World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 33, April, 2024
ISSN: 2749-3628,

MEASURING AND ANALYZING THE IMPACT OF MONEY SUPPLY ON ECONOMIC INFLATION IN IRAQ

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Article history:

Received: 11th January 2024
Accepted: 7th March 2024

Abstract:

The research included the concept of money supply and the factors affecting it, as well as inflation and the factors affecting inflation, that is, the research dealt with the descriptive aspect and the standard aspect based on statistical tools in analyzing the relationship between the money supply as the independent variable, and inflation as the dependent variable), which made the years (2004-2023) as limits to the study of measuring the impact of increasing the money supply on raising inflation rates in the Iraqi economy, as the following statistical tools were used in this study, the cointegration model, through the Johansen model, and the results were the presence of a relationship between the two variables, in the short term and the absence of a relationship In the long term, by testing the Johansen model.

Keywords: Money supply, inflation, Rangel Angel.

1. THE INTRODUCTION

The problem of inflation is considered one of the fundamental problems that capitalist economies have faced from the beginning until it has become an economic and monetary phenomenon faced by contemporary developed and developing economies. Iraq was and still is affected by this problem. , refers to the continuous rise in the general level of prices, which is usually calculated in a specific period of time, one year, so that it can be said that the current economic era is the era of inflation, and for this reason this topic has received great attention today, not only because it is of interest not only to colleges. Economics but also for political colleges, universities and research centres, it is also of interest due to its importance.

It negatively affects the economic efficiency of individuals, societies and countries. As a developing economy, the Iraqi economy has been severely affected by inflation, especially under special circumstances such as war and blockade. This problem began in the early eighties and continued even after the occupation in 2003. Now the development of the money supply is considered a fundamental factor in the occurrence and development of this problem in various economies, including the Iraqi economy.

1.1. Research Aims

- Knowing the causes and effects of inflation, with a view to avoiding it, especially by using a sound and appropriate money supply policy.
- Knowing the impact of changing the money supply on increasing inflation rates in the Iraqi economy, in order to avoid increasing these rates, especially if this supply is changed in an amount that does not lead to an increase in inflation rates, by linking this change to the level of change in the supply of goods and services, especially production. the local.

1. 2. Research problem

The increase in the money supply in the Iraqi economy contributed mainly to the problem of inflation, especially in light of the weak production in the economy.

research assumes

- There is a relationship between money supply and inflation in the short term, during the period (2004-2023).
-There is no relationship between money supply and inflation in the long term, during the period (2004 – 2023).

2. PREVIOUS STUDIES:

- Hassan Ali Kaitan, 2016, Measuring and analyzing the effect of money supply on inflation and the foreign exchange rate in the Iraqi economy for the period (1991-2014). The study proved that there is a relationship between the two variables. In addition, the study showed that banking awareness and the development of banking services did not grow well. This is indicated by the rise in the currency in circulation and the decline in current deposits, which weakened the role of monetary policy to mitigate high inflation rates and the deterioration in the exchange rate of the Iraqi dinar against the US dollar.
- Adnan Manati Saleh, Money supply and its impact on inflation, an analytical study in the Iraqi economy for the period (1990 - 2013). The study concluded that there is a strong relationship, through the results of

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Available Online at: https://www.scholarexpress.net
Vol. 33, April, 2024
ISSN: 2749-3628,

the correlation coefficient and the strength of the relationship between the two variables.

- Laila Badawi Mutlaq, fluctuations in the level of liquidity and its impact on inflation. The study concluded that the effect of bank liquidity was inverse on inflation, and the fact that local liquidity is affected by the state's financial policy, in that inflation is affected by the central bank's procedures in controlling the exchange rate and the currency auction.

3. The theoretical framework of money supply and economic inflation in Iraq

3. 1. MONEY SUPPLY

3. 1. 1 . Definition of money supply:

The concept of money supply is the purchasing power of an individual and is defined as the availability of money, i.e. the liquid assets of the economic sector (Thuraya Al-Khazraji, 34, 2010), which depends on the increase in the flow of currencies, services, goods, and money supply: the increase exceeds the flow of goods and services, which leads to economic inflation, and a decrease in the money supply. It leads to unemployment, deflation and economic stagnation. In other words, the money supply refers to the absolute amount of money available in society, and there are three forms of money supply in means of payment (M1, M2, M3), which represent different estimates of the money supply and can be interpreted as follows: Continued, (Hanan Hassan Mustafa, Hajar Adnan Zaki, 128, 2023)

M1 = are the currencies in circulation among the public or individuals outside banks, and they consist of, in addition to, circulation notes, cash currencies in circulation, and cash reserves in banks, (Asim Muhammad Saleh 120, 1978).

