Al-Qadisiyah Journal for Administrative and Economic Sciences ISSN$_{Online}$: 2312-9883
QJAE, Volume 26, Issue 4 (2024) ISSN$_{Print}$: 1816-9171

Measuring the impact of the Central Bank's policy in confronting external shocks in Iraq for the period (2005 – 2022)

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Received: 8/9/2024
Accepted: 7/10/2024
Available online: 25 /12 /2024

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Abstract : The research aims to measure the impact of the Central Bank's policies in confronting external shocks represented by imported inflation in Iraq through the performance of the Central Bank represented by monetary policy based on traditional and innovative monetary tools, as well as enhancing confidence in the banking system, as government's confidence in the Central Bank's procedures can play an important role in mitigating the effects of shocks. However, the choice depends on the Central Bank's ability to determine the quality of monetary policy in Iraq. The research relied on annual and quarterly data for the period (2005 - 2022) with the aim of demonstrating the role of the Central Bank and its impact in confronting external shocks through a quantitative and analytical reading of all variables and determining the type and extent of the relationship. Using advanced standard methods and approaches, in addition to identifying the characteristics of the time series of these variables, the stationarity tests, the Co integration test, the VECM error correction vector model, the ARDL autoregressive distributed lag model, the Granger Causality test, and the Variance decomposition analysis were applied.

Introduction:

Enhancing the role of the Central Bank comes through activating monetary policy tools, which are among the most important tools of economic policy in confronting external shocks and eliminating the problems that stand in the way of targeting them, as monetary policy is the most effective tool in directing the course of economic activity in a direction that contributes to achieving growth and financial and monetary stability. In the midst of these economic and financial transformations that have occurred in the countries of the world, the Iraqi economy witnessed many dual internal shocks and external shocks after 2003, represented by fluctuations in oil prices and imported inflation. These shocks may sometimes cause a large financial deficit or increase the severity of public debt, as it is exposed to fluctuations in oil prices and imported inflation, in addition to the weak trend towards economic diversification, which creates a state of exposure to the world, and the role of the Central Bank helps in confronting the crises and shocks that these countries are exposed to.

First: The research problem.

The research problem that we want to address revolves around clarifying the impact of the policies and tools of the Central Bank, represented by its monetary policy, in confronting external shocks (imported inflation) in light of monetary and financial developments and the challenges imposed by global economic developments on it.

Second: Research objective.

1- Identify the policies and tools of the Central Bank in Iraq for the period (2005 – 2022)
2- Analyze and measure the impact of the Central Bank's policy in confronting shocks and how to enhance the efficiency of the Central Bank's policies and improve the performance of its traditional and innovative tools.

Third: Research hypothesis.

The research is based on the hypothesis that the policies of the Central Bank have a role in confronting external shocks through its tools that have a direct and inverse effect and have significant relationships with imported inflation in Iraq for the period (2005 – 2022).

Theoretical aspect

First: The concept of the central bank.

The word bank goes back to the French word (Banque) and the Italian word (banca), both words initially mean table or desk, and in practical terms, the historical origin of the emergence of banks goes back to medieval merchants who used to sit in public places and near ports with money to carry out exchange operations, exchange money, buy and sell. Central banks work for the public good and not to achieve maximum profit. The modern central bank has witnessed a long development, and in this process, central banks have become diverse in authority, independence, functions, and tools of work. But almost everywhere, there has been a significant and explicit expansion in the

responsibility of central banks to promote economic stability, local growth and defend the international value of the currency. (1) The central bank is known as a monetary institution that controls the monetary and banking system and is responsible for issuing currency, monitoring the banking system, directing credit and supporting economic growth, as well as maintaining monetary stability by providing appropriate cash quantities within the economy and linking them to the needs of economic activity (2). Show defines the central bank as the bank that manages and regulates credit. (3)

1-Functions of the Central Bank.

