

Review Article

Analysis of the Impact of Monetary Policy Indicators and their Reflection on Inflation Rates in the Iraqi Economy for the Period (2004-2024)

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Abstract: The research aims to measure and analyze some monetary policy indicators and their impact on inflation rates in the Iraqi economy. The relationship between rising inflation rates, the movement of the currency exchange window, and the growth of the money supply (MS) in Iraq during the period (2004-2024) was analyzed. The data were analyzed using the Eviews12 program. The most important results of the study are that there is a statistically significant positive relationship between monetary policy and inflation rates in Iraq during the mentioned period.

Keywords: Monetary policy indicators, inflation rates.

INTRODUCTION

Inflation is a central challenge in the Iraqi economy, which suffers from structural fragility resulting from decades of war and conflict and almost total dependence on oil revenues, with no strategic vision to diversify the productive base. In this context, the dialectical relationship between the money supply in its broad sense (M2) and the parallel exchange rate emerges as two main drivers of inflationary fluctuations, especially in an economy that imports more than 80% of its needs, and whose monetary policies are managed by traditional mechanisms that reflect dependence on external factors more than internal ones. During the period (2004-2024), Iraq underwent radical transformations that affected its monetary and financial structure, starting with the restructuring phase after 2003, passing through severe economic crises such as the collapse of oil prices in 2014, and ending with the exchange rate crisis in 2021, which revealed structural bottlenecks in the currency management system. In this process, the money supply (M2) expanded from 12.2 trillion dinars in 2004 to 183 trillion dinars in 2024 (estimated), with a growth rate of 1,400%, driven by financing the government deficit through the direct money printing mechanism, while the parallel exchange rate witnessed violent fluctuations, rising from 1,454 dinars/dollar in 2004 to 1,420 dinars/dollar in 2024 (estimated), with a continuous gap between the official and parallel markets estimated at about 10%.

Research problem:

Despite previous studies that discussed the relationship between money supply and inflation, they omitted three crucial aspects of the Iraqi case:

1. The cumulative impact of deficit financing policies over decades and their association with weak institutions and lack of oversight.
2. The overlap of political and security factors with economic factors, such as wars and occupations and their impact on investor confidence.
3. The impact of unexpected external shocks (such as the coronavirus pandemic and the Ukraine crisis) on the exacerbation of internal imbalances.

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Therefore, the central problem of the research is presented as follows (how the interaction between the ill-considered expansion Iraq's persistently high rates of inflation from 2004 to 2024 were caused by changes in the money supply (M2) and the mill sales window, and how well the monetary policies implemented were able to mitigate these consequences.

The Importance of the Research:

The importance of this study is represented in several theoretical and applied aspects, making it an essential reference for understanding the dynamics of inflation in fragile rentier economies, with a special focus on the Iraqi case:

1. It provides a comprehensive analysis of the interaction of money supply (M2) and the parallel exchange rate in a unique economic environment dominated by political turmoil and dependence on oil, an area that has not been studied in depth in the economic literature of fragile states.
2. Support policymakers: Provides recommendations based on factual data to improve the management of monetary policy, such as controlling the printing of money or regulating the exchange market, with the aim of curbing inflation.
3. Understand the causes of inflation in designing social protection programs targeting the groups most affected by high prices, especially in light of the worsening poverty (reaching 31% in 2023)
4. The study reveals the reasons for the ineffectiveness of Iraqi monetary policies, such as the lack of the central bank's independence and the prevalence of corruption in foreign exchange allocation, as well as a warning of the dangers of continuing to finance cash as it shows how relying on money printing to finance the deficit exacerbates inflation in the medium term, even as oil revenues increase.

Research Hypothesis:

The primary hypothesis of the study is that the unchecked expansion of the money supply (M2) and the volatility of the currency selling window have been the primary causes. to the high inflation rates in Iraq during the period (2004-2024), with the weak impact of monetary policies in containing these effects due to structural imbalances (such as corruption and the economy's dependence on oil).

Research Objective:

The following goals are the focus of this study:

1. Analysis of the connection between high inflation rates, currency selling window movements, and money supply growth (M2) in Iraq during, the period (2004-2024).
2. Measure the extent to which both the money supply (M2) and the currency selling window affect inflation using time-series economic models.
3. Assess how well Iraq's monetary policies work against inflation and find any structural weaknesses (such as corruption and lack of diversification) that have hindered their success.
4. Provide practical recommendations to decision-makers to improve monetary policy management, promote price stability, and address exchange market bottlenecks.

RESEARCH METHODOLOGY

The research tried to mix between two methods, or two methodologies as follows:

1. Descriptive and analytical approach to study theoretical frameworks and ideas regarding money supply, exchange rate and inflation rates.
2. The second approach is the standard quantitative approach by applying the Eviews model for estimation and conducting the necessary tests for analysis.

Research Limitations: The Iraqi economy is a spatial boundary.

Time Restrictions: The study's time frame is from (2004-2024).

Research Structure:

Because of the importance of the relationship between monetary policy tools and inflation, the conceptual and theoretical frameworks of monetary policy tools and inflation—which included the concept of inflation and the most significant influencing factors—were examined in the first axis. The third axis measured and analysed the effect of monetary policy tools on inflation in the Iraqi economy over the period, while the second axis looked at the development of monetary policy instruments and inflation rates in the country. (2004-2024). A number of conclusions and suggestions were made at the end of the investigation.

Previous Studies:

1. **Title:** The Impact of Monetary Expansion on Inflation in Iraq: An Econometric Analysis for the Period (2003-2018), Ali Hassan *et al.*, (2019) The study's goal is to investigate the connection between Iraq's inflation rate after 2003 and

the expansion of the money supply (M2). The study found that inflation and M2 growth were strongly positively correlated, with 60% of the increase in inflation being attributed to high liquidity, particularly during times of political unrest.

2. **Title:** " The Effect of the Parallel Exchange Rate on Rentier Economies' Price Stability: The Case of Iraq (2010–2020) (Nada Abdullah (2021) The purpose of the study is to evaluate how parallel exchange rate swings affect inflation and the increase in the cost of imported goods. The findings demonstrated that a 10% increase in the parallel exchange rate causes a 4.5% rise in inflation, with food items being more affected than services.
3. **Title:** (Monetary Policy in Light of Oil Dependence: A Comparative Analysis between Iraq and Venezuela (Mohammed Al-Khalidi (2018) The study aims to compare monetary policy tools in easing inflation in rentier economies, as the study confirmed the failure of traditional policies (such as the interest rate) in Iraq and Venezuela because of the predominance of outside influences (oil) and weak institutions, with a recommendation to adopt flexible exchange policies.
4. **Title:** (The Role of Financial Corruption in Exacerbating Inflation: A Case Study of Iraq (2004-2022) Sarah Mahmoud (2023)

The study aims to explore how corruption in the leakage of foreign currency affects the exchange rate and inflation. The study concluded that 40% of the exchange rate gap between the official and parallel markets is due to corruption in the distribution of the dollar, which raises inflation by 3% annually.

