THE IMPACT OF INFLATION AND INTEREST RATES ON EXCHANGE RATES IN IRAQ

Lect. Dr. Jabbar Saadoon Darag
AL-Nahrain University: Baghdad, Iraq.
Email: jabbar.saadon@nahrainuniv.edu.iq.

A B S T R A C T	K E Y W O R D S
The research included the concept of the exchange rate and the factors affecting it, as well as inflation in terms of the concept and the factors affecting it, and interest rates in terms of the concept and factors affecting the interest rate, for the period (2004-2023). Data was used through the Central Bank of Iraq. An autoregressive model was studied. Through the ARDL program, the results were that there was a relationship between the independent variables, represented by inflation and interest rates, and the dependent variable, represented by the exchange rate, through the results of the aforementioned model.	Exchange rate, interest rates, inflation, ARDL

Introduction

Exchange rates parallel to the official exchange rates are one of the economic and financial indicators that express the strength of the economy of any country, whether developed or developing countries. Exchange rates are affected by multiple political and economic factors, and among these economic factors are inflation and prevailing interest rates in the market. Which reflect their impact on the exchange rate of the national currency in the market parallel to the official national exchange rate. This research focuses on the impact of inflation and interest rates on the exchange rates for the period (2004 - 2023), in Iraq and some neighboring countries. The research produced several conclusions and recommendations, which are...

1. 1. Research problem:

 Iraq has gone through difficult economic, political and social conditions represented by a comprehensive international economic blockade that isolated the country from the outside world for the period between 1990 and early 2003 following Iraq's occupation of the State of Kuwait and the subsequent deterioration of the economic and security situation until now, in addition to the consequences of the First Gulf War during The decade of the 1980s left a heavy economic legacy that had a negative impact on the exchange rate, as an inevitable result of high inflation rates.

1.2. Research objectives:

The research aims to confirm its hypothesis and thus identify the errors of the economic policies taken at the time and attempt to develop solutions to address them, which prevent their recurrence by adopting balanced economic monetary and financial policies that work in an integrated manner to reflect economic performance that thus reflects positively on achieving stability.

1. 3. Research hypothesis:
2.Previous studies:

- Hakim Mohsen Muhammad, 2002, The impact of inflation and interest rates on exchange rates, and he stated that exchange rates are affected by multiple political and economic factors, and among these economic factors are inflation and interest rates prevailing in the market, which reflect their impact on the exchange rate of the national currency in Parallel market for the national official exchange rate. This research focuses on the impact of inflation and interest rates on the parallel exchange rates for the period from (1992 - 2001) in Iraq and some neighboring countries.

- Mahmoud Muhammad Dagher, Ihsan Jabr Ashour, 2014, and it was concluded through standard tests that there is a single cointegration between the money supply and the inflation rate and between the money supply and the parallel exchange rate, which confirms the existence of a long-term relationship between the variables, and the results of testing the error correction vector model also confirmed (VECM) The existence of a long-term, one-way causal relationship from the money supply to the inflation rate, which confirms that inflation in the Iraqi economy is a monetary phenomenon and that expansions in the money supply have harmed economic stability, and also the existence of a long-term, one-way causal relationship from the parallel exchange rate to Money supply, which indicates the impact of the exchange rate on the money supply and then economic stability in Iraq, which indicates the use of the exchange rate channel primarily by monetary policy to transfer the monetary impact to economic activity.

- Bouzidi Souad, Taleb Dalila, 2017, The impact of changing the interest rate and the money supply on the real exchange rate. The study showed that there is a long-term relationship between the exchange rate as a dependent variable and both the interest rate and the money supply as independent variables, as the money supply has a negative impact on the exchange rate.

3. The theoretical framework of inflation, interest rates and exchange rates
3. 1. Inflation
3. 1. 1.The concept of inflation

Inflation is defined as an increasing rise in the prices of consumer goods. This definition is one of the simplest types of definitions of inflation. There are other definitions, but this definition is clearer from the consumer's point of view, and inflation may be accompanied by full employment in exchange for a decrease in unemployment, as prices rise as the percentage of employment of the unemployed increases (Jawad Shaker Freih, Ahmed Hussein Battal, 108, 2023).