It is noted that the definition of its functions and responsibilities has undergone a gradual development similar to the economic and intellectual development that extended for a long period of time. After World War II and due to the huge capital needed to rebuild the destroyed economies, the goals and tasks of central banks evolved from an intermediary role represented in the process of issuing money and organizing the work of commercial banks to a developmental role supported by economic literature at the time, especially that issued by international institutions such as the World Bank and the International Monetary Fund. In general, the most important functions performed by central banks are represented by the following (4)

A- Issuing money.

B- State Bank

C- Bank of Banks (responsible for the cash reserves of commercial banks)

D- Managing the state's foreign currency reserves

C- The last resort for lending

H- Central Clearing Bank

2- Central Bank Tools.

The Central Bank's tools vary between general tools called the traditional tools group and special tools used in one country rather than another and differ from one period to another within the same country. These tools are as follows (5)

Quantitative Tools.

They are also called in a group of books traditional quantitative tools or indirect methods, which aim to influence the total volume of money and credit regardless of the aspects of its use and its tools (6)

A. Rediscount rate: It represents the interest rate imposed by central banks on securities, treasury bills, and loans granted to commercial banks (7)

B. Open market operations: Open market operations mean that the central bank sells and buys securities and government bonds in the financial markets, which in turn leads to an increase or decrease in the monetary base. (8)

C. Legal reserve ratio: The legal reserve ratio means the percentage of deposits that commercial banks must keep with the central bank, or the central bank requires commercial banks to deposit a certain part or percentage of their deposits with it.(9)

Second: The concept of external shock.

A shock means any unexpected situation (10). Or it is the occurrence of a severe and sudden change in economic variables, and this shock can be either positive or negative. A positive shock leads to an increase in the value of the variable, while a negative shock leads to a decrease in the value of the variable (11). Or it means events that can affect the economy and whose source is external or internal (12). External shocks are defined as changes that occur in variables outside a specific economy that have a significant impact on the local economy and cannot be controlled. These shocks may be positive or negative on the economy, given that the main source of external shocks is represented by international prices of goods, services and raw materials. Positive external shocks occur when the prices of the country's main exports rise, or the prices of the country's main imports fall, and a negative external shock refers to the situation in which the prices of the country's main exports fall or the prices of the country's main imports rise (13)

Characteristics of external shocks

External shocks are characterized by a set of characteristics, the most important of which are:

A. It is a sudden and unexpected event and did not occur due to quantitative or qualitative accumulations..

B. The shocks generated by it are more profound and influential because they affect all macroeconomic variables such as production, consumption, investment, spending, etc.

C. The short period of time between one shock and another, as these shocks can recur within (5) years, and this is attributed to the intertwining of the global economy. (14)

2- Causes of external shocks.

1- Imported inflation.

Due to the openness of the economies of countries to the global economy and their increased integration into the global economy, these economies have become affected and influenced by global economic facts. Accordingly,

inflation levels in these economies will be affected by factors outside the geographical scope of these economies as well as by local factors that affect the goods and services market. Hence, inflation can be of external origin and thus imported from abroad. After "Jean Bodin" in 1568, he was the first to point out the phenomenon of imported inflation, as he pointed out that the general rise in prices in Europe was mainly due to the increase in the supply of gold and silver imported from America. Then came the mercantilist school "mercantilist literature" in the seventeenth and eighteenth centuries, such as R. Cantillon and D. Hume, who gave great importance to the money supply, local price levels, and external balances, and the classic additions to the previous relationship Ricardo. Mill in the nineteenth century within the framework of the gold standard by automatically adjusting external balances, the entry or exit of metals accompanied by a change in local prices. Accordingly, the phenomenon of imported inflation "is the phenomenon that leads to a general and continuous rise in the level of prices as a result of a surplus in aggregate demand or a rise in costs that originate from external factors". (15)