Scientific Addition to the Research:

1. Previous studies have focused on analyzing individual factors (such as M2 or the exchange rate) but have not combined them into a single model to measure cumulative impact.
2. The absence of studies covering the period until 2024, especially with the repercussions of the Corona pandemic and the 2021 exchange rate crisis.
3. Lack of in-depth analysis of the role of political factors (such as protests and delayed government formation) in disrupting monetary policies.
4. This study contributes to bridging this gap through an integrated analysis of variables in an extended time context, with the introduction of qualitative factors such as corruption and political unrest.

The concept of economic inflation and monetary policy indicators are conceptually and theoretically supported by the first axi:

First: The conceptual and analytical foundation of the idea of monetary policy indicators:

1. Money supply in the broad sense (M2): The total amount of money in circulation within an economy, including cash outside the banking system (M1) and quasi-cash deposits like time and savings deposits, is referred to as the money supply (M2). (Mishkin, 2016). In Iraq,
2. M2 components: - M1 includes cash in circulation (notes and coins) and current deposits that can be easily withdrawn.

Quasi-cash deposits: such as time deposits (withdrawn only after a specified period) and savings deposits, which are less liquid than M1 but convertible into cash (IMF, 2020).

M2 measurement and its importance in monetary policy M2 is the most used indicator to measure liquidity in the economy, as it reflects the ability of the banking sector to finance economic activity. A rise in M2 may indicate credit expansion, which stimulates growth, or excessive money printing, which raises inflation (Bernanke *et al.*, 2018).

1. **Factors affecting M2** The most prominent factors affecting the money supply can be summarized through the following:
 - ✓ **Government fiscal policies (spending and deficit):** Government spending financed through the Central Bank is the most prominent factor in the expansion of the money supply (M2) in Iraq. With the budget dependent on oil at 90%, any drop in oil prices leads to a deficit covered by money printing, raising M2 by 20% annually in crisis years (IMF, 2022). For example, in 2020, the central bank financed 40% of the budget deficit of 28 trillion dinars by increasing liquidity. (Central Bank of Iraq, 2021)
 - ✓ **Oil prices and foreign currency inflows:** Oil revenues are organically linked to the money supply, as oil dollars are converted into dinars via the central bank, increasing M2. In 2013, the rise in the price of oil to \$100 per barrel increased M2 by 16%, while the collapse to \$30 in 2016 caused M2 to shrink by 9% (Ali, 2019).
 - ✓ **Central Bank Monetary Policies:** Monetary policy tools affect M2 management, such as:
 - Reserve requirement ratio: which has remained constant at 15% since 2004, limiting the central bank's ability to reduce liquidity (CBI, 2020).
 - ✓ **Open-market operations:** such as the issuance of treasury bills, but the weakness of the government debt market in Iraq has limited its impact. (IMF, 2023)

✓ **Political and security factors:** Wars and unrest have increased the demand for cash to cover military and emergency spending. During the occupation of ISIS terrorist gangs (2014–2017), M2 increased by 25% annually to finance military operations (Khalidi, 2018). Political instability (such as the 2019 protests) also increases the flight of dollar deposits, forcing the central bank to print more dinars (UNDP,) (2020).

2. **The relationship between M2 and inflation: Monetary theory:** According to the theory of quantity of money, inflation is fundamentally a monetary process. where an increase in the money supply without parallel growth in production leads to higher prices (Friedman, 1963) In Iraq, data show that M2 growth of 15% per year (2004–2024) was accompanied by average inflation of 7%, reflecting a strong link between the two variables (Ali, 2019)

3. **The Central Bank's function in overseeing: M2** The Iraqi Central Bank aims to maintain price stability by (International Monetary Fund, 2022)

- Control of cash printing: especially to finance the government deficit, which constitutes 70% of M2 growth
- Credit regulation: by setting credit ceilings for banks to reduce inflation.

1 **Definition of currency sales window:** It is a regulatory mechanism established by the monetary authorities in a country (such as the Central Bank or the Ministry of Finance) to sell foreign currencies (such as the dollar or the euro) under specific conditions, with the aim of achieving economic objectives such as stabilizing the exchange rate, managing cash liquidity, or limiting capital flight, especially in countries with restrictive economic systems or suffering from financial crises (International Monetary Fund, 2020). These windows are part of capital control policies, and are often used when there is a gap between the official currency rate and parallel market rates (CBE, 2016).

2 **Main functions:** Its most prominent functions can be summarized as follows:

3 **Regulating the demand for foreign currency:** by directing it to specific sectors (such as the import of basic commodities).

4 **Preventing speculation:** by limiting the circulation of currency outside the official channels.

5 **Supporting financial transparency:** by announcing uniform customer rates (World Bank, 2019).

1. Definition of economic inflation: The steady, widespread Inflation is the gradual rise in prices for goods and services that lowers the purchasing power of the currency. Inflation is commonly measured using the Consumer Price Index (CPI), which monitors changes in the costs of a basket of goods. (IMF, 2022). In Iraq, the index includes commodities such as food, fuel and housing, which account for 70% of household spending (Central Bank of Iraq, 2023).

Factors affecting economic inflation:

- 1 Expansion of the money supply (M2): Increased liquidity without parallel growth in production leads to higher prices (the theory of the quantity of money). For example, M2 in Iraq grew by 1,400% between 2004 and 2024, due to financing the government deficit via direct printing (Central Bank of Iraq, 2023).
- 2 Weakness of monetary policy tools: such as failure to raise interest rates (fixed at 4%) or the use of treasury bills to absorb liquidity (IMF, 2022)
- 3 Parallel exchange rate collapse: The rise in the dollar in the parallel market increases the cost of imports, which account for 80% of consumer goods. For example, every 10% rise in the parallel price raises inflation by 3% (Abdullah, 2022).
- 4 Official and Parallel Market Gap: The gap reached 15% in 2023, increasing inflationary pressures (World Bank, 2023)
- 5 Global oil price fluctuations: such as the 2014 price crash (\$100 to \$30 per barrel) leading to a sharp deficit and increased money printing (IMF, 2016).
- 6 Global pandemics: The Corona pandemic (2020) disrupted supply chains and raised transportation costs by 25%, increasing inflation to 1.009% (Central Bank of Iraq, 2021)

2. Security instability: The wars against Daesh terrorist gangs (2014–2017) led to the destruction of infrastructure and increased military spending, raising inflation to 2.2% in 2014 (Khalidi, 2018).

3. Increased consumer demand: As the population grows (2.5% annually) and spending is concentrated on imported goods, demand rises without increasing domestic supply

The second axis: An examination of, the evolution, of monetary policy instruments and inflation rates in the Iraqi economy from 2004 to 2024

Table 1: Evolution of the M2 money supply, inflation and the Central Bank sales window in a window in Iraq for the period (2004-2024)

Central Bank sales window in window	M2 Cash Supply	Inflation rate (%)	Sunnah
6108	12,254,000	31.6	2004
10462	14,684,000	37.088	2005
11175	21,080,000	53.106	2006
15980	26,956,076	30.89	2007
25869	34,919,675	12.7	2008
33992	45,437,918	8.34	2009
36171	60,386,086	2.457	2010
39798	72,177,951	5.596	2011
48649	75,466,360	6.056	2012
53231	87,679,504	1.856	2013
51728	90,727,801	2.242	2014
44304	82,595,493	1.439	2015
33524	88,081,993	0.068	2016
42201	89,441,338	0.203	2017
47133	92,105,401	0.404	2018
51127	103,104,122	0.201	2019
44080	119,906,163	1.009	2020
37094	136,000,000	6	2021
46805	152,000,000	5	2022
33490	168,000,000	4	2023
50402	183,000,000	3.5	2024

Source:

- Ministry of Finance, Economic Department, General Budget Tables.
- Ministry of Planning, Central Bureau of Statistics, Directorate of National Accounts.
- The annual rate of change is calculated according to the following formula: $R = \frac{Y_t - Y_{t-1}}{Y_{t-1}}$, where R: the annual rate of change Y_t : its value in the current year, Y_{t-1} : its value in the previous year. (Al-Fahdawi, 62: 2020)

Clear economic shifts were observed in the money supply (M2), inflation rate, and Central Bank sales window activity between 2004 and 2024.