3.1. 2. Factors affecting inflation

Inflation arises due to various economic factors, the most prominent of which are:

Cost-induced inflation: This type of inflation arises due to the rise in operational costs in industrial or non-industrial companies, such as the contribution of company management in raising the salaries

and wages of its employee members, especially those who work in production sites, which comes due to workers' demands to raise wages (Yahya, Widad Younis, 100, 2001).

- Demand-induced inflation: This type of inflation results from an increase in the volume of money demand, which is accompanied by a fixed supply of goods and services, as the increase in aggregate demand is not matched by an increase in production. Leading to higher prices
- Inflation resulting from total changes in the composition of total demand in the economy, even if this demand is excessive or there is no economic concentration, as prices can rise and cannot fall despite a decrease in demand, (Jawad Shaker Freih, Ahmed Hussein Battal, 108, 2023) .
- Inflation resulting from the practice of economic blockade towards other countries, practiced by external forces, as is happening to Iraq and Cuba. Therefore, imports and exports are absent in the case of a total blockade, which leads to high inflation rates and thus a decline in the value of the national currency and an increase in prices at unreasonable rates.

3.2. Exchange rates
3. 2 . 1. The concept of exchange rate

Exchange rates represent the conversion relationship between currencies, and this depends on the supply and demand relationships between two currencies. The foreign exchange rate is the price of a currency unit with a corresponding currency unit of another country, (2023, 127, (Hanan Hassan Mustafa, Hajir Adnan Zaki) and is expressed in the national currency. Such as the Iraqi dinar against the dollar, the Jordanian dinar, the Syrian pound, or the French franc against the German mark. The foreign exchange rate expresses the amount of units of one of the two currencies that are exchanged for one unit of the other currency. There are two types of exchange rates, which are fixed exchange rates and free exchange rates., (Hakim Mohsen Muhammad, 153, 2002.

  1. Fixed exchange rates: Fixed exchange rates are determined in light of some foundations determined by the official administration in the country to determine the fixed exchange rate, and this relationship between the two currencies does not change except within very limited margins.
2. Free exchange rates: The exchange rates of the national currency change against other currencies based on the relationship between supply and demand for the currency in the foreign exchange market, and this change occurs freely in the free exchange rates.

3. 2 . 2. Factors affecting exchange rates: Exchange rates are affected by several factors, the most prominent of which are:

1. High exchange rates for foreign currencies, which leads to a decrease in the value of the national currency against these currencies (Damodaran, Aswath, 66, 1999).
2. The decline in exports or the decline in their prices affects the volume of cash flows entering the country.
  3. Wars and natural disasters affecting the national economies of countries, as this affects the imbalance in the strength of the national economy, which leads to a decline in the value of the national currency against other currencies.
4. Inflation rate: The high rate of inflation in national economies leads to a decrease in the value of the national currency against other currencies, and thus the exchange rate is affected, which leads to an increase in the number of units of the national currency that are exchanged for one unit of its corresponding foreign currency.

5. External debt and debt service: External debt is one of the burdens that burden the national economy, in addition to the debt service represented by annual interest installments. Some countries may resort to rescheduling their debts with creditors in exchange for high interest, which makes these countries pay the interest and not the original installments, and this means an imbalance. The national currency against other currencies
(MADURA, TEFF, 2000, 78).

6. Interest rates: Interest rates affect exchange rates indirectly. Low interest rates with the availability of investment opportunities lead to an increase in demand for capital with the aim of investing it. Investment is achieved, the national economy is stimulated, and investment is doubled to achieve the strength of the national economy, which leads to an improvement in the value of the national currency. towards other currencies. While high interest rates lead to investors avoiding the trend towards borrowing, resulting in a decline in investment and a decline in economic growth, which leads to adverse results that reduce the strength of the national economy, and this is reflected in the value of the national currency towards other currencies. Weston, J, Fneel & Brigham, f, Engene, 34, 1997).