2- Oil price shocks

The development of the global price of crude oil is important for consumers, producers, companies, and economic policymakers because oil price fluctuations affect economic decisions in all sectors of the global economy. However, this forecast of oil price fluctuations is difficult due to unexpected shifts in supply and demand and the factors affecting them. The unexpected and sudden change in the price of oil is called an oil price shock, which is defined as the difference between the expected price of oil in the oil market and the actual price achieved in this market (16)

Second: The applied aspect

First requirement: Description of the standard model

First: Building the model structure:

This area in our research included reliance on quarterly data for both independent variables represented by monetary policy tools in Iraq on the one hand and external shocks represented by (imported inflation) as a dependent variable on the other hand for the period (2005-2022) and with (72) observations, by converting the data using the statistical program (Eveiws12)

According to the economic analysis of the policies of the Central Bank of Iraq in confronting external shocks represented by (imported inflation), and with the aim of testing the research hypothesis and achieving its goals, it is possible to formulate the standard model for the independent variables represented by the monetary policy tools followed in Iraq and the dependent variable (imported inflation), which can be explained through the following table:

Table (1)Definition and measurement of research variables

Money Supply	M2	independent
Reserve Requirement	LR	independent
Interest Rate	IR	independent
Currency Window Sales	CWS	independent
Imported Inflation	IIN	Dependent

Second: Results of stationarity tests (unit root test)

1. Phillips-Perron Test

Moving to the Phillips-Perron Test, it is clear from the data in Table (2) that the time series of the studied variables were all non-stationary at the (At Level), so we accept the null hypothesis that states the existence of a unit root, given that the value of Prob was greater than 0.05 and 0.10, but when calculating the first difference for these variables, it appears that they were stationary, which is why we reject the null hypothesis and accept the alternative hypothesis towards the stationarity of the time series for all variables, and we will rely on the results of the (p.p) test because they are more accurate than the results of the (ADF) test. Accordingly, the (ARDL) methodology will be adopted to estimate the parameters, whether in the long term or in the short term.

Table (2)

Phillips-Perron (P.P) test results

With Constan				With Constant & Trend			Without Constant & Trend		
	t-Statistic	Prob.		t-Statistic	Prob.		t-Statistic	Prob.	
IIN	1.699495-	0.4270	No	0.705644-	0.9684	No	0.689802-	0.4145	No

OP	1.896565-	0.3321	No	1.910971-	0.6380	No	0.082848	0.7057	No
M2	1.953267	0.9998	No	1.756075-	0.7155	No	5.681126	1.0000	No
LR	2.725129-	0.0750	No	2.679805-	0.2481	No	0.219111-	0.6037	No
IR	1.417625-	0.5687	No	2.889243-	0.1725	No	0.928807-	0.3107	No
CWS	1.536229-	0.5094	No	1.780993-	0.7031	No	1.241840	0.9441	No
d (IIN)	3.554762-	0.0094	***	3.779723-	0.0238	**	3.582490-	0.0005	***
d (OP)	2.947816-	0.0453	**	2.847937-	0.1860	No	2.917080-	0.0041	***
d (M2)	9.582932-	0.0000	***	9.635944-	0.0000	***	8.306624-	0.0000	***
d (LR)	3.246467-	0.0216	**	3.228916-	0.0877	*	3.226134-	0.0016	***
d (IR)	3.056483-	0.0348	**	2.900459-	0.1690	No	3.013382-	0.0031	***
d (CWS)	2.939878-	0.0461	**	2.906120-	0.1673	No	2.587948-	0.0103	**

Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant

Source: Researcher's own work based on program results (Eviews: 12)

The second requirement: The results of the estimation of the autoregressive distributed lag model ARDL

First: The results of the relationship between monetary policy variables and imported inflation