Inflation started at 31.6 percent in 2004 and then rose sharply to reach a 2006 peak of 53.1 percent, which could reflect an economic crisis or external shocks. After that, inflation fell significantly to 12.7 percent in 2008 and continued to gradually decline until it reached a 2016 low of 0.068 percent, a decline that may be related to tight monetary policies or the effects of a global recession. From 2021 to 2024, inflation gradually rebounded to 3.5%, possibly due to pressures such as disruptions to global supply chains or increased domestic demand. On the other hand, the money supply (M2) has grown continuously, jumping from 12.3 billion in 2004 to 183 billion in 2024, more than 14 times increased. However, this significant growth in liquidity has not always been associated with higher inflation, especially between 2010 and 2016, suggesting mitigating factors. Such as a decrease in the speed of money circulation or improved productivity, while the activity of the central bank's sales window fluctuated between high and low. The figure started at 6,108 in 2004, peaked in 2013 (53,231), fell to 33,490 in 2023 before rising again to 50,402 in 2024. This volatility reflects the central bank's attempts to control liquidity by buying or selling assets to balance the market, whether to absorb surplus money or pump it to stimulate the economy. In general, data indicate that the economy has shifted from a stage of high inflation (2004-2008) to relative stability (2009-2020), then a recent moderate inflation wave (2021-2024), with an unprecedented growth in the amount of money in circulation, which raises questions about the effectiveness of monetary policies or external factors influencing.

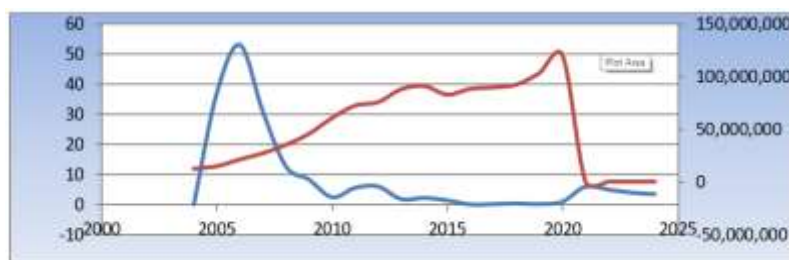
**Figure 1: The evolution of the inflation rate, exchange rate and money supply in the Iraqi economy for the period (2004-2024)**

Figure 1 shows evolution of three major economic indicators during the period from 2004 to 2025: inflation rate, money supply (M2), and central bank sales window activity. Inflation began at 31.6% in 2004 and rose sharply to reach a peak in 2006 at 53.1%, which could reflect an economic crisis or the impact of external shocks such as high oil prices. After that, it experienced a significant decline to 12.7% in 2008, and continued to decline gradually until it reached the lowest level in 2016 (0.068%), a decline that may be attributed to tighter monetary policies or the consequences of the global financial crisis. From 2021 to 2024, inflation gradually rebounded to 3.5%, possibly due to recent pressures such as supply chain disruptions or increased domestic demand. The money supply (M2) is witnessing continuous and high growth in the money supply, as it has more than 14 times increased from 12.3 billion in 2004 to 183 billion in 2024. Despite this significant growth, M2 rise has not always been associated with higher inflation, especially between 2010 and 2016, suggesting other factors such as Rapid circulation of money, improved productivity, or change in the behavior of the financial sector. As for the Central Bank sales window, the window figures fluctuated significantly, rising from 6,108 in 2004 to a peak of 53,231 in 2013, then falling to 33,490 in 2023, before jumping again to 50,402 in 2024. This fluctuation reflects the central bank's attempts to manage cash liquidity through buying or selling, such as absorbing the cash surplus to contain inflation or injecting money to stimulate growth in recessions. The figure highlights the transformation of the economy from a phase of high inflation (2004–2008) to a phase of relative stability (2009–2020), and then entering a recent moderate inflation wave (2021–2024), with unprecedented growth in the amount of money in circulation.

Table 2: Evolution of the annual rates of change of the parallel exchange rate, money supply M2 and inflation in the Iraqi economy for the period (2004-2024)

Rate of change in the sales window (%)	Rate of change in inflation M2 (%)	Rate of change in inflation (%)	Sunnah
-	-	-	2004
71.28%	19.84%	17.35%	2005
6.82%	43.54%	43.14%	2006
43.00%	27.88%	-41.84%	2007
61.91%	29.52%	-58.87%	2008
31.41%	30.14%	-34.33%	2009
6.44%	32.89%	-70.54%	2010
10.03%	19.53%	127.70%	2011
22.24%	4.56%	8.21%	2012
9.41%	16.18%	-69.35%	2013
-2.82%	3.48%	20.80%	2014
-14.37%	-9.00%	-35.81%	2015
-24.34%	6.64%	-95.28%	2016
25.89%	1.54%	198.53%	2017
11.68%	2.98%	99.01%	2018
8.46%	11.94%	-50.25%	2019
-13.78%	16.31%	401.89%	2020
-15.85%	13.44%	494.75%	2021
26.18%	11.76%	-16.67%	2022
-28.44%	10.53%	-20.00%	2023
50.50%	8.93%	-12.50%	2024

Source:

- Ministry of Finance, Economic Department, General Budget Tables.
- Ministry of Planning, Central Bureau of Statistics, Directorate of National Accounts.
- The annual rate of change is calculated according to the following formula: $R = \frac{Y_t - Y_{t-1}}{Y_{t-1}}$, where R: the annual rate of change Y_t: its value in the current year, Y_{t-1}: its value in the previous year. (Al-Fahdawi, 62: 2020)

The three economic indicators (inflation, M2 money supply, and central bank sales window) have experienced significant volatility over the past two decades, with radically different patterns. Inflation began with sharp fluctuations, rising by 494.75% in 2021 (highest in the table) and declining by -95.28% in 2016 (lowest), reflecting sudden economic shocks such as global turmoil or monetary policy changes. In contrast, the money supply (M2) on near-continuous growth, peaking in 2006 with a growth of 43.54%, with a single slight decline in 2015 (-9%), indicating steady monetary expansion despite the challenges. As for the central bank sales window, it fluctuated between large jumps such as the increase of 71.28% in 2005 and the sharp decline of -28.44% in 2023. It indicates the central bank's periodic attempts to balance liquidity through buying or selling. It is noticeable because excessive inflation and the expansion of the money supply were clearly related in the early period (2004-2008), but this correlation separated after 2010, as M2 continued. In recent years (2020-2024), inflation has returned moderately (despite a slowdown in M2 growth), possibly due to external factors such as the pandemic or supply chain disruptions, while the sales window witnessed a recent jump of 50.50% in 2024,

reflecting the central bank's response to emerging inflationary pressures. Overall, the data shows profound shifts in economic policies and the influence of internal and external factors in shaping indicators.