2 M= M1 + S + P, which means narrow money supply + savings deposits + postal savings accounts, which are not the same as current deposits.

M3 = M1 + M2 + cash deposits.

3.1. 2. Factors affecting the money supply.

There is a group of factors or determinants that affect the amount of cash provided, whether cash in circulation or cash available in commercial banks or other banks, as follows (Abdel Moneim El-Sayed Ali, 203, 1970).

1. Cash (C) in circulation outside individuals or banks. This is the factor that has the greatest impact on the size of the money supply, as the central bank or monetary authority cannot control the actions of individuals and how they spend or dispose of this money.

2. Bank cash reserves (R) are the amount of money held as liquid, convertible cash in the vaults of commercial banks. It is also important in influencing the money supply, and what it represents with money in circulation is called the cash basis or high balance (B=C+R)) 3 The variables R and C are positively related to the money supply M1 (Bilal Nouri Saeed and Mina Ghassan Hamid, 20, 2021) .

3. The money multiplier (m) represents the ratio of the money supply to the money base M= $\frac{M1}{B}$, and the greater the value of the money multiplier (1), the greater the money supply when the money base (B) increases. The amount of change or change is less than the amount of change in the money supply (B1>M).

4. The price index (IP) indicates the amount of change in the general level of consumer prices during a specific period (one year). It is considered a measure of the level of inflation in a country's economic activity. Whenever prices rise or increase, or the level of inflation rises, this negatively affects the money supply, which means that there is an inverse relationship between inflation and the quantity of money , W = $\frac{M1}{Pi}$.

W = purchasing power, IP the general level of prices.

5. Other factors that the central bank affects in the money supply include interest rates and legal reserve ratios, but their influence is less than the previous variables, especially the money base or high-density balances.

3. 2 . 1. The concept of inflation

Inflation means a continuous rise in the general level of prices, calculated over a specific period of time, usually a year, which leads to a decrease in the real value of money and thus a decrease in the real income of the individual and the state. This increase reflects the rise in the prices of basic consumer goods and services and the prices of goods and services included in the calculation of the gross domestic product. Total, (Hassan bin Salem Jaber Al-Zubaidi, 35, 2011).

3. 2 . 1. 1. Factors that can affect inflation:

1. Monetary policy: Decisions made by central banks, such as increasing or decreasing interest rates, can affect inflation.

2. Demand-induced inflation: When demand for goods and services in the economy rises faster than supply, this can lead to inflation, (Khaled Wassif Al-Wazani, Ahmed Hussein Al-Rifai, 78, 2001).

3. Cost-induced inflation: When the cost of producing goods and services rises, this can lead to higher prices and inflation.

4. Expectations: If people expect prices to rise in the future, they may be more likely to buy goods and services now, leading to increased demand and potential inflation, (Ramzi Zaki, 135, 1986).

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5 .Fiscal policy: Decisions made by the government, such as increasing or decreasing taxes or spending, can affect inflation.
6. Global Factors: Inflation can be affected by events and policies in other countries, such as changes in trade agreements or natural disasters that affect global supply chains.
7. Structural factors: Changes in the structure of the economy, such as increased competition or technological advances, can affect inflation.
8 .Supply shocks: Unexpected changes in the supply of goods and services, such as natural disasters or political events, can lead to inflation. (Samo Yelsin, 46, 2006).

3. 2 . 1. 2. Factors that lead to a decrease in inflation rates, (Rawhi Samara, 66, 2013):

1. A decrease in government and individual spending.
2. Surpluses are formed in government budgets, which means that tax collection is greater than government spending.
3. A decrease in the growth rate of the money supply and its volume.
4 . A rise in the level of interest rates above the general rate of inflation, which means that depositors with financial institutions will benefit.