1-The general estimation of the (ARDL) model for the imported inflation function

Through the results of the estimation of the autoregressive distributed lag model ARDL for the third model shown in Table (3), it is clear that it was consistent with the statistical and standard tests and thus the quality of the model, as the value of the coefficient (R2) reached about 0.91)%), which means that the independent variables included in the model explain 91)%) of the change in the dependent variable, and the remaining percentage (9%) is due to other variables that were not included in the model, and the value of the F-Statistic was about ((236.0380, and at a significance level less than 0.01, since the value of Prob equals (0.0000), so we accept the alternative hypothesis and reject the null hypothesis, and therefore there is a relationship between the independent variables and the dependent variable

Table (3)

General model (ARDL) for imported inflation equation

Dependent Variable: IIN				
Method: ARDL				
Date: 07/29/24 Time: 02:29				
Sample (adjusted): 2006Q1 2022Q4				
Included observations: 68 after adjustments				
Maximum dependent lags: 4 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (4 lags, automatic): M2 LR IR CWS				
Fixed regressors: C				
Number of models evalulated: 2500				
Selected Model: ARDL(1, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
IIN(-1)	0.546433	0.091715	5.957935	0.0000
M2	1.39E-05	5.34E-06	2.610584	0.0122
M2(-1)	-2.09E-06	6.15E-06	-0.338934	0.7362
M2(-2)	2.85E-19	6.14E-06	4.64E-14	1.0000
M2(-3)	-9.04E-19	6.14E-06	-1.47E-13	1.0000
M2(-4)	-1.87E-05	6.85E-06	-2.725412	0.0091
LR	0.000158	2.29E-05	6.883617	0.0000
LR(-1)	-5.68E-05	2.12E-05	-2.672182	0.0104
LR(-2)	-5.77E-19	1.90E-05	-3.04E-14	1.0000
LR(-3)	1.75E-18	1.90E-05	9.19E-14	1.0000
LR(-4)	5.49E-05	2.17E-05	2.527155	0.0150

IR	-0.002551	0.023471	-0.108693	0.9139
IR(-1)	0.022343	0.024049	0.929068	0.3577
IR(-2)	-2.32E-15	0.023755	-9.75E-14	1.0000
IR(-3)	-6.34E-18	0.023755	-2.67E-16	1.0000
IR(-4)	-0.115306	0.034720	-3.321062	0.0018
CWS	4.15E-06	7.20E-06	0.576807	0.5669
CWS(-1)	-3.55E-06	9.34E-06	-0.379896	0.7058
CWS(-2)	-2.76E-18	9.32E-06	-2.96E-13	1.0000
CWS(-3)	4.03E-18	9.32E-06	4.32E-13	1.0000
CWS(-4)	-1.74E-05	7.40E-06	-2.353601	0.0229
C	0.794182	0.299327	2.653219	0.0109
R-squared	0.915079	Mean dependent var		0.922941
Adjusted R-squared	0.876311	S.D. dependent var		0.542298
S.E. of regression	0.190723	Akaike info criterion		-0.219793
Sum squared resid	1.673268	Schwarz criterion		0.498283
Log likelihood	29.47297	Hannan-Quinn criter.		0.064730
F-statistic	23.60380	Durbin-Watson stat		1.331179
Prob(F-statistic)	0.000000			

Source: Researcher's own work based on program results (Eviews: 12)

3- Bounds test for joint integration

To verify the existence of joint integration between the economic variables or not, it is clear from Table (4) that the calculated statistical value (statistic-F) of (6.286415) was less than the upper and lower tabular limits of the statistical values and at a significance level of (1%, 5%, 10%), and therefore we accept the null hypothesis that there is no joint integration or equilibrium relationship between the model variables.

Table (4)

Results of the bounds test for joint integration The Bound Test for the imported inflation function

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.286415	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Researcher's own work based on program results (Eviews: 12

.Diagnostic tests for the imported inflation function.4

In this field, it is possible to detect the absence or containment of the model from standard problems such as (the problem of autocorrelation, instability of homogeneity of variance), as follows:

A. Testing the problem of autocorrelation

It is clear from the results of the serial correlation test between the residuals of the estimated model shown in Table (5) under study that the model is free from the problem of autocorrelation and using the LM Test, because the value of Chi-Square reached about (0.0837) which is greater than the level of significance (0.05) and therefore the model does not suffer from the problem of serial correlation. Thus we accept the null hypothesis and reject the alternative hypothesis which states the existence of a problem.