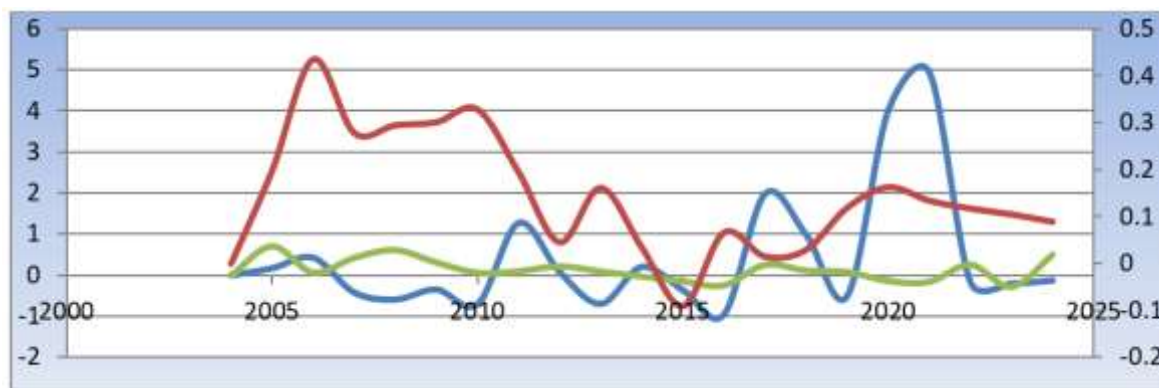


Figure 2: Evolution of the annual rates of change of inflation, exchange rate and money supply in Iraq for the period (2004-2024)

Figure shows the evolution of the annual rate of change of the central bank sales window and the money, supply (M2) between 2000 and 2025. The sales window has experienced sharp fluctuations, rising to a peak close to 6% in some years (e.g. 2005), while falling to negative levels of -2% in other periods (e.g. 2020), reflecting strong moves by the central bank to absorb or inject liquidity according to economic conditions. The growth rate M2 remained within a narrow range (between 0.1% to 0.5%) with a calm general trend compared to the volatility of the sales window, indicating a relatively conservative monetary policy in expanding the money supply. It is noticeable that the peak volatility of the sales window coincided with periods of potential economic turmoil (such as the 2008 crisis or the 2020 pandemic), while the M2 maintained its relative stability until 2025, which may reflect the priority of controlling inflation or maintaining the stability of the financial sector. The torch highlights a clear disconnect between the movements of the central bank is active (via the sales window) and the cautious growth in liquidity, which raises questions about the effectiveness of monetary instruments or the nature of the economic challenges in this period.

Third Theme: Findings from assessing how monetary policy factors affect inflation rates in the Iraqi economy for the period (2004-2024)

The goal of this study is to offer a comprehensive econometric analysis to calculate and interpret the impact of monetary policy indicators in Iraq during the period (2004-2024), represented by (the window of selling foreign currency and the wide money supply), on inflation rates, and the EViews 12 program has been adopted to estimate the standard model, and interpret its results, by describing the economic structure. Constructing the model, and examining the dynamic and statistical properties of the joint integration methodology based on the self-regression model and the time series of the variables that comprise it. In order to accurately formulate an understanding of the trends and impact of monetary policy indicators on the general level of prices, as will be explained later, Distributed Time Gaps (ARDL) aims to examine the short- and long-term equilibrium relationship between the variables in question.

- Description of the standard model used:** What is meant by the description of any standard model is the set of economic relations that are between the variables of the research, and this stage is one of the most prominent stages of building the standard model, because of what it requires to determine. The shape of the standard model of monetary policy indicators dictates the linkages between economic variables, which must be appropriately formulated. and their reflection on inflation rates in the Iraqi economy for the period (2004-2024), the variables that must be included in the model and the description of any standard model are based on. It is possible to measure the parameters for analysis, interpretation, and presentation by testing the data of the particular variables, and the standard model characterization stage includes the following steps:
- Determining the conventional model's variables:** The standard model for monetary policy and inflation rates in the Iraqi economy for the period will be developed using the (Eviews12) program, which is based on the economic analysis of monetary policy and inflation rates. (2004-2024) so that we can through this model test the data of the variables specified by the researcher to measure their parameters in order to analyze, interpret and display them. We start according to the following functional relationship:

$$Y = f(X_1, X_2, \dots, X_i) \dots \dots \dots (1)$$

Whereas:

Y : The dependent variable and expressed as (inflation rates).

X_1 : The first independent variable is expressed as (the window of selling currency).

X_2 : The second independent variable is expressed as (broad monetary supply).

Before we start estimating and analyzing the standard model in question, it is necessary to give a table of the symbols used in the standard analysis, as in the table () that shows the variables used in the estimated standard model and their symbols as follows:

Table 3: Functional Characterization of Standard Model Variables and Symbols Used in Standard Analysis

Variable type	Variable name	Variable code
independent	Foreign currency sale window	Cpsw
independent	Wide Cash Offer	M2
adherent	Inflation	In

Source: Researcher work

Graph test results as can be seen from the graph, graph (3) shows the time series curves of the variables at the first level to ascertain their starting characteristics. This is one way to confirm the scope of the time series of the variables under study of the dependent variable represented by (inflation rates) and the independent variables represented by (the window of selling the currency and the wide money supply) were the following graphs demonstrate how unstable the data was at its initial level:

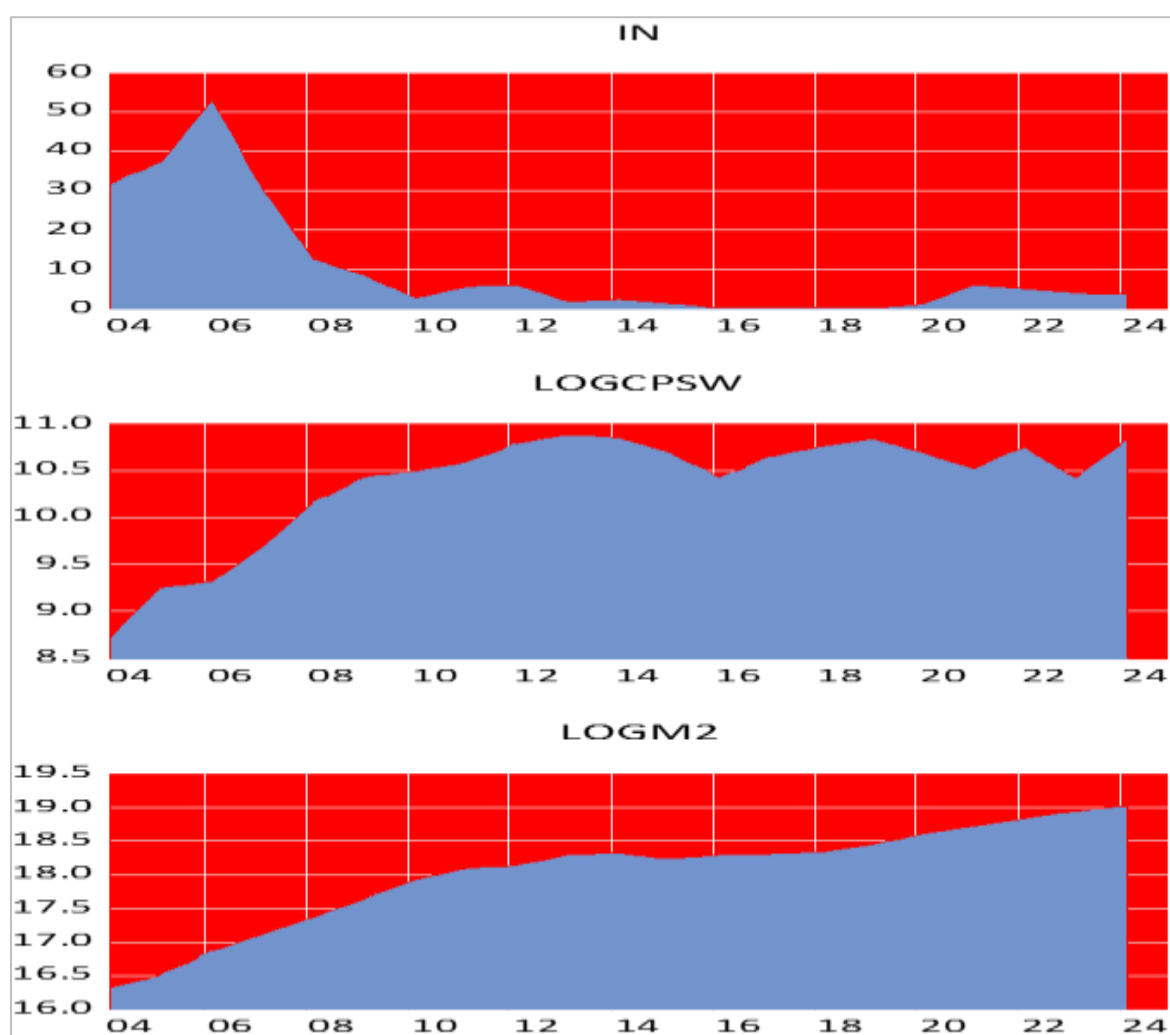


Figure 3: Time series graphs of search variables at the original level

Source: Prepared by the researcher based on the outputs of the standard program (EViews12).

The researcher checked the series after taking the first differences since the variables in question were unstable at the beginning and found that all of them stabilised. In light of this, the slow time gap (ARDL) self-regression model is preferred because data has stabilised at the first difference and there aren't many observations. The graph (4) illustrates the stability of the data at the first difference.

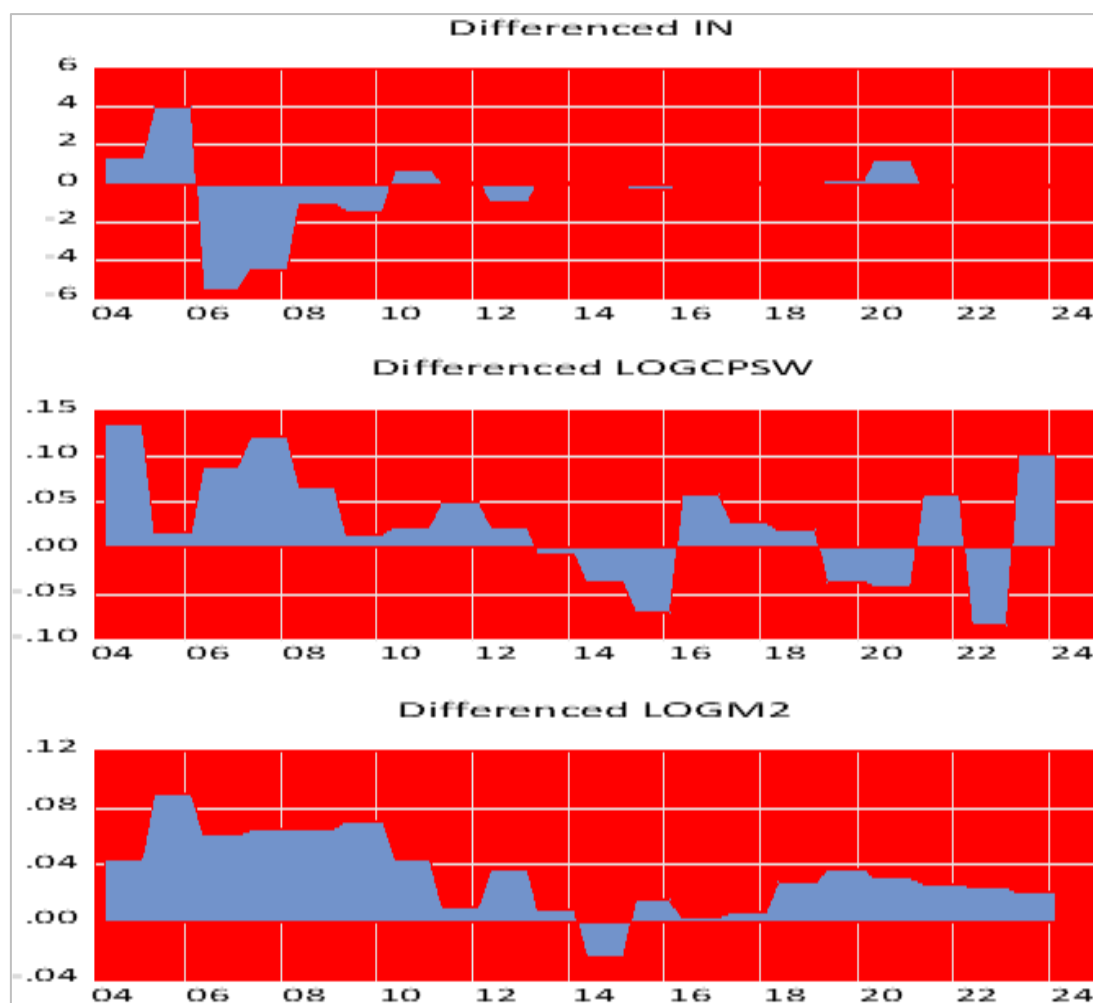


Figure 4: Time series curves of search variables at the first difference.

