Monetary policy and its impact on controlling inflation rates

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Abstract:

Monetary policy is one of the main tools used by countries to achieve economic stability and promote growth. With the rapid changes witnessed by the global economy, monetary policy has emerged as an effective mechanism for controlling inflation rates and maintaining the purchasing power of the currency. Inflation, as an economic phenomenon that directly affects individuals' living conditions and production costs, is one of the most important challenges facing economic policymakers. Hence, the importance of understanding the close relationship between monetary policy tools and inflation becomes evident, as decisions related to interest rates, money supply, and intervention in financial markets play a decisive role in directing price levels and achieving economic balance. This study aims to shed light on the concept of monetary policy, its various mechanisms, and to analyze its direct and indirect impact on inflation rates.

Key words: Monetary policy; inflation; purchasing power; economic growth; money supply.

Introduction:

Monetary policy is one of the fundamental policies for achieving stability and growth in any country in the world. It occupies a leading position in the structure of macroeconomic policies, because it is capable of playing an important role in achieving the multiple objectives sought by the economy. Its concept has witnessed many developments due to changes in functions, objectives, and tools, as its application differs from one country to another according to the variables of each country. The view of developing countries toward monetary policy differs from that of developed countries. Some countries direct their monetary policy toward addressing inflation and thus stabilizing prices, while others direct their policy toward stabilizing financial markets and foreign exchange markets, etc. Accordingly, central banks are keen to implement it optimally. It should be noted that its application requires tools that must be understood, along with the way they operate, and that they must be effective, such as quantitative tools, for monetary policy to succeed in achieving its objectives. Through these tools, the quantity of money in circulation is influenced and monetary stability is achieved, that is, combating inflation, which is a more common phenomenon in our contemporary world. It is not merely a product of the modern era; rather, it has accompanied all economic systems and has been known by both developing and developed countries alike. This phenomenon has

negative effects on decision-making. The more unstable prices are, the lower the confidence of economic agents in various economic policies becomes, and declining confidence affects their rationality and reasonableness in making decisions related to investment, saving, and others. Therefore, most reforms have focused on preparing a new design for managing monetary policy that operates efficiently in addressing the fundamental causes of inflation. In response to this objective, inflation targeting policy emerged as a framework for managing monetary policy, after other frameworks showed their ineffectiveness in achieving final objectives. This policy aspires to control inflation in a way that provides an economic environment characterized by non-inflationary growth while improving the standard of living.

Study Problem:

Despite the multiplicity of economic policies adopted to achieve economic stability, monetary policy remains one of the most widely used tools.

To what extent do monetary policy tools contribute to controlling inflation rates?

Study Hypotheses:

In order to attempt to answer the proposed problem, this study proceeds from the following hypotheses:

• There is a direct or inverse relationship between some monetary policy tools, such as the interest rate, and inflation rates;

• Monetary policy tools affect inflation indirectly by stimulating or restraining economic activity;

• The effectiveness of monetary policy tools in influencing inflation differs according to the nature of the economic system and its level of development.

Study Objectives:

This study aims to:

• Clarify the theoretical concepts related to monetary policy and inflation.

• Analyze the relationship between monetary policy tools and inflation rates.

• Evaluate the effectiveness of monetary policy tools in controlling inflation.

• Provide recommendations that may contribute to improving the performance of monetary policy in order to achieve price stability.

Importance of the Study:

The importance of this study stems from the direct impact of inflation on individuals' living conditions and general economic stability, and from the fact that monetary policy is a central tool in the hands of decision-makers. The study also gains particular importance in light of the current global economic challenges, as countries seek to contain inflationary pressures without hindering economic growth. Therefore, deepening the understanding of the relationship between monetary policy and inflation can contribute to supporting the formulation of more effective and sustainable policies.

Methodology Adopted:

The descriptive method was adopted for the theoretical framework of monetary policy and its quantitative tools, by presenting some of its definitions and quantitative tools. Inflation, its negative effects, and the policy used to address it were also discussed. Appropriate econometric methods were also used, relying on the ARDL model in order to compare and interpret the relationship between quantitative tools and inflation.

