculated statistic $\tau_{(\hat{\phi}_1)} = -10.21034$, which is less than the critical value at the 5% significance level, $(\tau_{tabulé}^{(5\%)}) = -3.435269$. Therefore, we reject the hypothesis $H_0: \lambda = 0$, which means that the series is free from a unit root. We also have $t_b^* = 0.235700$, which is less than the tabulated value $(t_b^{0.05}) = 3.11$. Accordingly, we accept the hypothesis $H_0: b = 0$, which means that the trend coefficient does not differ significantly from zero, and therefore we reject the TS model hypothesis according to the methodology of this test.

In model (2): We have the calculated statistic $\tau_{(\hat{\phi}_1)} = -10.23600$, which is less than the critical value at the 5% significance level, $(\tau_{tabulé}^{(5\%)}) = -2.877636$. Therefore, we reject the hypothesis $H_0: \lambda = 0$, which means that the series does not contain a unit root. We also have $t_c^* = 6.541258$, which is greater than the tabulated value $(t_b^{0.05}) = 2.83$. Accordingly, we reject the hypothesis $H_0: c = 0$, which means that the constant term does not differ significantly from zero.

In model (1): We have the calculated statistic $\tau_{(\hat{\phi}_1)} = -1.060494$, which is greater than the critical value at the 5% significance level, $(\tau_{tabulé}^{(5\%)}) = -1.942722$, which means that the series contains a unit root.

Accordingly, by accepting the hypothesis of the existence of a unit root in the third model while rejecting the TS hypothesis, it can be said that the time series of inflation rates in Algeria during the studied period is non-stationary and is of the DS form.

3-2- Study of the First-Difference Series of the Monthly Inflation Rates Series in Algeria:

This series can be made stationary by using differences, and first-order differences are often used in such models and can be written in the following form:

$$\Delta INF_t = INF_t - INF_{t-1}$$

Through this relationship, we obtain 180 observations representing the corrected time series of first differences, extending from February 2010 to January 2025. It can be graphically represented as follows:

We use the Augmented Dickey-Fuller test once again.

3-3- Augmented Dickey-Fuller (ADF) Test for the First-Difference Series of Inflation Rates in Algeria:

In this test, to study the stationarity of the time series, we rely on estimating the following models: (Bourbonnais, 2009, p. 234)

$$\left\{ \begin{array}{l} \Delta INF_t = \lambda INF_{t-1} - \sum_{j=1}^P \phi_{j+1} \Delta INF_{t-j} + \mu_t \quad \dots \dots \dots (1) \\ \Delta INF_t = \lambda INF_{t-1} - \sum_{j=1}^P \phi_{j+1} \Delta INF_{t-j} + c + \mu_t \quad \dots \dots \dots (2) \\ \Delta INF_t = \lambda INF_{t-1} - \sum_{j=1}^P \phi_{j+1} \Delta INF_{t-j} + c + bt + \mu_t \quad \dots \dots \dots (3) \end{array} \right.$$

Based on the EViews13 program, we obtained the estimation of the three formulas using the time-series data for the period February 2010 – January 2025, as shown in the following table:

Table (02): Augmented Dickey-Fuller (ADF) Test for the First-Difference Series of Inflation Rates in Algeria

ADF Test for the Series INF_t							
$H_0: c = 0$		$H_0: b = 0$		$H_0: \lambda = 0$			
$t_c^{0.05}$	t_c^*	$t_b^{0.05}$	t_b^*	Prob	$\tau_{tabulé}^{5\%}$	$\tau_{\hat{\phi}_1}$	
-	-	-	-	0.0000	-	-	Model (1)
2.83	0.004171	-	-	0.0000	-	-	Model (2)
3.38	0.395808	3,11	-	0.0000	-	-	Model (3)
			0.441938		3.436634	8.820634	

From Table (02) above, we conclude the following:

In model (3): We have the calculated statistic $\tau_{(\hat{\phi}_1)} = -8.8240634$, which is less than the critical value at the 5% significance level, $(\tau_{tabulé}^{5\%}) = -3.436634$. Therefore, we reject the hypothesis $H_0: \lambda = 0$, which means that the series is free from a unit root. We also have $t_b^* = -0.441938$, which is less than the tabulated value $(t_b^{0.05} = 3.11)$. Accordingly, we accept the hypothesis $H_0: b = 0$, which means that the trend coefficient does not differ significantly from zero, and therefore we reject the TS model hypothesis according to the methodology of this test.