The Phelps Perron test findings for time series stillness are as follows: The rank of stillness of all study variables must be known before beginning any standard study. A number of tests are used to determine the problem with the unit root test for estimation in order to eliminate the issue of false regression and guarantee that stable time series can eventually return to equilibrium after eliminating the shocks they encounter. calmness and ascertain whether the time series of the relevant economic variables is stable. Among those tests, Phillips Perron test, as it was employed in this research because it is one of the most reliable and accurate tests to detect the stillness of time series data has been converted to quarterly as **the** program (EViews12) provides the possibility of converting data from annual data to quarterly data and the introduction of logarithm on the independent variables and on this basis the tests were conducted on time series in order to reach the stillness of the time series and the results were as follows: -

Table 4: Results of the Phillips Perron test at the original level and the first difference

UNIT ROOT TEST TABLE (PP)				
	At Level	IN	LOGM2	LOGCPSW
With Constant	t-Statistic	-1.6191	-3.7991	-4.1595
	Prob.	0.4682	0.0043	0.0014
		n0	***	***
With Constant & Trend	t-Statistic	-1.4214	-2.3267	-2.8173
	Prob.	0.8473	0.4147	0.1956
		n0	n0	n0
Without Constant & Trend	t-Statistic	-1.8252	4.4411	1.9460
	Prob.	0.0649	1.0000	0.9872
		*	n0	n0
At First Difference				
		d(IN)	d(LOGM2)	d(LOGCPSW)

With Constant	t-Statistic	-3.3197	-1.9036	-3.3414
	Prob.	0.0172	0.0160	0.0162
		**	**	**
With Constant & Trend	t-Statistic	-3.3519	-2.4005	-3.3523
	Prob.	0.0656	0.0031	0.0655
		*	***	*
Without Constant & Trend	t-Statistic	-3.2533	-1.3337	-3.0822
	Prob.	0.0014	0.0558	0.0024
		***	*	***

Source: Researcher's work based on the outputs of the econometric program (Eviews12).

(*), (**), (***) indicates that it is significant at the level of (10%, 5%, and 1%) respectively according to the tabular values of (Mackinnon), and (no) indicates that it is not significant.

It is noted from Table (4), which shows that the results according to the Phelps and Peron test (PP) were time series non-static at the original level of all variables, and therefore the first differences of the time series were taken and found to be static at a significant level (1%, 5%, 10%), as the p-values became less than (5%) with a categorical and also without a secant and direction, which means accepting the alternative hypothesis ($H_1=B_0 \neq$) that the unit root does not exist, that is, it is integrated from the order I(1).

Analysis of the results of measuring the impact of monetary policy indicators and their reflection on inflation rates in Iraq

- Preliminary estimation of the ARDL model:** This test is in order to verify the existence of a common integration or not between the research variables, that is, whether there is a long-term equilibrium relationship or not, and according to the methodology (ARDL), where the standard (AIC) is used automatically in order to determine the duration of time lag (time slowdown), and Table (5) shows the results of the initial estimation of the ARDL model)) between monetary policy indicators and their reflection on inflation rates in the Iraqi economy for the period (2004-2024).

Table 5: Results of the preliminary estimation of the ARDL model for the relationship between monetary policy indicators and their reflection on inflation rates in the Iraqi economy for the period (2004-2024)

Dependent Variable: IN				
Method: ARDL				
Date: 05/21/25 Time: 05:21				
Sample (adjusted): 2004Q3 2024Q1				
Included observations: 79 after adjustments				
Maximum dependent lags: 4 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (4 lags, automatic): LOGCPSW LOGM2				
Fixed regressors:				
Number of models evaluated: 100				
Selected Model: ARDL (2, 2, 1)				
Note: final equation sample is larger than selection sample				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
IN (-1)	1.746702	0.069633	25.08453	0.0000
IN (-2)	-0.794234	0.069283	-11.46365	0.0000
LOGCPSW	-10.48661	3.648959	-2.873864	0.0053
LOGCPSW (-1)	20.64361	6.613536	3.121417	0.0026
LOGCPSW (-2)	-11.22752	3.649771	-3.076225	0.0030
LOGM2	10.04709	6.256901	1.605761	0.1127
LOGM2 (-1)	-9.429193	6.233031	-1.512778	0.1347
R-squared	0.994334	Mean dependent var		9.339215
Adjusted R-squared	0.993862	S.D. dependent var		13.84948
S.E. of regression	1.085022	Akaike info criterion		3.085511
Sum squared resid	84.76359	Schwarz criterion		3.295462
Log likelihood	-114.8777	Hannan-Quinn criter.		3.169623
Durbin-Watson stat	1.998655			

Source: Researcher's work based on the outputs of the econometric program (Eviews12)

It is noted from Table (5) that the results of the preliminary estimate of the model that shows the relationship between the dependent variable represented by (inflation rates) and the independent variables represented by (the window of currency sale and money supply), as it turns out that the coefficient of determination (R^2) amounted to $R^2(0.99)$ and this gives explanatory power to the studied model, that is, the independent variables explain (99%) of the changes things take place within the dependent variable, The effect of additional variables not included in the model is represented by the remaining percentage of 1%, however the adjusted coefficient of determination was $\bar{R}^2(0.99)$, as it showed the value of (R-squared), which was less than the value of Durbin-Watson stat) and this shows the absence of false regression between the variables and therefore we go with the integrity of the prototype to estimate the relationship of joint integration between the variables in question as follows.

1. Test of optimal slowdown periods: The test of optimal slowdown periods was performed according to the method of (Akaike information Criteria) (AIC), Figure (5) shows the optimal slowdown periods for the (ARDL) model is (2.2.1).

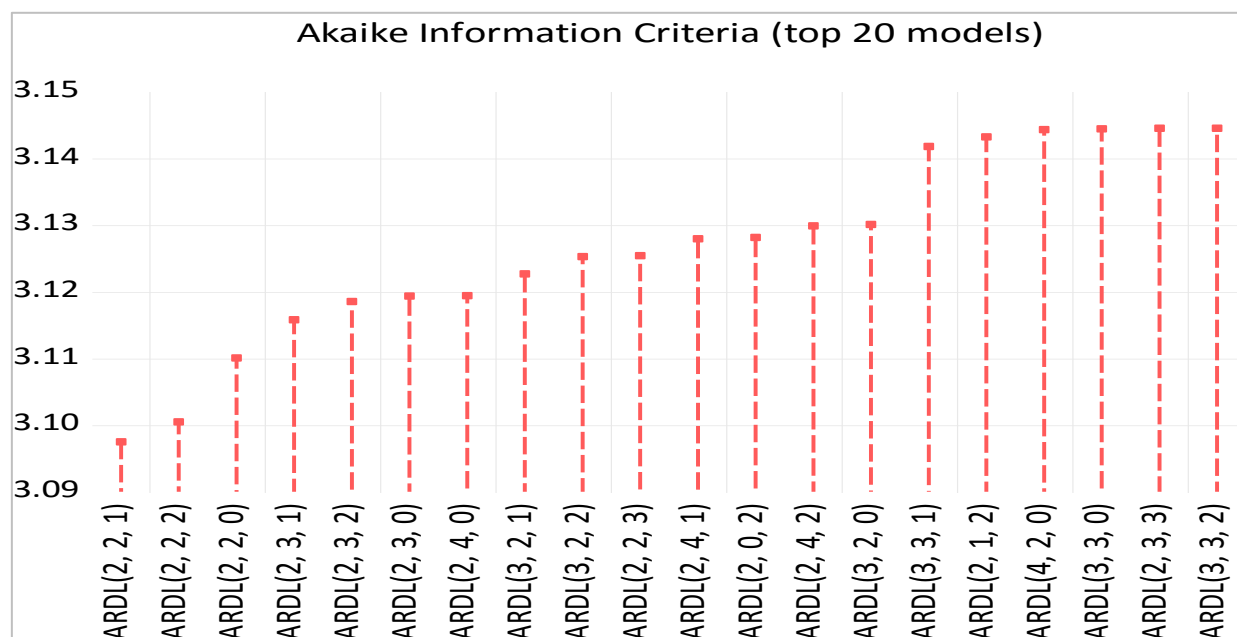


Figure 5: Results of optimal slowdown periods for ARDL model according to AIC standard

Source: Researcher's work based on the outputs of the econometric program (Eviews12).