Study Divisions:

The first axis: The theoretical framework of monetary policy;

The second axis: The theoretical aspect of inflation;
The third axis: An econometric study of the impact of monetary policy tools on inflation.

The First Axis: The Theoretical Framework of Monetary Policy

First: Definition of Monetary Policy.

The term monetary policy is a relatively modern term, appearing in economic literature only in the nineteenth century. However, many writers dealt with monetary policy, and their writings appeared from time to time during crises and periods of economic instability.

Monetary policy began to be used by the state alongside other policies, such as fiscal policy, price policy, trade policy, or wage policy, to influence the level of economic activity through its effect on the basic variables of this activity, such as investment, prices, production, and income.[1]

Definitions related to monetary policy have varied, each according to the angle from which it is viewed:

- The economist Einzig defined it as including all monetary decisions and measures, regardless of whether their objectives are monetary or non-monetary, as well as all non-monetary measures aimed at influencing the monetary system.[2]
- The economist G. L. Bsh also defined it as the action taken by the government that effectively affects the volume and composition of liquid assets held by the non-banking sector, whether currency, deposits, or government bonds.[3]
- The economist Kent defines it as the set of means followed by the monetary authority to control the money supply with the aim of achieving an economic objective, such as full employment.[4]
- Monetary policy is also defined as that policy which has the ability to influence the economy through money and which uses the money-income relationship.[5]

Through the previous definitions, a comprehensive definition of monetary policy can be given as a set of measures taken by the central bank to control the money supply, interest rates, and the volume of bank credit, in order to achieve some macroeconomic objectives, such as promoting economic growth or reducing inflation. This is done through tools used by the central bank for this purpose. Economists began to pay attention to this policy, especially at the beginning of the 1970s, with the emergence of the monetarist school led by Milton Friedman, who emphasized in his writings the importance of monetary variables and the extent of their impact on the real sector in the macroeconomy.

Second: Objectives of Monetary Policy.

There are a number of objectives that monetary policy seeks to achieve. These objectives include the following:

I- The Final Objectives of Monetary Policy.

Monetary policy aims to establish and maintain appropriate monetary and credit conditions within a sound economy. Monetary authorities believe that a sound economy is characterized by high employment and a good growth rate, and that it can be maintained through the stability of the exchange rates of the national currency against different foreign currencies.[6] The final objectives of monetary policy can be summarized as follows:

- Price stability;
- External balance;
- Economic growth;
- A high level of employment.

These objectives coincide with the objectives of economic policy, which seek what economists call the "magic square."

Intermediate Objectives of Monetary Policy.

Monetary policy cannot directly influence its final objectives; therefore, resort is made to other objectives that can influence these final objectives through intermediate targets. The choice of one of these targets is important in dealing with a world characterized by uncertainty. In addition, these intermediate targets have another benefit, as they constitute an announcement of the monetary policy strategy. Through announcing these intermediate targets, the central bank seeks to provide economic agents with a framework for guiding their expectations, especially those who wish to intervene in the capital market and the foreign exchange market. However, these intermediate targets must possess a set of characteristics in order to transmit the effect of monetary policy tools to the final objective, particularly price stability. These conditions are:[7]

- They must be easy to evaluate and measure;
- They must have a clear, strong, and stable relationship with the objective of monetary policy;
- Their changes must reflect the movement of the objective in the future;
- Their relationship with the operational target or monetary tools must be close and clear.

Primary Objectives of Monetary Policy.

Primary objectives are considered the starting point of the monetary policy strategy, through which the central bank influences the final objectives. They represent a link between monetary policy tools and intermediate objectives. The primary objectives include two groups of variables: the first group consists of monetary reserve aggregates, while the second group relates to money market conditions.[8]

Third: Quantitative (Indirect) Tools of Monetary Policy:

Legal Reserve Ratio:

The ability of the commercial bank to create credit and grant loans depends on the volume of monetary deposits it receives from its clients, which provide it with a kind of liquidity to meet its obligations. These deposits are not frozen in its vaults, but are used in various forms, such as lending them or purchasing financial and commercial papers. In order for banks not to fall into a liquidity crisis, they must keep a certain ratio with the central bank to meet expected withdrawal requests from depositors. This ratio is determined by the central bank.[9]