3. 3. Interest rates
3. 3 . 1. The concept of interest rate
The interest rate is the amount resulting from the process of borrowing money from a bank or commercial institution, and is usually expressed as a rate or percentage. The term interest may also express the percentage that an investor owns in the capital of a particular company. The interest rate is affected by many variable factors, such as the inflation rate, the duration of the lending period, the degree of liquidity, and the risk of default on payments due, (1988, 210, Henning, N, Cgarles, Pigott, Willian & Haneyseott, Robert).

3. 3 . 2. Factors affecting the interest rate
1. Forces of supply and demand: The interest rate is directly affected by the rates of supply and demand for money within the country's economy. An increase in demand for credit will lead to higher interest rates and thus higher costs of the borrowing process, and vice versa. Reduced demand for credit. Over time, interest rates will decrease, and thus the cost of the borrowing process will decrease (Damodaran, Aswath, 33, 1999).

2. Inflation rate: Interest rates rise directly with rising inflation rates, and the reason for this is that the parties that lend money use the money generated by the interest to limit their losses resulting from the currency losing its value due to high inflation rates (Brenner, Menachem & Venezia , It zhak ,44,2003)

3. Government policies: The government's movements in the market affect interest rates. If the government buys bonds, the amount of money in the hands of banks will increase, so banks reduce interest rates with the aim of encouraging the public to borrow from them, so that the money does not remain frozen without benefiting from it. When the government sells these bonds, this reduces the bank's ability to lend, causing interest rates to rise (Henning, N, Cgarles, pigott, Willian & Haneyseott, Robert, 207, 1988).

4 Statistical analysis

4.1. Data examination: Data can be examined, using measures of central tendency, measures of dispersion, a normal distribution test, and graphs. All of these statistical operations are considered part of data examination. Descriptive statistics can be clarified for the dependent variable represented by public debt, and the independent variables represented by the exchange rate and the interest rate.
.

4. 1. 1. Table No. (1), showing the normal distribution of the independent variables (MI, I) and the dependent variable (ER)
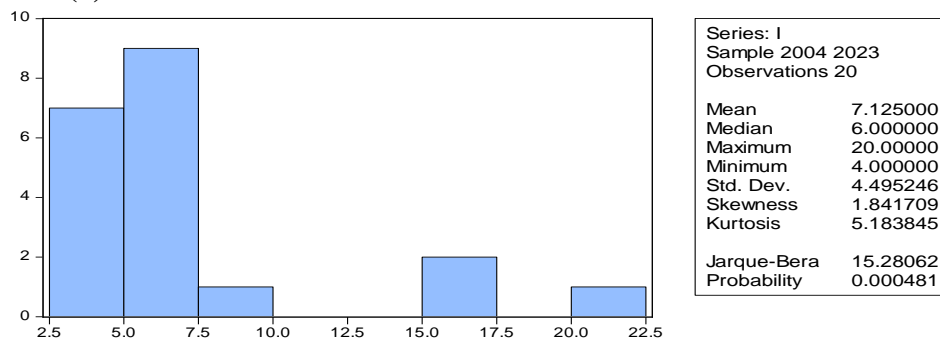
The table below shows that the exchange rate follows a normal distribution, with Probability being greater than 1% and greater than 5%, while the interest rate variable and inflation do not follow the distribution, with Probability being less than 5%. Therefore, we accept the alternative hypothesis and reject the null hypothesis.