In model (2): We have the calculated statistic $\tau_{(\hat{\phi}_1)} = -8.824666$, which is less than the critical value at the 5% significance level, $(\tau_{tabulé}^{5\%}) = -2.878515$. Therefore, we reject the hypothesis $H_0: \lambda = 0$, which means that the series does not contain a unit root. We also have $t_c^* = 0.004171$, which is less than the tabulated value $(t_b^{0.05} = 2.83)$. Accordingly, we accept the hypothesis $H_0: c = 0$, which means that the constant term does not differ significantly from zero.

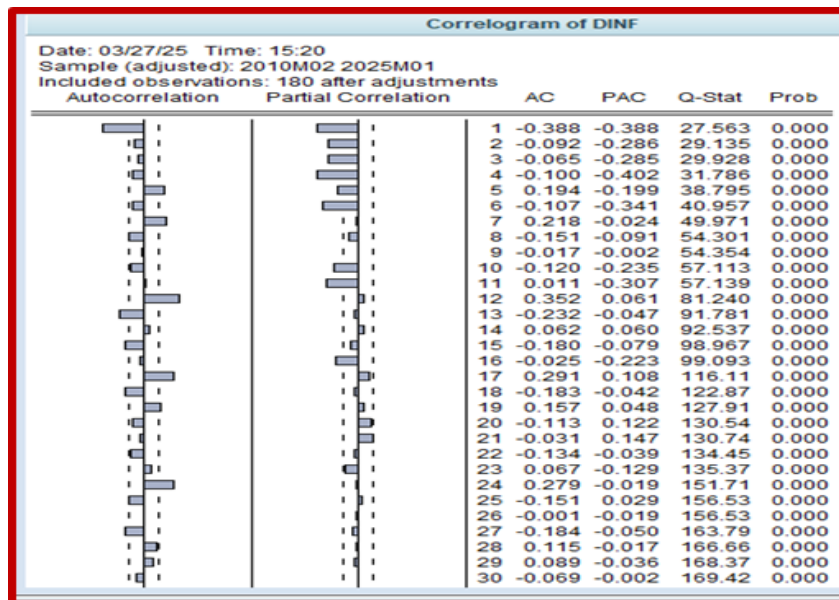
In model (1): We have the calculated statistic $\tau_{(\hat{\phi}_1)} = -8.877268$, which is less than the critical value at the 5% significance level, $(\tau_{\text{tabulé}}^{(5\%)}) = -1.942722$. Therefore, we reject the hypothesis of the existence of a unit root in the differences series.

Accordingly, by rejecting the hypothesis of the existence of a unit root in the three models while rejecting the TS hypothesis, it can be said that the first-difference series of inflation rates in Algeria during the studied period is stationary.

4- Proposing an ARIMA Model for the Monthly Inflation Series in Algeria for the Period (January 2010 – January 2025)

The diagnosis stage is considered an important stage in time-series analysis, as it helps identify the model and determine its orders through the autocorrelation function AC and the partial autocorrelation function ACF of the stationary DINF series, and the following figure illustrates this:

Figure (02): The Autocorrelation Function and the Partial Autocorrelation Function of the DINF Series



By examining the autocorrelation function (AC) and the partial autocorrelation function (ACF) of the stationary DINF series, we observe that, for AR, there are significant bars at the lags (p=1,2,3,4,5,6), and for MA, we also observe the presence of significant bars at the lags (q=1,5). Accordingly, we nominate all possible models for (p=1,2,3,4,5,6) and (q=1,5) and estimate them.