Rediscount Rate:

The rediscount rate can be defined as that portion of interest received by the central bank as a result of commercial banks discounting the commercial papers they possess, which had previously been discounted for clients.[10] In other words, the rediscount rate is considered the interest rate charged by the central bank to commercial banks when they resort to it to rediscount the short-, medium-, and long-term commercial papers in their possession, such as bonds and treasury bills, which aim at borrowing against financial papers in order to obtain new or additional cash resources to strengthen their monetary reserves and thus increase their ability to grant credit and create new current deposits.[11]

Open Market Policy:

Open market policy is considered one of the traditional functions used by central banks to influence the volume of credit. It differs from the rediscount policy in terms of the scope of application and the nature of the relationship between commercial banks and the central bank. While in the second policy, namely the rediscount policy, the central bank attempts to influence the liquidity of commercial banks and, consequently, the liquidity of the money market, in an attempt to restrict or expand credit

according to the desired economic objectives, we find, on the contrary, that in market policy it attempts to influence the liquidity and ability of commercial banks to create credit.[12]

Open market operations refer to the central bank's sale of shares and securities invested in the financial market, as well as treasury bills, bonds, and commercial papers in the money market for its own account,[13] with the aim of controlling the size of the money supply and the available bank financing. This is done through their effect on the volume of cash balances held by the banking sector or those outside the banking system, held by individuals, and consequently changing the amount of money in circulation in a way that is consistent with the level of economic activity.[14] This tool operates according to the prevailing conditions in the economy, either a state of recession or a state of inflation, through which the appropriate monetary policy is determined.

- In the case of inflation: the central bank resorts to adopting a contractionary monetary policy to reduce the money supply circulating in the existing economy that has no productive counterpart. By relying on the open market tool in this case, the central bank proceeds to sell government securities, such as government bonds, or even commercial papers, in order to withdraw money from the economy through a decrease in bank reserves, which leads to a decrease in bank liquidity and, consequently, a reduction in the granting of loans and a decrease in money supply, so prices decline.

- In the case of recession: the central bank resorts to adopting an expansionary monetary policy to increase the money supply circulating in the economy in order to stimulate it through increased liquidity. In this case, the central bank uses the open market tool by purchasing securities, thereby increasing bank reserves,[15] and consequently increasing the granting of loans, which results in an increase in money supply and thus an increase in effective demand.[16]

The Second Axis: The Theoretical Aspect of Inflation

Inflation is an economic problem suffered by countries of the world without exception, whether these countries are developing or developed. This phenomenon is almost characterized by regularity and recurrence. High inflation rates constitute a concern that frightens world economies, because inflation has significant and varying effects from one country to another. A rise in the level of inflation leads to a decline in the value of the currency, limits economic growth, and burdens citizens.

First: Definition of Inflation

Despite the multiplicity of definitions and writings that have dealt with the concept and meaning of inflation, they all refer to the successive and continuous rise in the general level of prices, accompanied by a decline in the purchasing power of the monetary unit.

A number of market participants often find difficulty when attempting to express verbally the definition of inflation, as it represents rising prices and their decline, which means a slowdown in the increase in prices. However, in the world of inflation, investments are viewed in terms of the cash paid, without taking into account the loss of purchasing power.[17]

1. Inflation can be defined as a continuous upward movement in prices resulting from excess demand exceeding supply capacity.[18]

2. Inflation is a continuous rise in the general level of prices. It results from a set of internal and external factors, and it is important to record a number of observations, namely:[19]

First: inflation is the phenomenon of price increases, not high prices themselves;

Second: the continuity of these increases;

Third: the object of the increase is neither absolute prices nor relative prices, but rather the general level of prices.

Inflation is a continuous decline in the price of money, or in the value of money, or in the purchasing power of money.

3. Inflation can be defined as "the steady or continuous rise in the general level of prices, or the continuous decline in the value of money." This definition includes several points, the most important of which are:[20]

▪ Inflation refers to a movement in the general level of prices and does not refer to changes in one price relative to other prices. Such changes are common when the general level of prices is stable;

▪ The prices meant here are the prices of goods and services, not the prices of assets;

▪ The rise in the price level must be relatively significant and must continue for a longer period.