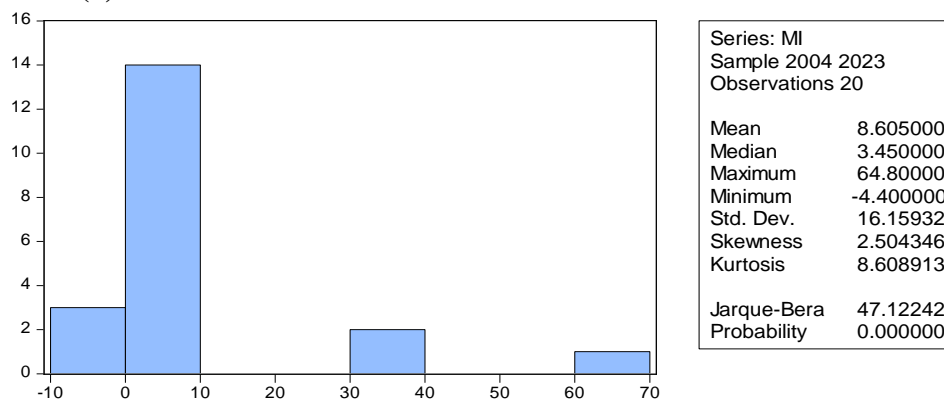|	I	MI	ER
Mean	7.125000	8.605000	124.7500
Median	6.000000	3.450000	117.5000
Maximum	20.00000	64.80000	147.0000
Minimum	4.000000	-4.400000	116.0000
Std. Dev.	4.495246	16.15932	12.24691
Skewness	1.841709	2.504346	0.994699
Kurtosis	5.183845	8.608913	2.176448
Jarque-Bera	15.28062	47.12242	3.863288
Probability	0.000481	0.000000	0.144910
Sum	142.5000	172.1000	2495.000
Sum Sq. Dev.	383.9375	4961.350	2849.750
Observations	20	20	20

4. 1. 2. Table No. (2) Normal distribution of the exchange rate variable.
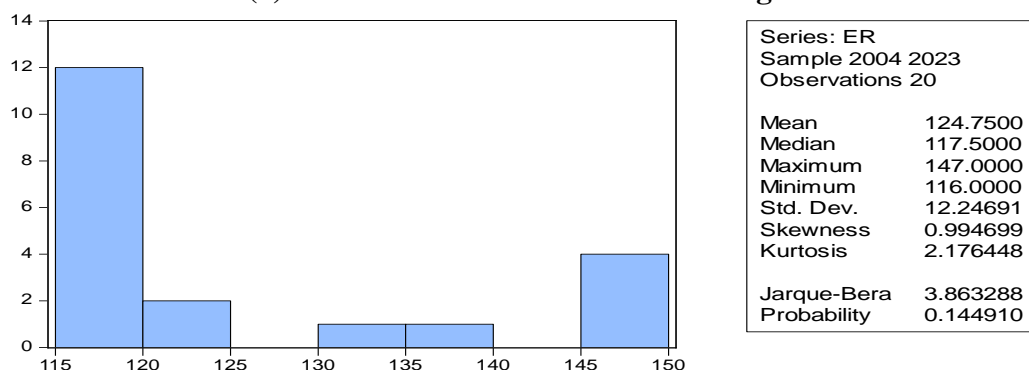
The exchange rate follows a normal distribution, with Probability (0.144910) being greater than 5%, and therefore we accept the null hypothesis and reject the alternative hypothesis.

4. 1.3. Table No. (3) Normal distribution of the interest rate variable.

Series: I	
Sample 2004 2023	
Observations 20	
Mean	7.125000
Median	6.000000
Maximum	20.00000
Minimum	4.000000
Std. Dev.	4.495246
Skewness	1.841709
Kurtosis	5.183845
Jarque-Bera	15.28062
Probability	0.000481

The interest rate follows a normal distribution, with Probability (0.000481) being less than 5%. Therefore, we accept the alternative hypothesis and reject the null hypothesis.

4. 1. 4. Table No. (4) Normal distribution of the inflation variable.

Series: MI	
Sample 2004 2023	
Observations 20	
Mean	8.605000
Median	3.450000
Maximum	64.80000
Minimum	-4.400000
Std. Dev.	16.15932
Skewness	2.504346
Kurtosis	8.608913
Jarque-Bera	47.12242
Probability	0.000000

Inflation does not follow a normal distribution, since Probability (0.000000) is less than 5%, and therefore we accept the alternative hypothesis, and reject the null hypothesis.