5- Estimation of the Selected Model for Explaining Inflation in Algeria during the Study Period:

After estimating all possible models, the best model for representing the data of the DINF series was selected, based on the comparison criteria in terms of the lowest value of the criteria (Akaike, Hannan-Quinn, Schwarz), the good significance of the estimated parameters, the highest value of the coefficient of determination R², and the DW statistic. The best model among the estimated models was the ARIMA(6,1,5) model. The following are the estimation results of this model:

Table (03): Estimation Results of the ARIMA(6,1,5) Model for the DINF Series.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-1.139288	0.082750	-13.76787	0.0000
AR(2)	-1.233167	0.117799	-10.46839	0.0000
AR(3)	-1.288975	0.112052	-11.50340	0.0000
AR(4)	-1.194312	0.106898	-11.17248	0.0000
AR(5)	-0.482311	0.119899	-4.022657	0.0001
AR(6)	-0.426308	0.084724	-5.031700	0.0000
MA(1)	0.349152	0.059316	5.886274	0.0000
MA(5)	-0.710146	0.092917	-7.642780	0.0000
SIGMASQ	0.714204	0.094250	7.577756	0.0000
R-squared	0.599180	Mean dependent var	0.005556	
Adjusted R-squared	0.580428	S.D. dependent var	1.338586	
S.E. of regression	0.867060	Akaike info criterion	2.644117	
Sum squared resid	128.5567	Schwarz criterion	2.803765	
Log likelihood	-228.9705	Hannan-Quinn criter.	2.708847	
Durbin-Watson stat	2.105796			
Inverted AR Roots	.36-.82i	.36+.82i	-.08-.73i	-.08+.73i
Inverted MA Roots	-.86-.50i	-.86+.50i	.22-.88i	-.83-.54i

From the results of Table (03), the significance of all the coefficients of the selected model appears to us, where the ARIMA(6,1,5) equation representing the temporal changes in monthly inflation rates in Algeria for the period (January 2010 – January 2025) can be written in the form: $[[INF]]_t \sim ARIMA(6,1,4)$, that is:

$$\begin{aligned}
 DINF_t = & -1.139288DINF_{t-1} - 1.233167DINF_{t-2} - 1.288975DINF_{t-3} \\
 & - 1.194312DINF_{t-4} - 0.482311DINF_{t-5} - 0.426308DINF_{t-6} \\
 & + 0.349152\varepsilon_{t-1} - 0.710146\varepsilon_{t-5}
 \end{aligned}$$

According to this equation, the value of the INF series level in period t is explained, on the one hand, by the autoregression of order (p=6), that is, by the weighting of the observations of the previous six months, and, on the other hand, by the moving average process of order (q=5), that is, by the weighted averages of the random errors of the previous five months, as follows:

- When the level of the series in the previous month $[[DINF]]_{(t-1)}$ increases by 1%, the level of the series in the current period $[[DINF]]_t$ decreases by 1.139288% (existence of a negative correlation).
- When the level of the series in the month before the previous one $[[DINF]]_{(t-2)}$ increases by 1%, the level of the series in the current period $[[DINF]]_t$ decreases by 1.233167% (existence of a negative correlation).
- When the level of the series three months earlier $[[DINF]]_{(t-3)}$ increases by 1%, the level of the series in the current period $[[DINF]]_t$ decreases by 1.288975% (existence of a negative correlation).
- When the level of the series four months earlier $[[DINF]]_{(t-4)}$ increases by 1%, the level of the series in the current period $[[DINF]]_t$ decreases by 1.194312% (existence of a negative correlation).
- When the level of the series five months earlier $[[DINF]]_{(t-5)}$ increases by 1%, the level of the series in the current period $[[DINF]]_t$ decreases by 0.482311% (existence of a negative correlation).

- When the level of the series six months earlier $[[DINF]]_{t-6}$ increases by 1%, the level of the series in the current period $[[DINF]]_t$ decreases by 0.426308% (existence of a negative correlation).

Accordingly, we conclude that the inflation rate in month t is self-correlated and inversely related to its level in each of the previous six months.

With regard to the moving averages in the equation, we observe that:

- When the weighted average of the random errors in the previous month ε_{t-1} increases by 1%, the level of the inflation series in the current period $[[DINF]]_t$ increases by 0.710146% (existence of a positive correlation).

-When the weighted average of the random errors two months earlier ε_{t-5} increases by 1%, the level of the inflation series in the current period $[[DINF]]_t$ decreases by 0.256927% (existence of a negative correlation).

Thus, it can be said that the level of inflation in month t is based on the autoregressive values of the previous six months and the estimated values of the weighted averages of the random errors of the previous five months.