4. Economic inflation is one of the most common economic terms. However, despite the widespread use of this term, there is no agreement among economists regarding its definition. This is due to the division of opinion concerning the determination of the concept of inflation, as this term is used to describe a number of different cases, such as:[21]

➢ The excessive rise in the general level of prices, called price inflation.

➢ The inflation of monetary income, or one of the components of income such as wages or profits, called income inflation.

➢ The rise in costs, called cost inflation.

➢ The excessive creation of cash balances, called monetary inflation.

It is not necessary for these different phenomena to move in one direction and at one time. This means that prices may rise without being accompanied by an increase in monetary income. It is also possible for costs to rise without being accompanied by an increase in profits. It is likely that excessive money creation may occur without being accompanied by an increase in prices or monetary incomes. The term inflation is distinguished by the phenomenon to which it is applied, and thus a set of inflationary terms is formed, as mentioned in the four previous cases.

5. On the other hand, inflation is defined as the percentage change in price indices. There are two important indicators that are frequently used and allow us to measure inflation: the GDP deflator and the Consumer Price Index.[22]

6. Inflation is an economic condition in which the purchasing power of the monetary unit weakens because prices rise to high levels. Accordingly, the velocity of money increases, its function as a store of value is disrupted, and its role is limited to serving only as a medium of exchange due to the relative scarcity of money.[23]

7. Inflation is a tangible and continuous rise in the general level of prices. What is meant here includes two matters:

First: the rise in prices must be clear and perceptible in society.

Second: this tangible rise must extend over a period of time.[24]

8. Inflation is viewed as a harmful economic phenomenon that erodes the purchasing power of disposable income and leads to numerous economic and social problems.[25]

9. It is also defined as "an upward movement in prices characterized by self-continuity and resulting from excess demand exceeding supply capacity."[26]

10. Inflation is a sustained rise in the average price, measured as the annual rate of change in the price level, while deflation is negative inflation.[27]

11. Economists have not yet agreed on a comprehensive and exclusive definition of inflation. Some have described it as an abundance of money, which is a primitive definition. Others have advanced

slightly by saying that it is an abundance of money and credit, while some contemporary writers see it as an increase in the purchasing power of the group. This is very close to the truth, because the mere abundance of money, or the abundance of both money and credit, although in most cases among the causes of inflation, may not necessarily lead to it.[28]

Based on the above, the following definition can be given: "Inflation is the continuous increase in the prices of goods and services in a given country, accompanied by a continuous decline in the purchasing power of its national currency, which is contrary to price stability, and may, over time, lead to a reduction in the purchasing power of individuals' money."

Second: Types of Inflation

There are several types of inflation, which can be classified as follows:

1. State Control over the Productive Apparatus

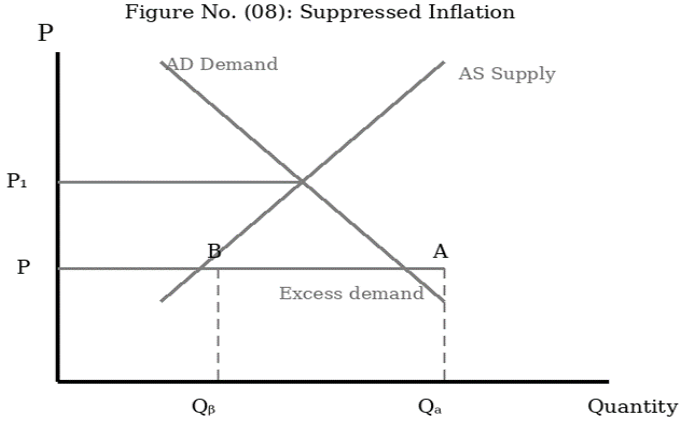
According to this criterion, we distinguish between several types, including:

Open Inflation (Apparent or Explicit): It is a continuous rise in prices, wages, and expenditures that enjoy a degree of flexibility as a result of the rise in aggregate demand compared with the aggregate supply of goods and services. This type of inflation is characterized by a clear rise in prices without intervention by government authorities to limit these increases.[29]

