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AN ECONOMIC ANALYSIS OF IMPACT OF SOME MONETARY POLICY INDICATORS ON THE FOREIGN AGRICULTURAL TRADE IN IRAQ FOR THE PERIOD 1990-2021

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ABSTRACT

This study aims to examine impact of monetary policy indicators on the agricultural foreign trade in Iraq. In addition, it seeks to examine the causal relationship between these indicators and analysis of the short and long-term effects of economic indicators (exchange rate, inflation rate, wide money supply, and interest rate) on agricultural foreign trade in Iraq for the period 1990-2021. The researcher used econometric analysis using the modern ARDL co-integration methodology. The results showed that the exchange rate had a negative multiplier effect on agricultural exports, reaching (-0.004) at a 2% significance level, and that annual inflation had a negative impact on agricultural exports, reaching (-0.004) at a level of significance of 2%. The level of significance is 1%. As for the broad money supply, increasing money would increase the purchasing power of everyone who owns it, and it reached (2.54) at the level of significance of 5%. As for the interest rate, a rise in the interest rate would reduce the volume of loans and investments and thus affect It had a negative impact on agricultural exports and amounted to (-0.17) at a significance level of 1%. The results of the analysis showed that the exchange rate has a clear impact on agricultural imports, as it amounted to (0.003) at a significance level of 1%, and in comparison, with the interest rate, which amounted to (0.01), which was not significant. As for the broad money supply, as it reached (4.41) at a 5% significance level, the increase in the money supply will be pushed to reduce the value of the currency, which will lead to an increase in agricultural imports. As for the annual inflation rate, which reached (-0.0008), it is not significant, and it is recommended.

Key words: Keywords: agricultural exports, agricultural imports, exchange rate, inflation rate. wide money supply, Interest rate

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INTRODUCTION

The problems of economic development and its relationship to external trade continue to be of concern to various world economies, both developed and developing. These problems continue to be of great importance, especially in developing countries, as the only way to free themselves from the background of underdevelopment and to join the ranks of developed countries. This syndrome may be hampered by a number of difficulties, such as the lack of financial resources and the poor choice and application of appropriate macroeconomic policies. This has made their economies vulnerable to many structural economic imbalances, which have threatened the economic and even political stability of those states, especially in the face of the volatility and economic crises to which the world economy is subjected. The agricultural foreign trade sector is one of the sectors identified for the performance of any economy, including the Iraqi economy. In most economies of both developed and developing countries, their importance is reflected in their contribution to food security through imports to meet domestic production needs as well as the provision of foreign exchange through agricultural exports. Measuring the volume of foreign agricultural trade gives a clear indication of the reality of the agricultural sector in Iraq. On the contrary,

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the statement of monetary policy performance and the extent to which it affects the volume of agricultural foreign trade through the exchange rate , inflation rate , wide money supply and interest rate for the period 1990-2021, and these economic variables have a significant impact on agricultural foreign trade trends through exports and imports of various food commodities and products. These indicators, which are used by the government and the Central Bank to operationalize the role of monetary policy in economic stabilization in general and in the agricultural sector in particular, have become an important part of all other sectors because it, regarding to food, systems that provide food goods and products for self-sufficiency are indicators that give a real impression of the extent to which the State and the Central Bank contribute to addressing the volume of foreign trade . The importance of research has come from the problematic relationship between agricultural foreign trade with the nature and impact of monetary policy variables (exchange rate, inflation rate, wide money supply and interest rate) reflecting the nature of government decisions and decisions of the Central Bank and their impact on agricultural foreign trade. This has affected the government and the Central Bank review of their decisions, which have a negative impact on agricultural output and foreign agricultural trade. The study of this relationship has become an important topic for analyzing the nature, form and direction of the relationship between agricultural foreign trade and the nature of monetary policy through its studied indicators (Al-Badri, 2019).The problem of research arises from the existence of a chronic deficit in the agricultural foreign trade balance due to the limited capacity of agricultural exports to cover imports. This deficit is due to the government dependence on the oil sector rent side of nearly 90% despite fluctuations in oil prices. The main problem is to know the extent of foreign agricultural trade in the Iraqi economy. The research assumes that the volume of agricultural foreign trade in Iraq leads to the extent to which the development of the agricultural sector is known, a long-term causal relationship towards a specific direction in which the size of the agricultural gap follows the economic indicators of monetary policy (exchange rate, inflation rate, wide money supply and interest rate). Analysis and study of the extent of the gap in agricultural foreign trade through the examination of exports and imports of various agricultural goods and identification of the reasons for their existence and persistence, identification of the impact of monetary policy indicators on the volume of agricultural foreign trade and consideration of the causal relationship between them.