Figure (5) shows us that the optimal model is (2.2.1) (ARDL), as the next step requires estimating the prototype of the relationship between the variables in question.

The outcomes of the bounds test combined with the joint integration test: To ascertain whether or not there is a long-term equilibrium relationship between the independent variables (money supply and currency selling window) and the dependent variable (inflation rates), the boundary test is utilised for joint integration. We can ascertain the existence of a long-term equilibrium relationship by calculating a statistic (the F-statistic). We accept the null hypothesis and reject the alternative hypothesis if the estimated value of the statistic (F) is smaller than the minimal critical values. The findings of the test limits for the (ARDL) model are shown in Table (6).

Table 6: Testing the results of the boundary tests between the dependent variable represented by (inflation rates) and the independent variables represented by (the window of currency sale and money supply)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I (0)	I (1)
			Asymptotic: n=1000	
F-statistic	8.854590	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

Source: Researcher's work based on the outputs of the econometric program (Eviews12).

We accept the alternative hypothesis and reject the null hypothesis that there is no long-term equilibrium relationship since the computed (F.statistic) statistic value is higher than the upper limit of the critical values. When

compared to the tabular data, we see that the value of (F), which is equal to 8.854590 in Table (6), is higher than the upper limit, which is (5), and at the significant level (1%). that affirms the presence of a connection of long-term balance.

The outcomes of calculating the error correction parameter and the long- and short-term responses: After conducting boundary tests (joint integration), we found a long-term equilibrium relationship heading from the explanatory variables represented by (the window of currency sale and money supply) towards the dependent variable represented by (inflation rates) and here should obtain short-term and long-term estimators for the parameters of the estimated model and the error correction parameter (ECM) and it appears from Table (7) the results of estimating the long-term and short-term response according to the ARDL model)) as follows:

Table 7: Results of Estimating the Long- and Short-Term Response to the ARDL Inflation Rates Model

ARDL Long Run Form and Bounds Test				
Dependent Variable: D (IN)				
Selected Model: ARDL (2, 2, 1)				
Case 1: No Constant and No Trend				
Date: 05/21/25 Time: 05:21				
Sample: 2004Q1 2024Q4				
Included observations: 79				
Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq (-1)*	-0.047532	0.014748	-3.223050	0.0019
LOGCPSW (-1)	-1.070526	0.647623	-1.653007	0.1027
LOGM2 (-1)	0.617894	0.376268	1.642165	0.1049
D (IN (-1))	0.794234	0.069283	11.46365	0.0000
D (LOGCPSW)	-10.48661	3.648959	-2.873864	0.0053
D (LOGCPSW (-1))	11.22752	3.649771	3.076225	0.0030
D(LOGM2)	10.04709	6.256901	1.605761	0.1127
Levels Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGCPSW	-22.52210	11.82630	-1.904409	0.0609
LOGM2	12.99949	6.888412	1.887153	0.0032
EC = IN - (-22.5221*LOGCPSW + 12.9995*LOGM2)				

Source: Researcher's work based on the outputs of the econometric program (Eviews12).

1. It is also clear from the table that the error correction parameter (1-Cointeq) for the model of (-0.047532) is negative, in addition to the fact that its p.value is significant less than (0.05), which means that the basic condition in this parameter is met which is its negative value and statistical significance, which means that there is a common integration between the independent variables (currency sale window and money supply) and the dependent variable (inflation rates) as a result of the fulfillment of the two basic conditions in this The test is negative value and statistical significance, which means that (0.04) short-term errors can be corrected over time in order to reach long-term equilibrium.
2. The coefficient, of the currency selling, window shows an inverse response with inflation rates and is statistically significant in the long term, as the coefficient of the foreign currency sale window variable reached (22.52210), meaning that the increase in the sale of foreign currency in the long-term window by one unit leads to a decrease in inflation rates by (22.52210), while the money supply coefficient indicates a positive and significant response in the long term, the coefficient of the money supply variable reached (12.99949) That is, increasing the money supply in the long run by one unit leads to an increase in inflation rates by (12.99949)
1. **Evaluation of the model estimated in standard terms:** After estimating the relationship between the model variables for the following diagnostic tests are necessary to confirm the model's quality in measuring and analysing the relationship between monetary policy indicators and their reflection on inflation rates in the Iraqi economy for the period (2004–2024), as well as to ensure that it is free from common issues.:
2. **The results of the autocorrelation test and the heterogeneity test:** As can be seen from Table (8) below, this is accomplished using the Lakrang serial correlation multiplication tests (BGLM) and the ARCH test. The computed value of the F-statistic was (2.511199) in comparison to the probability value (Prob: 0.6020), which is larger than (5%). Because the (ARCH) test clearly shows that the value of the (F-statistic) reached (8.870912), which corresponds to the probability value (0.4012), which is greater than (5), the null hypothesis, which states that there is no autocorrelation, will be accepted. Additionally, the estimated model is free of the problem of heterogeneity of variance. %) This entails agreeing with the null hypothesis, which asserts that the calculated model's random error limit variation

is stable. and the table () displays the findings of the self-correlation tests as well as the instability of the homogeneity of the link between monetary policy indicators and how they affect inflation rates in the Iraqi economy between 2004 and 2024.

Table 8: Results of the self-correlation test and the instability of the homogeneity of the variance of the relationship between the indicators of monetary policy and their reflection on inflation rates in the Iraqi economy for the period (2004-2024)

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.511199	Prob. F (2,70)	0.6020
Obs*R-squared	4.137238	Prob. Chi-Square (2)	0.5663
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	8.870912	Prob. F (6,72)	0.4012
Obs*R-squared	33.57793	Prob. Chi-Square (6)	0.3108

Source: Researcher's work based on the outputs of the econometric program (Eviews12).

Normal Random Error Distribution Test (Jarque- Bera)

The Jarque-Bera test, which compares the alternative hypothesis (H1) that the residuals are not distributed normally with the null hypothesis (H0), which states that the residuals have a normal distribution, can identify the issue with the normal distribution of random errors. The test's result shows that the null hypothesis must be accepted because the p-value of (140.) is greater than (0.05.) i.e. the residues are normally distributed, as shown in Figure 6, and this is a good indicator of the quality of the estimated model.