Repressed Inflation (Restricted Inflation): It is inflation that represents the situation in which prices are prevented from rising through the adoption of certain policies represented by imposing controls and restrictions that limit aggregate spending and prevent prices from rising. However, this does not prevent individuals from accumulating monetary assets and converting them into significant purchasing power at a later time.[30]

In some cases, the government intervenes and fixes the prices of basic goods and services by force of law at a level lower than their level in the free market, which results in the creation of excess demand, as shown in the following figure:[31]

Figure No. (08): Suppressed Inflation



Thus, government intervention by imposing a price P lower than the free market price P_1 creates excess demand by the amount AB. Although excess demand is considered one of the most important factors leading to price increases, in the case of government intervention it does not manifest itself in the form of rising prices, but rather is reflected in other manifestations, such as waiting lines in front of distribution outlets, the emergence of the black market for selling these goods at prices higher than those set by the government, the deterioration of the quality of goods, and others.

Latent Inflation (Hidden Inflation): It consists of a noticeable increase in monetary incomes without finding an outlet for spending, due to state intervention, as the state, through its various measures, prevents these increasing incomes from being spent. Thus, inflation remains latent and hidden, and is not allowed to appear. It takes the form of a contraction in spending on consumer, food, and investment goods. Economic factors and conditions often intervene to force the state to limit the emergence of inflationary phenomena by reducing spending.

2. Multiplicity of Economic Sectors:

Here, we distinguish several types of inflation, including:

Commodity Inflation: It is inflation that occurs in the consumer industries sector, where it expresses an increase in the cost of producing investment goods over savings.[32]

Capital Inflation: This inflation occurs in the investment industries sector, and it results from an increase in the value of the investment commodity over its production cost; consequently, large profits are achieved by producers of investment industries.[33]

Profit Inflation: It is inflation that appears as a result of the increase in investment over savings, whereby profits are achieved in the consumer goods industries sector and the investment goods industries sector.[34]

Internal Inflation: It is a situation that occurs as a result of internal factors within a particular national economy and at a particular time, represented by a set of structural and functional imbalances in its local economic activity.[35]

3. Intensity of Inflationary Pressure:

Through this criterion, we distinguish many types of inflation, including:[36]

Galloping Inflation: It is the most dangerous type for the national economy, as prices rise astonishingly, confidence in money disappears, and this leads to higher wages, increased production costs, and lower profits. This rise continues day after day and rapidly until the price level reaches record figures.[37]

This type is characterized by the following:

- ✓ Price increases become widespread and uncontrollable;
- ✓ Related prices lose their linkage and encourage the rapid rise of prices;
- ✓ The national currency loses its functions, first its function as a store of value, and then its function as a medium of exchange, and foreign currencies, often the dollar, replace it.

To stop galloping inflation, governments need to:[38]

- ✓ Reaffirm public confidence in the value of money and reduce the growth of money supply.
- ✓ Stabilize the government budget deficit; if this does not happen, the commitment to reducing inflation will lack credibility.
- ✓ All successful attempts to stop hyperinflation are fiscal reforms.

Creeping Inflation: It refers to a moderate rise in the general level of prices. This type of inflation is a matter of disagreement among economists. Some view the slight increase in prices as economic growth. During periods of creeping inflation, the prices of goods rise before the prices of resources, which leads to increased profits and encourages businessmen to increase investments. Others, however, believe that the cumulative effects of such inflation are severe.[39]

Non-Galloping Inflation (Moderate Inflation): This is inflation in which price rates rise, but at a lower level than in galloping inflation. Its effects are therefore less dangerous to the national economy, making it easier for government authorities to treat, combat, and limit its effects, so that the situation does not lead to a complete loss of confidence in the currency in circulation.[40]

4. Geographical and Natural Phenomena:

Through natural geographical phenomena, we distinguish between natural inflation and dynamic inflation:

Natural Inflation (Exceptional Inflation): It is unusual inflation that arises as a result of existing natural conditions, such as inflation resulting from earthquakes or volcanoes, the spread of epidemics and diseases, the outbreak of revolutions as a political incentive to create inflationary signs, or wars. These natural conditions and others may be an incentive for the emergence of inflationary trends and their aggravation due to other factors. During wars, the economy passes through three stages: the period of war preparation, the period of the war itself, and the post-war period.