MATERIALS AND METHODS

First: Foreign Trade:-Foreign trade plays an important role in supporting the various national economies of developing and developed countries by providing the foreign exchange necessary to finance capital imports and the medium necessary for the implementation of economic development plans, and by alleviating the difficulties associated with the apparent unbalanced growth conditions of structural imbalances in the productive sectors, to the foreign that it is believed that greater economic development requires greater openness to the outside world and the removal of restrictions on free trade and the flow of goods, services and employment (Mukhtar, 2009).The concept of foreign trade is historically considered to be the first stages of the establishment of the first trade between different countries, if commercial transactions were characterized by small commercial transactions and limited dealing with goods (merchandise) without services (Assaf et al., 2022). Foreign trade is a reflection of economic relations between states and it is part of the state external relations, which include the trade of part of that state production with other states. Foreign trade is historically the oldest and most important part of external economic relations, which is the criterion for the evolution and balance of states in securing their needs for imports and exports of goods and services to the world. Foreign trade rules are numbers on the impact of various domestic and foreign policies. Foreign trade plays an important role in the development of the economic and social

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development process in developing countries. It contributes actively to defining the main features of the economic architecture and to creating balance and interdependence among all sectors. The components of agricultural foreign trade (agricultural exports and agricultural imports) must therefore be studied to demonstrate the relative importance of foreign trade, since the components of each of these variables (agricultural exports and agricultural imports) are indicators of the size of the trade gap (Al-Badri, 2013).Trade in Iraq foreign Iraq's agricultural trade, in both exports and imports, is highly volatile due to its many factors, political and economic and their association with the economic conditions of the major rowers, making them susceptible to the effects of extreme fluctuations in the prices of international commodities and the volatility of the world economy. The importance of foreign trade: The importance sets as follows :

1 .Assists in expanding marketing capacity by opening up new markets to state products, and linking them to each other

2Helps to increase the state well-being by expanding the areas of consumption and investment

3 .An important indicator of a state productive capacity and competitiveness in the international market is that it is linked to the available productive potential, the state export capacity, its income levels and its import capacity, as well as its reflection on the state foreign exchange stock and its effects on the trade balance

4 .There is a relationship between foreign trade and economic development. Economic development and the resulting high level of national income affect the volume and pattern of international trade, and changes in international trade conditions directly affect the composition and level of national income

5 .The natural trend is both a high level of national income and a flourishing foreign trade. Economic development is aimed at increasing the production of goods. If this objective achieved, then the state external export capacity has increased. For example, the economic history of Britain, Germany and Japan clearly indicates that the growth and increase of national income accompanied by an increase in the volume of trade in these countries.

Second: - Monetary Policy: - Monetary policy plays an effective and distinguished role in achieving high growth rates and achieving stability and economic balance. Monetary policy means the set of procedures by which monetary authorities control monetary and credit matters, and through events the amount of money (the amount of means of payment) is carried out in a manner appropriate to the country's economic circumstances (the monetary authorities seek to inject the economy either with a stream of extra money or absorb excess liquidity) (Akil, 1999). Channels for moving monetary policy implications-:

There are channels that affect the economy through monetary policy procedures, and these can be explained as follows:

1. Interest rate channel: - The stability of the interest rate is a final objective of monetary policy because fluctuations in interest rates create uncertainty in the economy and difficulty in planning the economy for the future, that fluctuations in interest rates may affect individuals willingness to borrow from commercial banks which the central bank may need to reduce their high rates and control through monetary policy instruments (Soraya Abdel Rahim, 2007)

2 .Exchange rate channel: Exchange rates have different consequences for effective demand, affecting expectations, particularly for companies that use imported inputs or seek foreign demand In addition, firms borrow from foreign financial institutions, but their returns are in local currency and, if the exchange rate changes, there is a mismatch between the company's revenues and costs, making its financial position fragile. Moreover, exchange rate devaluation may shift to domestic prices, leading to higher inflation.