6- Diagnosis of the Estimated ARIMA(6,1,5) Model:

Through the results of the previous table, the proposed model for the time series of monthly inflation rates in Algeria can be diagnosed as follows:

- **Statistical significance of the estimated parameters:** All the model parameters are statistically significant at the 5% level, which means that the parameters of the autoregressive and moving average equation ($\phi_1, \phi_2, \phi_3, \phi_4, \phi_5, \phi_6, \theta_1, \theta_5$) are significantly different from zero.

- **Overall significance of the model:** We observe that $\text{Prob}(F\text{-statistic}) = 0.000000$, which means that at least one parameter of the proposed model is significantly different from zero, and that the value of the coefficient of determination is statistically significant.

- **Absence of autocorrelation between the errors, as the statistic is:** ($DW=2.105796 \cong 2$).

In order to verify the adequacy of the model, we proceed with:

- Analyzing the residual series through the graphical representation of the autocorrelation of the squared residuals and their normal distribution.

Figure (03): Normal Distribution of the Residuals

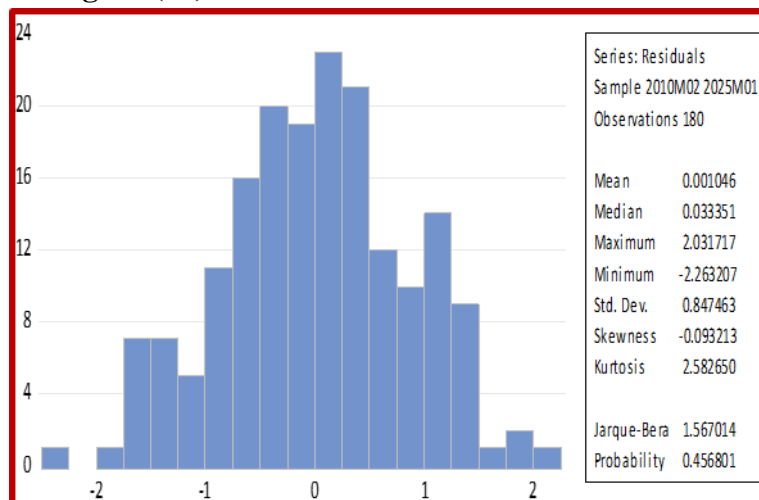
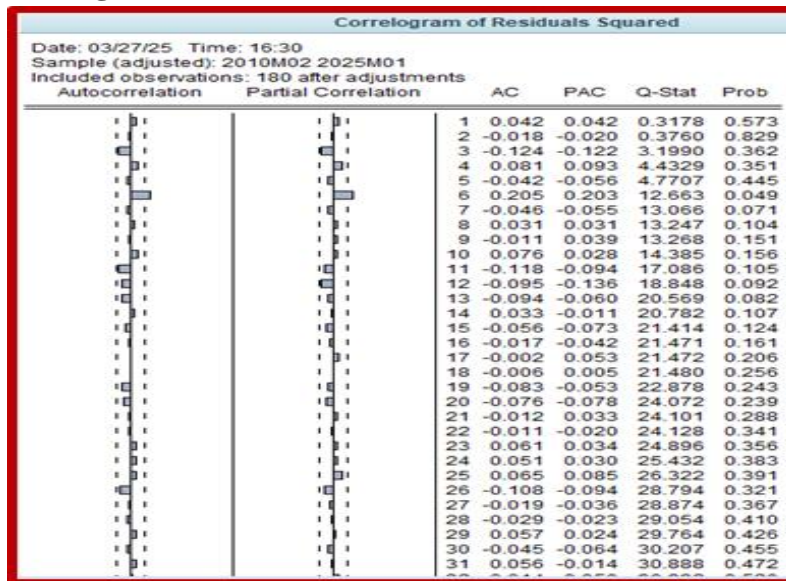


Figure (03): Normal Distribution of the Residuals



Through Figure (04) of the autocorrelation function of the squared residuals, we observe that all the values of the correlation coefficients fall within the confidence interval, which indicates the absence of autocorrelation of the residuals. Also, all the probabilities of the Ljung-Box statistic for lags from 1 to 36 are greater than 5%.

Through Figure (03) of the normality test of the residuals, we observe that the Jarque-Bera statistic ($S=1.567014 < \chi_{(0.05, (2))}^2=5.991$), which corresponds to the probability value (Prob = 0.456801), is greater than the critical probability value of 5%.