First: The War Period: This period is characterized by increased public expenditure to prepare the country for war and to undertake war projects at the expense of civilian projects. This leads to a decline in the output of civilian goods, such as consumer and food goods, resulting in a rise in prices. This period is also characterized by a decline in imports due to the lack of foreign currency, weak savings, the imposition of customs protection, etc., as happened in "Germany" at the beginning of the Second World War.

Second: The Period of the War Itself: This period is characterized by a shortage of labor, weak production, and the emergence of signs of solidarity among members of society, as national social solidarity ideas spread, along with other social and economic effects caused by the war. It is said that the lack of a sharp rise in prices in Britain during the Second World War was due to discipline and the solidarity of the working class with the government measures taken, including wage freezes.

Third: The Post-War Period: This is considered an extension of the period of the war itself, as it is difficult to combat inflation and price increases at the beginning of this period.

Dynamic (Cyclical) Inflation: This inflation is considered a characteristic of the capitalist system, as it expresses the movements of recurring capitalist phenomena, such as recurring economic crises, including cyclical inflationary phenomena characterized by periodic movement.[41]

5. Variation of Inflation:

There are several types of inflation, including:

Demand-Pull Inflation: This occurs when prices rise as a result of a large excess in aggregate demand compared to aggregate supply. It may be temporary or may continue.[42]

Cost-Push Inflation: Cost-push inflation occurs when any factor leads to an increase in costs, resulting in an increase in aggregate supply. This is due to many reasons, such as trade unions bargaining for higher wages, or when the cost of production for a company increases, leading to higher prices, which results in cost-push inflation.[43]

Combined Inflation: This type of inflation results from an increase in the volume of money in circulation (increased liquidity) among individuals, while the volume of goods and services produced remains constant, leading to an increase in aggregate demand while aggregate supply remains constant.[44]

The Third Axis: An Econometric Study of the Impact of Monetary Policy Tools on Inflation

1- Study Variables:

Based on what was presented in the two axes that addressed the subject of the study in its theoretical form, and in order to answer the research problem, the study variables were selected as follows:

A- Explanatory Variables:

TR: Required reserve ratio;

M_2 **:** Money supply.

B- Dependent Variables:

INF: Inflation, which is considered the final objective of using the quantitative tools of monetary policy;

ε_t : Random error.

These data were obtained from the International Monetary Fund, and the statistical bulletins of the Bank of Algeria were also consulted.

2- Study of the Stationarity of Time Series:

Table (1): ADF Test Results.

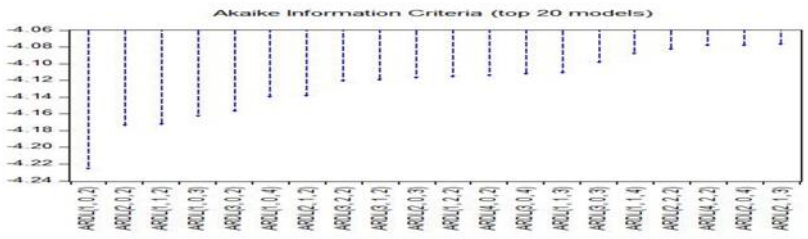
Variable	Level		First deference	
	ADF Statistics	Result	ADF Statistics	Result
Algeria				
TR	-4.273277	Non	-2.639210	Stationary(1%)
M_2	-4.243644	Stationary(1%)	-------	-------
INF	-2.632688	Stationary(1%)	-------	-------

Through the table above, all the results of the tests applied to the time series showed that they are stationary. Accordingly, from the stationarity tests applied previously, we note that some of the study variables are non-stationary at their original level, but they became stationary after taking first-order differences. This means that they may converge in the future. To confirm this, we conduct cointegration tests among them. We selected a modern methodology, namely the Autoregressive Distributed Lag Model (ARDL), as it is considered one of the most widely applied and most recent approaches in estimating regression models. In addition, the basic condition for applying this methodology was fulfilled, namely that the time series of the variables under study should not be integrated of the second order.