4 STATISTICAL ANALYSIS

4.1. Data examination: The examination is done through measures of central tendency, graphs, measures of dispersion, and the normal distribution test. All of these statistical operations are considered part of data examination.

4. 1. 1. The table below shows the descriptive statistics for the dependent variables represented by inflation and the independent variables represented by the money supply in Iraq.

Mean	8.605000	80932841
Median	3.450000	87019674
Maximum	64.80000	1.76E+08
Minimum	-4.400000	12254000
Std. Dev.	16.15932	47236326
Skewness	2.504346	0.348287
Kurtosis	8.608913	2.501668
Jarque-Bera	47.12242	0.611291
Probability	0.000000	0.736648
Sum	172.1000	1.62E+09
Sum Sq. Dev.	4961.350	4.24E+16
Observations	20	20

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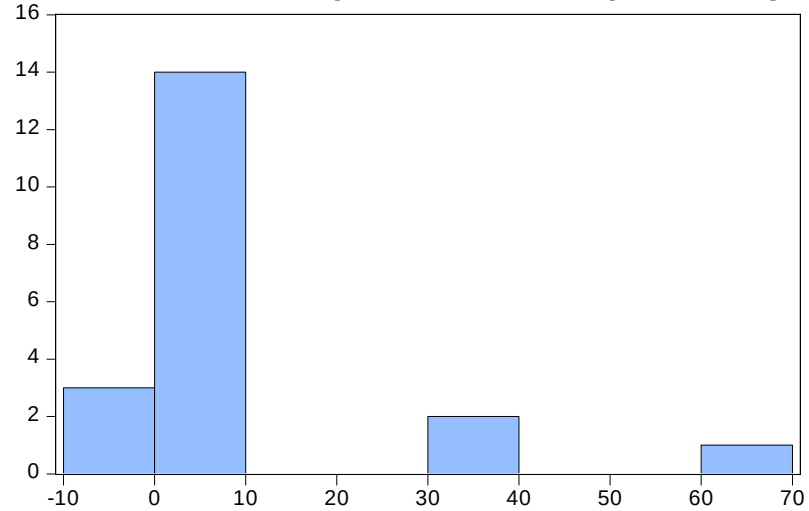

Series: INFLATION
Sample 2004 2023
Observations 20

Mean	8.605000
Median	3.450000
Maximum	64.80000
Minimum	-4.400000
Std. Dev.	16.15932
Skewness	2.504346
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Jarque-Bera	47.12242
Probability	0.000000

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Vol. 33, April, 2024
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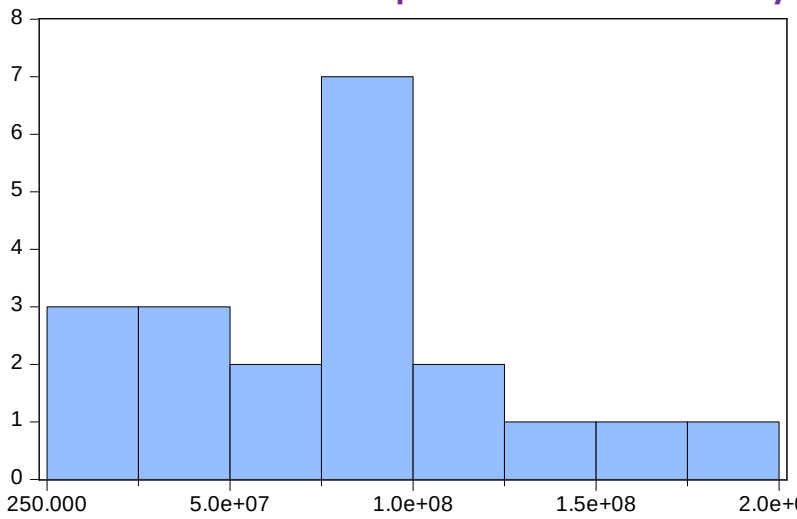
From the table we notice that the inflation variable does not follow a normal distribution, meaning that Jarque – Bera test: P < 0.05, Not Normal distribution, and therefore we accept the alternative hypothesis, and reject the null.

4. 1. 3 . The table shows descriptive statistics for the money supply variable in Iraq.