Therefore, we accept the null hypothesis H_0 , which states that the residual series follows a normal distribution. Accordingly, the residuals are white noise.

- Testing the hypothesis of homogeneity of residual variance using the ARCH test to verify the suitability of the proposed equation for inflation in Algeria for forecasting the future values of the phenomenon in the short term.

Table (04): ARCH Effect Test

Heteroskedasticity Test: ARCH				
F-statistic	0.309161	Prob. F(1,177)	0.5789	
Obs*R-squared	0.312109	Prob. Chi-Square(1)	0.5764	
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 03/27/25 Time: 17:52				
Sample (adjusted): 2010M03 2025M01				
Included observations: 179 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.687412	0.086433	7.953111	0.0000
RESID^2(-1)	0.041760	0.075105	0.556022	0.5789
R-squared	0.001744	Mean dependent var		0.717374
Adjusted R-squared	-0.003896	S.D. dependent var		0.902388
S.E. of regression	0.904144	Akaike info criterion		2.647455
Sum squared resid	144.6934	Schwarz criterion		2.683068
Log likelihood	-234.9472	Hannan-Quinn criter.		2.661896
F-statistic	0.309161	Durbin-Watson stat		1.997564
Prob(F-statistic)	0.578898			

We observe from the figure that the calculated statistic of the test (LM=0.312109) is smaller than the tabulated statistic of the chi-square distribution with degrees of freedom (1)

$(\chi_{(0.05,(1))^2}=3.84)$, where the probability (Prob = 0.5764) appears greater than the 5% significance level. Therefore, we accept the null hypothesis H_0 , which states the homogeneity of the variance of the estimated errors, which means that there is no ARCH effect.

Accordingly, the proposed model $[[DINF]]_t \sim ARIMA(6,1,5)$ can be considered suitable for representing the monthly series of inflation rates in Algeria and forecasting its values in the short term.

7- Forecasting Monthly Inflation Rates in Algeria for the Period (February 2025 - January 2027)

Using the proposed model and with the help of the EViews13 program, we carried out the forecasting process for monthly inflation rates in Algeria for the next 24 months, and obtained the following results:

Table (05): Forecast Values of Monthly Inflation Rates in Algeria for the Period (February 2025 – January 2027)

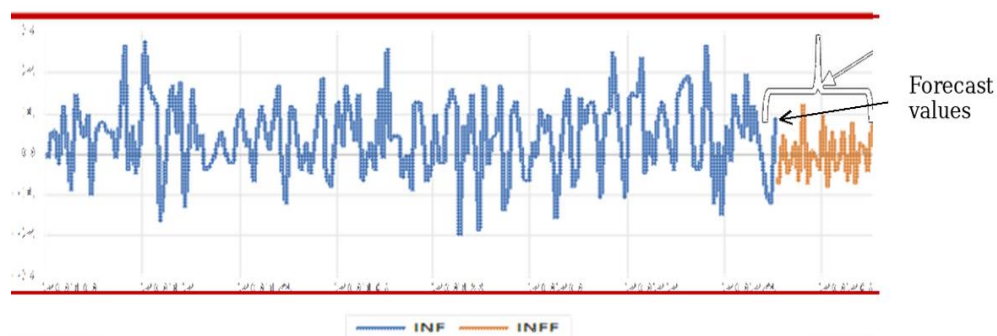
Month	INF	Month	INF
Feb-2025	0.20364	Feb-2026	-0.048669
Mar-2025	0.688123	Mar-2026	0.545629
Apr-2025	0.213849	Apr-2026	0.102171
May-2025	0.015107	May-2026	0.010804
Jun-2025	0.353557	Jun-2026	0.596685
Jul-2025	-0.313635	Jul-2026	-0.102465
Aug-2025	0.91492	Aug-2026	0.689728
Sept-2025	0.161315	Sept-2026	-0.036175
Oct-2025	0.258695	Oct-2026	0.24851
Nov-2025	0.211818	Nov-2026	0.389591
Dec-2025	-0.173251	Dec-2026	-0.045219
Jan-2026	0.789665	Jan-2027	0.692151

The is the

following graphical

representation of the values of the original monthly inflation rates series in Algeria and the forecast values for the period (February 2025 – January 2027).