Table (5)

Results of the autocorrelation problem test according to the LM Test for the imported inflation function

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	1.692067	Prob. F(2,43)	0.1962
Obs*R-squared	4.961203	Prob. Chi-Square(2)	0.0837

Source: Researcher's own work based on program results (Eviews: 12

B. Testing the problem of heteroskedasticity

According to the test of the problem of heteroskedasticity of variance, the data in Table (6) indicate that the value of prob. Chi-square (1) reached (0.6470), which is greater than (0.05), and therefore it is not significant, i.e. we accept the null hypothesis that states (homogeneity of residuals) and the absence of the problem of heteroskedasticity.

Table (6)

Results of testing the problem of heteroskedasticity of variance for the imported inflation function

Heteroskedasticity Test: ARCH			
F-statistic	0.769620	Prob. F(1,65)	0.3836
Obs*R-squared	0.784017	Prob. Chi-Square(1)	0.3759

Source: Researcher's own work based on program results (Eviews: 12

C. Error Correction Model (ECM) according to the ARDL methodology

For the purpose of estimating the short-term relationship between variables using the ARDL model, it is clear from the data in Table (7) that the error correction parameter CointEq(-1)*) met the two basic conditions, which are negative and significant (-0.453567), as the value of the error term indicates, that is, there is a short-term positive and significant response between the independent variables and imported inflation (IIN) in Iraq as a dependent variable, and that the error correction term parameter indicates the presence of joint integration as it is (negative and significant), and this is consistent with the joint integration limits in the presence of a long-term equilibrium relationship.

Table (7)

Results of the Error Correction Model (ECM) according to the ARDL methodology for the imported inflation function

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(M2)	1.39E-05	4.41E-06	3.159478	0.0028
D(M2(-1))	1.87E-05	5.04E-06	3.708217	0.0006
D(M2(-2))	1.87E-05	5.04E-06	3.708217	0.0006
D(M2(-3))	1.87E-05	5.04E-06	3.708217	0.0006
D(LR)	0.000158	1.52E-05	10.35586	0.0000
D(LR(-1))	-5.49E-05	1.53E-05	-3.583105	0.0008
D(LR(-2))	-5.49E-05	1.53E-05	-3.583105	0.0008
D(LR(-3))	-5.49E-05	1.53E-05	-3.583105	0.0008
D(IR)	-0.002551	0.017018	-0.149905	0.8815
D(IR(-1))	0.115306	0.023925	4.819461	0.0000
D(IR(-2))	0.115306	0.023925	4.819461	0.0000
D(IR(-3))	0.115306	0.023925	4.819461	0.0000
D(CWS)	4.15E-06	6.27E-06	0.662230	0.5111
D(CWS(-1))	1.74E-05	6.82E-06	2.555727	0.0140
D(CWS(-2))	1.74E-05	6.82E-06	2.555727	0.0140
D(CWS(-3))	1.74E-05	6.82E-06	2.555727	0.0140
CointEq(-1)*	-0.453567	0.070139	-6.466709	0.0000
R-squared	0.708661	Mean dependent var		0.002794
Adjusted R-squared	0.617260	S.D. dependent var		0.292783
S.E. of regression	0.181133	Akaike info criterion		-0.366852
Sum squared resid	1.673268	Schwarz criterion		0.188025
Log likelihood	29.47297	Hannan-Quinn criter.		-0.146993
Durbin-Watson stat	1.331179			