3- Selection of the Optimal Lag Periods for the Variables Included in the Estimation of the ARDL Model:

The optimal lag periods are determined according to several criteria (AIC, SC, HQ, BIC), by selecting the lowest value of one of these criteria. The figure below shows the optimal lag periods according to the AIC criterion:

Figure (01): Optimal Lag Periods According to the AIC Criterion.



Through the figure above, we note that the best model according to the AIC criterion is ARDL(1,0,2), which corresponds to the lowest value of the optimal lag periods.

4- Model Estimation According to the Optimal Lag Periods:

The table below shows the estimation of the ARDL model according to the optimal lag periods:

Table (02): Estimation of the ARDL Model According to the Optimal Lag Periods.

Dependent Variable: INF
Method: ARDL
Date: 08/30/25 Time: 19:10
Sample (adjusted): 1992 2025
Included observations: 34 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): M2 TR
Fixed regressors: C
Number of models evalulated: 100
Selected Model: ARDL(1, 0, 2)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INF(-1)	0.274779	0.145335	1.890654	0.0691
M2	0.134956	0.055906	2.413988	0.0226
TR	3.997890	0.778645	5.134418	0.0000
TR(-1)	-0.478934	1.232008	-0.388742	0.7004
TR(-2)	-2.667844	0.850627	-3.136326	0.0040
C	-0.002889	0.010511	-0.274836	0.7855

R-squared	0.903099	Mean dependent var	0.076279
Adjusted R-squared	0.885795	S.D. dependent var	0.082570
S.E. of regression	0.027904	Akaike info criterion	-4.161328
Sum squared resid	0.021801	Schwarz criterion	-3.891970
Log likelihood	76.74257	Hannan-Quinn criter.	-4.069469
F-statistic	52.19095	Durbin-Watson stat	1.762046
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

We note from the table of the ARDL(1,0,2) model estimation results that the coefficient of determination equals 0.90, meaning that the independent variables explain 90% of the changes occurring in the required reserve, while the remaining 10% falls within the margin of error. In general, this is a small margin, indicating the explanatory power of the model. In addition, we note that the calculated Fisher test value (F-stat = 5.219095) is greater than the tabulated value, meaning that the model as a whole is statistically significant. This means that the independent variables, taken together, have the ability to explain the changes occurring in the dependent variable.

5- Cointegration Test Using the Bounds Test Approach:

Table (03): Cointegration Using the Bounds Test Approach.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	10.72266	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

Through the results of the Bounds Test approach, we note that the calculated value of the Fisher statistic (F-stat = 5) is greater than the corresponding tabulated value calculated by Pesaran et al. (2001) at K = 2. Based on this comparison, we reject the null hypothesis: $H_0 : \beta_0 = \beta_1 = \ldots = \beta_n = 0$ which states that there is no long-term equilibrium relationship, and accept the alternative hypothesis: $H_1 : \beta_0 \neq \beta_1 \neq \ldots \neq \beta_n \neq 0$ which states that there is a long-term equilibrium relationship running from the explanatory variables to the dependent variable at the 10% significance level.

6- Estimation of the Long-Term Relationship:

Table (04): Estimation of the Long-Term Relationship.

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2	0.186090	0.092635	2.008842	0.0543
TR	1.173591	0.237950	4.932091	0.0000
C	-0.003983	0.014446	-0.275741	0.7848
EC = INF - (0.1861*M2 + 1.1736*TR -0.0040)				

Through the table, we note that the study variable TCF is significant at 1%, and the variable M2 is significant at 5%. The value of the constant C has no statistical significance, and its economic value is -0.003983, which represents the value of inflation in the absence of money supply and the required reserve. This is an exceptional case that is unlikely to occur in economic reality.

7- Estimation of the Short-Term Relationship:

At this stage, we estimate the short-term relationship, which consists of estimating the short-run equilibrium parameters of the Error Correction Model (ECM). The following table shows the estimation results:

Table (05): Results of the Estimation of the Error Correction Model (ECM).

ARDL Error Correction Regression
Dependent Variable: D(INF)
Selected Model: ARDL(1, 0, 2)
Case 2: Restricted Constant and No Trend
Date: 08/30/25 Time: 19:13
Sample: 1990 2025
Included observations: 34

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TR)	3.997890	0.648664	6.163269	0.0000
D(TR(-1))	2.667844	0.793353	3.362743	0.0022
CointEq(-1)*	-0.725221	0.105242	-6.891015	0.0000

Through the table, we note that the TR parameter was positive and statistically significant, meaning that there is a short-term relationship, that is, there is a relationship between the required reserve and INF (in the short term).