Series: MONEYSUPPLY
Sample 2004 2023
Observations 20

Mean	80932841
Median	87019674
Maximum	1.76e+08
Minimum	12254000
Std. Dev.	47236326
Skewness	0.348287
Kurtosis	2.501668
Jarque-Bera	0.611291
Probability	0.736648

The table above shows the normal distribution through the results of the parameters that were greater than 5%, which shows that there is a correlation in the values of the above variable, that is, Jarque – Bera test: P > 0.05, normal distribution**.**

4. 2. Unit root test for both inflation and money supply:

4. 2. 1. Testing the unit root on the stationary inflation variable through the Augmented Dickey-Fuller test

Null Hypothesis: INFLATION has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.626257	0.0116
Test critical values:	1% level	-2.692358	
	5% level	-1.960171	
	10% level	-1.607051	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 19

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFLATION)
Method: Least Squares
Date: 01/03/24 Time: 23:47
Sample (adjusted): 2005 2023
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION(-1)	-0.461810	0.175843	-2.626257	0.0171

R-squared	0.271120	Mean dependent var	-1.452632
Adjusted R-squared	0.271120	S.D. dependent var	16.51011

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S.E. of regression	14.09542	Akaike info criterion	8.180772
Sum squared resid	3576.253	Schwarz criterion	8.230480
Log likelihood	-76.71734	Hannan-Quinn criter.	8.189185
Durbin-Watson stat	2.452677		

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 16

The table above shows that the exchange rate variable is fixed at 1% level, where the value of 4. **4. 2. 2. Unit root test for the stationarity of the money supply variable through the Augmented Dickey-Fuller test**.

Null Hypothesis: MONEYSUPPLY has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.401311	0.3664
Test critical values:	1% level	-4.571559	
	5% level	-3.690814	
	10% level	-3.286909	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 18

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MONEYSUPPLY)
Method: Least Squares
Date: 01/07/24 Time: 23:34
Sample (adjusted): 2006 2023
Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MONEYSUPPLY(-1)	-0.431799	0.179818	-2.401311	0.0308
D(MONEYSUPPLY(-1))	0.804024	0.269974	2.978152	0.0100
C	3110401.	3508676.	0.886489	0.3903
@TREND("2004")	3162389.	1271333.	2.487459	0.0261

R-squared	0.449666	Mean dependent var	8979028.
Adjusted R-squared	0.331738	S.D. dependent var	7952303.
S.E. of regression	6500794.	Akaike info criterion	34.40588
Sum squared resid	5.92E+14	Schwarz criterion	34.60374
Log likelihood	-305.6529	Hannan-Quinn criter.	34.43316
F-statistic	3.813037	Durbin-Watson stat	2.389084
Prob(F-statistic)	0.034535		

research results

The independent variable, represented by the money supply, is stationary, at the zero level, since the trend is less than 5%. Therefore, we accept the result with the alternative hypothesis and reject the null hypothesis, whatever the results.

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ISSN: 2749-3628,

4. 2. 3. Static test results

4. 3. The relationship of the dependent variable to the independent variable (money supply) through the LS-Least squares test (NLS and ARMA).

Dependent Variable: INFLATION
Method: Least Squares
Date: 12/30/23 Time: 22:36
Sample: 2004 2023
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.79235	6.447242	3.535210	0.0024
MONEYSUPPLY	-1.75E-07	6.92E-08	-2.531675	0.0209

R-squared	0.262579	Mean dependent var	8.605000
Adjusted R-squared	0.221611	S.D. dependent var	16.15932
S.E. of regression	14.25678	Akaike info criterion	8.246982
Sum squared resid	3658.605	Schwarz criterion	8.346555
Log likelihood	-80.46982	Hannan-Quinn criter.	8.266420
F-statistic	6.409381	Durbin-Watson stat	1.365990
Prob(F-statistic)	0.020884		

Through the table above, there is a significant relationship between the independent variable and the dependent variable, as a result of the presence of both significant trends as shown above, through the parameter (0.0024), as well as the value of the parameter C (0.0209), and therefore we reject the null hypothesis, and accept the alternative hypothesis, due to the existence of a relationship Between the independent variable and the dependent variable.