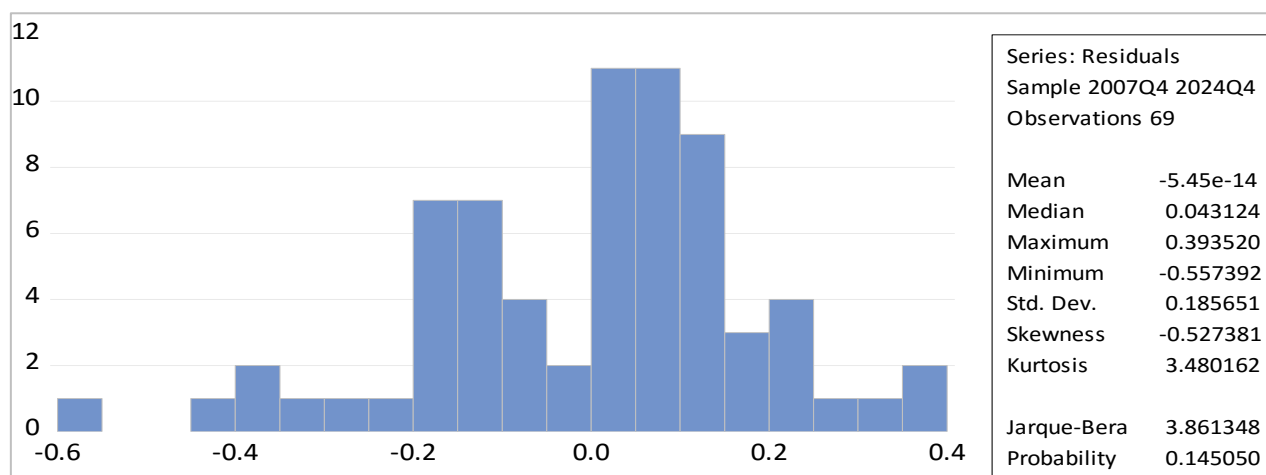


Figure 6: Normal residue distribution test

Source: Researcher's work based on the outputs of the econometric program (Eviews12).

Model quality: The following figure illustrates the quality of the estimated model. To guarantee the quality of the special standard model between monetary policy indicators and their reflection on inflation rates in the Iraqi economy for the period (2004–2024), it is necessary to compare the real values with the estimated values and make sure that the real values are close to the estimated values:

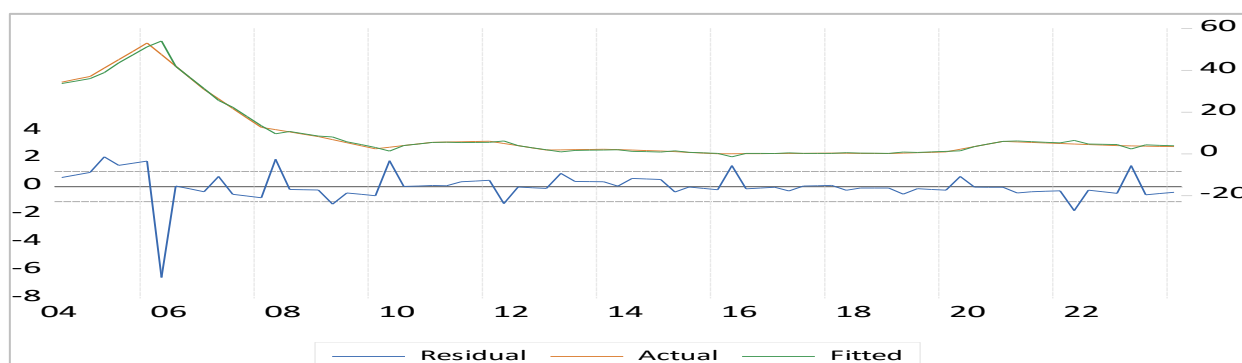


Figure 7: Real, Estimated and Residual Values (Model Quality)

Source: Researcher's work based on the outputs of the econometric program (Eviews12).

The quality of the statistically estimated model is confirmed by the fact that the real values are extremely near to the estimated values and that the residues are lower than them in this model.

Structural stability test for ARDL model coefficients): The CUSUM and SQ-SUSUM test statistics, as shown in Figure 8, fell within the critical limits at a significant level of 5%, indicating that the estimated coefficients of the UECM model are structurally stable over the course of the study and that short- and long-term estimates are consistent.

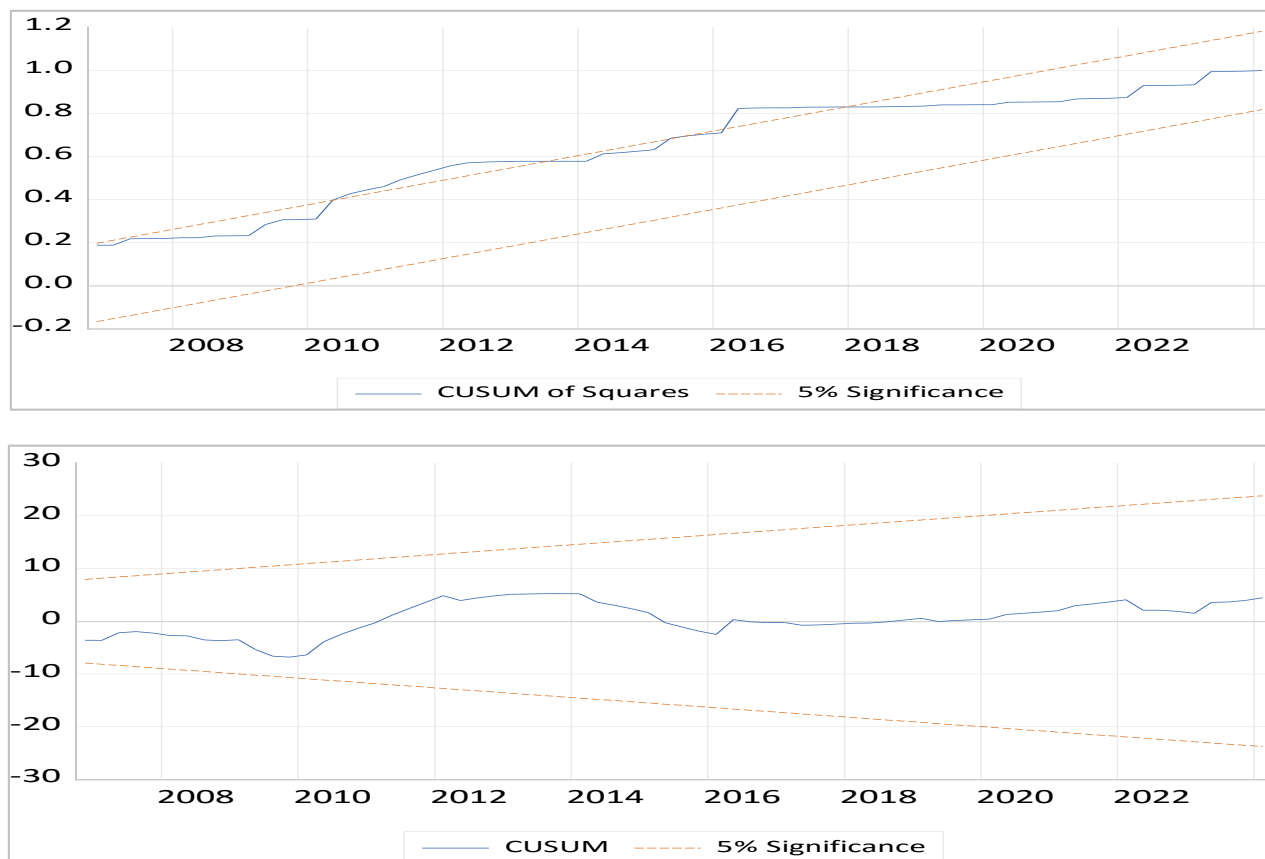


Figure 8: Test the cumulative sum of the recurrence and the cumulative sum of the squares of the residual residuals
Source: Researcher's work based on the outputs of the econometric program (Eviews12)

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