4. 2. Unit root test
4. 2 .1 . Table No. (5) shows the exchange rate static test

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.193285	0.0374
Test critical values:	1% level	-3.857386	
	5% level	-3.040391	
	10% level	-2.660551	

*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(ER)

Method: Least Squares
Date: 01/13/24   Time: 06:32
Sample (adjusted): 2006 2023
Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ER(-1)	-0.471040	0.147509	-3.193285	0.0060
D(ER(-1))	0.472934	0.219500	2.154594	0.0479
C	57.20933	18.24065	3.136365	0.0068

R-squared	0.436417	Mean dependent var		-0.833333
Adjusted R-squared	0.361273	S.D. dependent var		8.382405
S.E. of regression	6.699254	Akaike info criterion		6.792881
Sum squared resid	673.2000	Schwarz criterion		6.941276
Log likelihood	-58.13593	Hannan-Quinn criter.		6.813343
F-statistic	5.807710	Durbin-Watson stat		2.004516
Prob(F-statistic)	0.013558			

From the table above it is clear that the exchange rate is stationary at the original level (Constant), and in a slowdown phase of 1, the exchange rate is stationary, (Probability (0.0374), at the level of 5%.

4. 2 .2 . Table No. (6) Interest rate static test

Null Hypothesis: I 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		-4.620279	0.0091
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(I)
Method: Least Squares
Date: 01/13/24   Time: 06:35
Sample (adjusted): 2006 2023
Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
I(-1)	-0.812524	0.175860	-4.620279	0.0004
D(I(-1))	0.711969	0.176509	4.033617	0.0012
C	10.66520	2.653346	4.019531	0.0013

@TREND("2004")	-0.450975	0.146405	-3.080329	0.0081

R-squared	0.659275	Mean dependent var	0.027778
Adjusted R-squared	0.586262	S.D. dependent var	3.457610
S.E. of regression	2.224020	Akaike info criterion	4.629640
Sum squared resid	69.24771	Schwarz criterion	4.827500
Log likelihood	-37.66676	Hannan-Quinn criter.	4.656922
F-statistic	9.029602	Durbin-Watson stat	0.947072
Prob(F-statistic)	0.001403		

From the table above it is clear that the interest rate is static at the original level and at the longest model (Constant, Linear Trend), and a slowdown rate of 1. ,The interest rate, Probability (0.0091), will remain at 1%.

4. 2 .3 . Table No. (7) Static inflation test

Null Hypothesis: MI 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(MI)
Method: Least Squares
Date: 01/13/24   Time: 06:36
Sample (adjusted): 2005 2023
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MI(-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
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		

From the table above it is clear that inflation is stationary at the original level and at None, i.e. without (Constant, Linear Trend), and a slowdown of 1, being stationary at the first level and not at the original level. Inflation is stationary (Probability 0.0116), at the level of 1%.

4.3: Cointegration test
4. 3 . 1 . Table No. (8), Johansen model test between the independent variables and the dependent variable.

Date: 01/20/24   Time: 07:36
Sample (adjusted): 2006 2023
Included observations: 18 after adjustments
Trend assumption: Linear deterministic trend
Series: ER I MI
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.956616	64.60246	29.79707	0.0000
At most 1	0.342792	8.124663	15.49471	0.4522
At most 2	0.031121	0.569085	3.841466	0.4506

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.956616	56.47780	21.13162	0.0000
At most 1	0.342792	7.555578	14.26460	0.4257
At most 2	0.031121	0.569085	3.841466	0.4506

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Through the table above, the results appear, and it has two parts, the first is Statistic Trace and the second part is Statistic Max-Eigen. In the first part, one cointegration vector appears, which is None * and it is significant (0.0000 Probability), and it was confirmed through Statistic Trace (64.60246). Greater than (29.79707Critical Value), and therefore we judge that the model is significant regardless of the second and third vector, and therefore we reject the null hypothesis, and accept the alternative hypothesis.

4. 3 .2 . Table No. (9) Autoregressive test for distributed time lags using the ARDL test.
Through the table above, we see the importance of the model through (0.0003 probability) the exchange rate, (0.0003 probability), the interest rate, and a probability of 0.0113, significant

regardless of the lack of importance of the independent variable, inflation, in addition to choosing the calculated F of 14.55488, (the probability of the F-statistic being equal to 0.000103)

Dependent Variable: ER
Method: ARDL
Date: 01/13/24 Time: 06:52
Sample (adjusted): 2005 2023
Included observations: 19 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): I MI
Fixed regressors: C
Number of models evaluated: 4
Selected Model: ARDL(1, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ER(-1)	0.761882	0.160025	4.761008	0.0003
I	-1.103809	0.382248	-2.887676	0.0113
MI	0.179935	0.127676	1.409312	0.1791
C	35.47790	18.91749	1.875402	0.0803