4.4. Cointegration test, through the Johansen test model.

Dependent Variable: INFLATION
Method: Least Squares
Date: 01/04/24 Time: 00:30
Sample: 2004 2023
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.79235	6.447242	3.535210	0.0024
MONEYSUPPLY	-1.75E-07	6.92E-08	-2.531675	0.0209

R-squared	0.262579	Mean dependent var	8.605000
Adjusted R-squared	0.221611	S.D. dependent var	16.15932
S.E. of regression	14.25678	Akaike info criterion	8.246982
Sum squared resid	3658.605	Schwarz criterion	8.346555
Log likelihood	-80.46982	Hannan-Quinn criter.	8.266420
F-statistic	6.409381	Durbin-Watson stat	1.365990
Prob(F-statistic)	0.020884		

first stage: The estimated, now the remains are extracted

4.4.1. The first stage: The regression stage was estimated Now extract the remains.

Last updated: 01/04/24 - 00:39

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Modified: 2004 2023 // makeresids u

2004 11.0557452052561
2005 11.38171904049188
2006 45.70292424632236
2007 -13.36701211999166
2008 -9.871010141263326
2009 -19.22718449901973
2010 -8.906802419715701
2011 -4.139713547850438
2012 -5.661550781426536
2013 -4.001078277600863
2014 -4.891602627251984
2015 -5.674903824011839
2016 -7.633792567673909
2017 -5.714711970760341
2018 -6.170563602483582
2019 -4.559344541156353
2020 1.426957577272415
2021 7.029359677432663
2022 11.00876487231476
2023 12.21380030111608

4.4.2. The second stage is the sleep test:

Null Hypothesis: U has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.043961	0.0487
Test critical values:	1% level	-3.831511	
	5% level	-3.029970	
	10% level	-2.655194	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 19

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(U)
Method: Least Squares
Date: 01/04/24 Time: 00:47
Sample (adjusted): 2005 2023
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
U(-1)	-0.709563	0.233105	-3.043961	0.0073
C	-0.395180	3.168061	-0.124739	0.9022

R-squared	0.352768	Mean dependent var	0.060950
Adjusted R-squared	0.314696	S.D. dependent var	16.66258
S.E. of regression	13.79380	Akaike info criterion	8.185617

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Sum squared resid	3234.573	Schwarz criterion	8.285031
Log likelihood	-75.76336	Hannan-Quinn criter.	8.202441
F-statistic	9.265698	Durbin-Watson stat	2.078822
Prob(F-statistic)	0.007333		

Through the table above, it shows us that there is a relationship between the independent variable and the dependent variable through the parameters (0.8206), and Statistic 11.87478) is smaller than Critical Value (25.87211), and through None and Statistic 6.874198 is smaller than Critical Value (19.38704), and therefore we reject the alternative hypothesis and accept the null hypothesis because there is no correlation between the independent variable and the dependent variable in the long run.

5. CONCLUSIONS AND RECOMMENDATIONS

5. 1. Conclusions:

- Proving the validity of the hypothesis that there is a significant and positive effect between the money supply as the independent variable and inflation as the dependent variable, and this was proven by the results of the analysis of the simple linear regression model 2. Inflation is one of the most serious economic problems that various countries, including Iraq, suffer from, and it has social, political, and security repercussions, especially what Iraq suffers from is stagflation, which combines inflation and unemployment.
- The Central Bank of Iraq was able to reduce inflation rates after 2003 in light of the increasing foreign exchange earnings resulting from the rise in crude oil prices, compared to the 1990s.

As Iraq is a developing country and lacks an advanced banking system, the currency in circulation constitutes the largest proportion of the money supply compared to current deposits.

The weakness of the productive system in Iraq, especially the commodity production sectors (industry and agriculture), led to an exacerbation of inflation rates.

5. 2. Recommendations:

- Activating the role of monetary policy in economic life, especially through the independence of the Central Bank of Iraq, as this is a basic necessity to address economic problems, including inflation. Developing the banking and financial sector and activating its role to serve the economic development process in the country.
- The Central Bank follows a policy of absorbing money from the public, in order to reduce inflation, using this bank's tools that do not disrupt investment and economic development.
- Creating banking and savings awareness for individuals, leading to addressing inflation

Reducing inflation rates and addressing unemployment depends on developing productive commodity sectors, especially industry and agriculture, in order to provide products and reduce dependence on imports, which at the same time constitutes a basic solution to the problem of unemployment and its social and security repercussions.

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