Figure (08): Forecast Values of Monthly Inflation Rates in Algeria



Source: Prepared by the researcher based on EViews13 outputs

These estimates regarding the inflation rate in Algeria for the next two years indicate the continued rise in consumer prices in general.

References:

- Bourbonnais, R. (2009). *Econometrics* (7th ed.). Paris: DUNOD.
- ONS, O. N. (2025, January). *Consumer Price Index*. (No. 350).
- Abu al-Qasim Omar Al-Tabouli. (1997). *Principles of Analytical Macroeconomics* (2nd ed.). Tripoli: National Book House - Benghazi.
- Ahmed, B., Ben Kaddour, A., & Zitouni, A. (2022). The Development of the General Price Level in Algeria - An Econometric Study Using ARMA Models - *Dafater Boudax Journal* (Vol. 11). (No. 01).
- Adboub, S., & Lesbaa, M. (2021). Diagnosing the Reality of Inflation in Algeria during the Period (2000 - 2019). *Irtiqa Journal for Economic Research and Studies*. (Vol. 02). No. (02).
- Al-Hajjar, B. (2006). *Monetary and Banking Economics*. (1st ed.). Beirut: Dar Manhal Al-Lubnani.
- Al-Saeed, H. (2021). *Econometric Modeling of the Phenomenon of Inflation in Algeria Using ARCH Models during the Period (1990 - 2020)* (Doctoral Dissertation). Ouargla, Algeria.
- Al-Issawi, K. J., & Mahmoud Hassan, I. (2007). *Macroeconomics - Theoretical and Applied Analysis* - (1st ed.). Amman: Dar Al-Masirah for Publishing, Distribution and Printing.
- Al-Issa, N. S., & Ibrahim Suleiman, Q. (2006). *Macroeconomics - Principles and Applications* - (1st ed.). Amman: Dar Hamed for Publishing.
- Rania Al-Sheikh Taha. (2021). *Inflation: Its Causes, Effects, and Ways to Address It*. (Arab Monetary Fund) Introductory Booklet Series. (No. 18).
- Souhila, T. (2024). *The Use of Monetary Policy to Target Inflation in Algeria* (Doctoral Dissertation). Algeria, Faculty of Economic, Commercial and Management Sciences, Boumerdes: University of Ahmed Bougara.
- Saliha, J., & Shashoui, H. (2021). Determinants of Inflation in Algeria during the Period (1980 - 2018) - An Econometric Study Using ARDL Models - *Economic Additions Journal*. (Vol. 05). (No. 01).

- Keddi, A. M. (2006). Introduction to Macroeconomic Policies - An Analytical and Evaluative Study -. Algeria: University Publications Office.
- Majlakh, S., & Walid, B. (2021). An Analytical Econometric Study of the Determinants of Inflation in Algeria for the Period (1970 - 2018). *Strategy and Development Journal*. (Vol. 11). (No. 03).
- Mohammed, H., & Moussa, A. (2006). Principles of Analytical Macroeconomics. (1st ed.). Amman: Dar Wael for Publishing.
- Mouloud, K. (2024). Measuring the Impact of Cash Circulation on the Consumer Price Index in Algeria during the Period (1990 - 2021) (Doctoral Dissertation). Mila, Algeria.
- Noua Ben Youssef. (2023). An Econometric Study of the Impact of Money Supply on the Consumer Price Index in Algeria during the Period (1990 - 2021). *Journal of Banking Financial Economics and Business Administration*. (Vol. 12). (No. 01).
- Hadia, B. Q., & Hamida, M. (2020). Forecasting Inflation Rates in Algeria Using the Box-Jenkins Methodology. *Strategy and Development Journal*. (Vol. 10). (No. 06).

List of Sources:

1. Source: Prepared by the researcher based on EViews13 outputs
2. Source: Prepared by the researcher based on EViews13 outputs
3. Source: Prepared by the researcher based on EViews13 outputs
4. Source: Prepared by the researcher based on EViews13 outputs
5. Source: Prepared by the researcher based on EViews13 outputs
6. Source: Prepared by the researcher based on EViews13 outputs
7. Source: Prepared by the researcher based on EViews13 outputs
8. Source: Prepared by the researcher based on EViews13 outputs
9. Source: Prepared by the researcher based on EViews13 outputs