R-squared	0.744309	Mean dependent var	123.6316
Adjusted R-squared	0.693171	S.D. dependent var	11.48531
S.E. of regression	6.361955	Akaike info criterion	6.723212
Sum squared resid	607.1171	Schwarz criterion	6.922042
Log likelihood	-59.87052	Hannan-Quinn criter.	6.756862
F-statistic	14.55488	Durbin-Watson stat	1.737402
Prob(F-statistic)	0.000103		

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

5. Conclusions and recommendations:

5. 1. Conclusions

1. A rise or fall in the rate of inflation will lead to higher rates of interest rates.

. 2 High interest rates reduce the willingness of investors and businessmen to assume, while their decrease encourages assumption and investment, which is reflected in doubling investment, monitoring the national economy, and improving the value of the national currency.

3. The exchange rate is affected by inflation rates, as high inflation leads to a decline in the value of the national currency, and the exchange rate changes accordingly.

4. Stable exchange rates in some countries, which is not consistent with changing economic conditions.

5. 2. Recommendations

1. Reducing government spending in all its forms and raising the tax rate on the profitability of activities that do not reflect positive effects on the national economy.

2. Activating the role of central banks (central banks) in practicing monetary policy in order to influence the liquidity circulating in the market.

3. Activating the role of the Ministry of Finance in practicing financial policy to influence the liquidity circulating in the markets as well.

4. Making data available to researchers on inflation rates, interest rates, and official and parallel exchange rates specifically.

5. Activating the role of productive institutions to increase production and improve performance.

References
1. Al-Amin and Pasha, Abdel-Wahhab, Zakaria Abdel-Majeed, Principles of Economics - Part Two - Macroeconomics - Dar Al-Maarifa - Kuwait - 1983.
2. Al-Shamaa, Khalil Muhammad Hassan, Financial Administration, Baghdad, 1992.

3. Al-Amiri, Muhammad Ali Ibrahims, Iraqi Journal of Administrative Sciences, Foreign Exchange Rate - A Theoretical Introduction, Volume One - Issue Two - Volume 1, 2001 - Issued by the University of Babylon - College of Administration and Economics.
4. Yahya, Widad Younis, Critical Theory, Dar Al-Kutub for Printing and Publishing, University of Mosul - Mosul - 2001.
5. Raad Hassan, Basics of Contemporary International Trade, Part 1, Al-Hana Information Series - Damascus, 200
6. Jawad Shaker Freih, Ahmed Hussein Battal, The impact of total banking risks on some indicators of economic stability in Iraq using the limits test for the period 2004-, Al-Reyadah Finance and Business Magazine, Al-Nahrain University, College of Business. Economics, Volume 4, Issue 2, April, 2023.- Weston, J, Fand Copel and, T, E, Managerial Finance, Adapted by A.F Fox and R.J Limmack, , 2ed, UK edition, 1988.
7. MADURA, TEFF, Inter national Financial, management, 6th. ed, New york, 2000.
8. Weston, J, Fned, Besley, seott & Brigham, F, Essentials of Managerial Finance, ll. Ed, New york, 1996.
9. Henning, N, Cgarles, pigott, Willian & Haneyseott, Robert, Fiancial Markets and the economy, Prentice Hall, New Jersey, 1988.
10. Weston, J, Fneel & Brigham, f, Engene, Essentials of Managerial Finance, 10. eel, the Dryden press, Vew york, 1993.
11. Damodaran, Aswath, applied Corperate Finance, New york. John Willey & sons, Ine, 1999.
12. Brenner, Menachem & Venezia, It zhak, The effect of Inflation and taxes on Jrowth Inrestments anel Replace ment policies, The Jourunal of finance, Vol, XXX VIII, December,2003.
13. Hanan Hassan Mustafa , Hajir Adnan Zaki , The window for selling foreign currency and its role in influencing the exchange rate of the Iraqi dinar (An analytical study for the period 2003-2021), Al-Reyadah Journal of Finance and Business, Al-Nahrain University, College of Business Economics, Vol 4, No 4, Dec. , 2023.