Source: Researcher's own work based on program results (Eviews: 12

H. Estimating the long-term relationship according to the (ARDL) methodology

It is clear from the results of Table (8) that the independent variable represented by the money supply (M2), had an inverse effect on the dependent variable represented by imported inflation (IIN) in the long term, and the truth of this can be identified through the value of (Prob) which was less than (10%), while there was a clear direct effect regarding the independent variable represented by the mandatory reserve (LR), on the dependent variable represented by imported inflation in the long term, given that the value of (Prob) was less than (10%), and this did not agree with the logic of economic theory, due to the structural imbalances that Iraq suffers from, in addition to the economic and political situation and economic and political challenges, which affect the effectiveness of the Central Bank's policies, as political unrest and economic instability can reduce the effectiveness of mandatory reserve policies in controlling imported inflation, and it is noted that there is an inverse and significant relationship between the interest rate and imported inflation in the long term, because the probability value was less than 10%, and this is consistent with economic theory, as the Central Bank aims to increase the interest rate to reduce demand, so when it raises The central bank interest rate, the cost of borrowing increases, which leads to a reduction in consumer and investment spending, which leads to a reduction in demand for goods and services, and thus a reduction in demand for imports, which can reduce imported inflationary pressure, as well as an increase in the value of the local currency (the Iraqi dinar) because it makes financial assets in dinars more attractive to investors, and a stronger currency makes imports less expensive, which can reduce imported inflation, and there is an inverse relationship between currency window sales and imported inflation, and this is consistent with the objectives of currency window sales, as when the amount of currency window sales increases, it increases the value of the local currency, which makes imports less expensive, and the decrease in the cost of imports can lead to a decrease in imported inflation, as imported goods and services become cheaper for local consumers, in addition to reducing inflationary pressure, as improving the value of the local currency through currency window sales can reduce inflationary pressure in the local economy, which helps stabilize prices and prevent an increase in imported inflation.

Table (8)

Results of estimating the long-term relationship according to the (ARDL) methodology for the imported inflation equation

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2	-1.50E-05	5.95E-06	-2.527594	0.0150
LR	0.000343	7.84E-05	4.375266	0.0001
IR	-0.210586	0.065635	-3.208434	0.0024
CWS	-3.71E-05	1.19E-05	-3.116743	0.0031
C	1.750967	0.656514	2.667067	0.0105
EC = IIN - (-0.0000*M2 + 0.0003*LR -0.2106*IR -0.0000*CWS + 1.7510)				

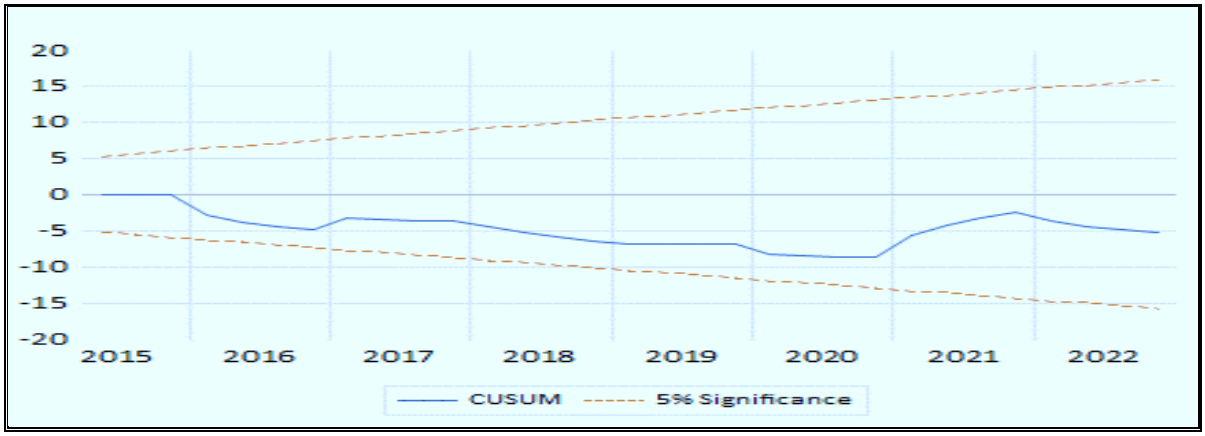
Source: Researcher's own work based on program results (Eviews: 12

7-Stability test of model parameters

It is clear from Figures (1) and (2) that the estimated line falls within the critical limits and oscillates around the zero value and the upper and lower limits and at a significance level of (5%), and thus the long- and short-term parameters, in light of the statistical test, are considered stable for the estimated model (ARDL).