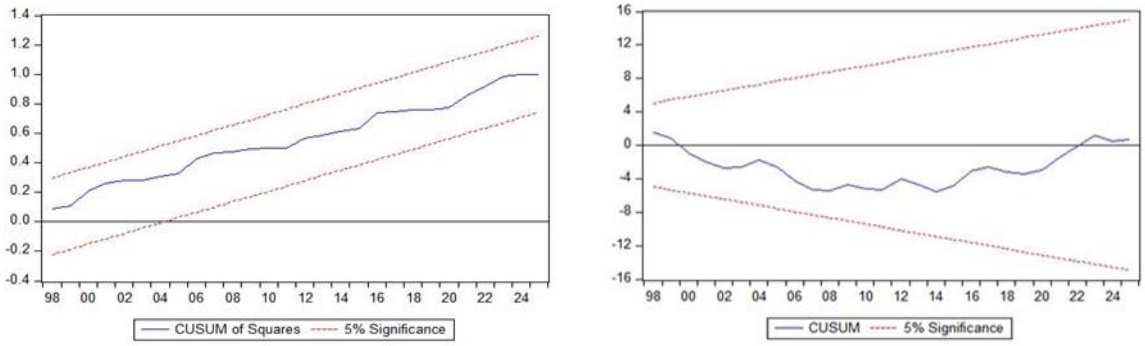
The results of the error correction model showed that the coefficient of the lagged error correction term reached the value -0.725221, which indicates the speed of error correction, and is statistically significant (prob=0.000<0.05). This means that 72.5221% of deviations and imbalances in the inflation rate during the study period are corrected after

$(\frac{1}{0.725221} = 1.378 \approx)$, one year. Thus, the first correction would be in 1991 and the second correction in 1992, which means that the behavior of the dependent variable, represented by the inflation rate, takes one period to reach the long-term equilibrium position.

8- Model stability test:

The structural stability of the estimated parameters of the error correction form of the autoregressive distributed lag model is achieved if the graphical form of the CUSUM and CUSUM of Squares tests falls within the critical bounds at the 5% significance level. This means that the error curve lies within the range of two standard deviations ±2S. Therefore, we reject the null hypothesis at the 5% level, which states that the parameters are stable throughout the study period. This is what was reached, and the following figure confirms this.

Figure (02): Model stability test



Study results:

As for the results reached by the study, they were as follows:

1. The effectiveness of quantitative monetary policy depends on the degree of independence of the monetary authority;
2. All the objectives of monetary policy cannot be achieved at once; rather, one or two objectives at most must be determined, because the objectives of monetary policy are often contradictory;
3. The multiplicity and diversity of the causes leading to inflation, and the severity of its effects, whether on the economic or social structure, have created an unstable environment for achieving economic growth;
4. Inflation negatively affects economic and social life and reduces macroeconomic indicators, which has led to a decline in the purchasing power of money, its slowdown, and rising unemployment levels;
5. There is an effect of the required reserve on the inflation rate, but its impact is not at the required level;
6. There is a weak effect of the rediscount rate on the inflation rate, and the effect depends on the degree of development of the banking sector;
7. Quantitative instruments have weak effectiveness in targeting inflation in Algeria, and this is due to the nature of its economy, as it lacks economic diversification and has weak infrastructure.

Sources:

- ✓ Source: Yassmina Zaoui, Inflation in Algeria between Theory and Reality and the Extent to Which the ARIMA Technique Is Suitable for Forecasting It in Relation to the Characteristics of the Phenomenon, a dissertation submitted as part of the requirements for obtaining a Master's degree in Quantitative Economics, Department of Economic Sciences, Branch of Quantitative Economics, Faculty of Economic, Commercial and Management Sciences, University of Algiers 03, Algeria, 2012–2013, p. 06.
- ✓ Source: Prepared by the researchers based on E-views10 outputs.
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Footnotes:

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