Figure (1)

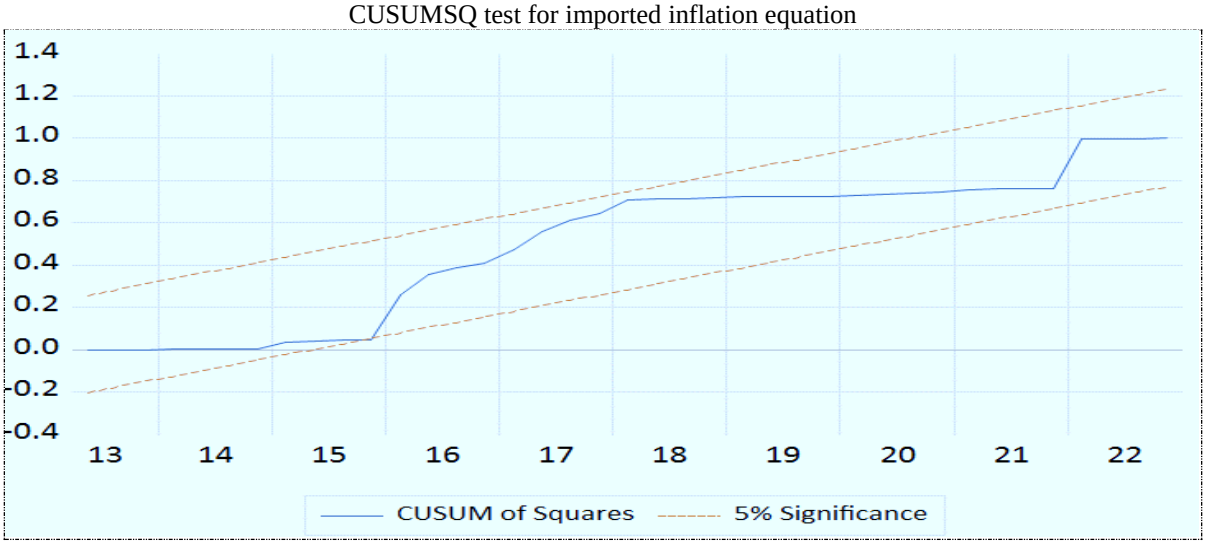
Results of the test for the cumulative sum of residuals CUSUM



Source: Researcher's own work based on program results (Eviews: 12

Figure (2)

CUSUMSQ test for imported inflation equation



Source: Researcher's own work based on program results (Eviews: 12

Conclusions

1-Money supply (M2) had an inverse effect on imported inflation in the long term

2-There is a clear direct effect regarding the independent variable, the required reserve (LR), on the dependent variable, the imported inflation in the long term, given that the value of (Prob) was less than (10%)

3-There is an inverse and significant relationship between the interest rate and imported inflation in the long term because the probability value was less than 10%.

4-There is an inverse relationship between currency window sales and imported inflation.

Recommendations

1-Emphasizing the continuation and preservation of the independence of the Central Bank of Iraq to enable it to increase the effectiveness of monetary policy in creating tools that keep pace with urgent economic events.

2-Iraq must benefit from the experiences of countries in confronting external shocks through cooperation in reducing the role of oil and benefiting from the experiences of diversifying the economy and adopting a diversification strategy.

3- Training specialized cadres in banks to monitor the course of economic events and predict what will happen through a database related to monetary and financial indicators to enable them to develop early solutions before the shock.

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