3 .Money supply channel: Money supply is one of the most important instruments used by monetary policy to achieve economic stability, and its direct and indirect impact on economic variables. The increase or decrease in cash

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supply determines the modus operandi of monetary policy, whether a deflationary or an expansionary policy. Thus, the money supply has positive effects in achieving economic stability, and negative effects in expanding the money of cash that leads to inflationary pressures that significantly affect the economy as a whole. The concept of wide money supply called local liquidity, so it consists of means of payment plus time deposits (forward) and private savings deposits of commercial banks (Abdallah & Dawood, 2023). The objectives of monetary policy in developing and Arab countries in particular can be limited through identification For the purposes stipulated in legislation, including (achieving monetary stability, maintaining, Currency value, encouraging economic growth, price stability) (Soraya Abdel Rahim, 2007).

Third: - Table (1) shows, the variables of (exchange rate, inflation rate, wide money supply, interest rate, agricultural exports and agricultural imports)

1.Exchange rate: - The exchange rate determined by the flow of stocks (funds) on the foreign exchange market. As a result of the large movement of international capital, the exchange rate is determined on the basis of the reciprocal effect of the exchange rate on the movement of capital, where this theory emphasized that the exchange rate is a monetary phenomenon because it is affected by the determinants of real money demand, since the supply of money is supposed to be determined separately by monetary authorities. On the other hand, the demand for money depends on the level of real income in the state, the general level of prices and the interest rate. The rate of exchange was at its max value against the Iraqi dinar for 2003 was (1836) and its min in 1990, when it was (0.31)(Assaf et al., 2022).

2 .Interest rate: The Central Bank of Iraq the power to determine the upper and lower interest rates charged by banks or paid in their banking work. On this basis, during the first period 1990-2002, the Central Bank of Iraq continued to intervene in determining those rates for all banks. It adopted a policy of raising the interest rates as a means of attracting savings and containing a portion of the liquidity surplus from the public. This increase was moderate and gradual in proportion to the multiple objectives of the monetary policy role at this stage. The adoption of monetary policy on interest rates was a direct monetary instrument restricting the exits of the monetary and financial imbalance in the economy. During this period, interest rates generally changed only by slightly higher limits. In particular, in 1999, an adjustment made to the interest rates paid to be approximately 7.35 per cent. In the second period of 2003-2010, there were fluctuations in the interest rate established by the Central Bank, where in 2018 the rate was 16.75 per cent, the highest interest rate during the period studied, where the interest rate was in 2007 at 20% and min. in 2017-2021 at 4%.

3 .Annual inflation: - From the table above, we note that the average annual inflation rate was (48.78%) during the period studied. There was a volatility and instability of annual inflation during the period. In 1996, it was the min. rate of inflation (%-16.11), while in 1996 it was the maximum rate of inflation (%448.5). There were crises and breakthroughs in certain years, in the 1990, the annual rate of inflation was very high, reflected in other periods after 2003 and gradually declined, reflecting the economic sector impact, despite positive developments, the most important of which may be the substantial flow of oil revenues and the almost complete opening of space to international trade and import flows of various kinds and unprecedentedly to cope with surplus demand.

4. wide money supply: - From the table above, it is clear that there has been a growing increase in the wide money supply during the period considered, with less than (64314 million diners in 1992, while it was the highest (139900000 million diners in 2021). (Al-Wasity & Al-Attabi, 2023).

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Table 1. Exchange rate, inflation rate, wide money supply, interest rate, agricultural exports and agricultural imports in Iraq during 1990-2021

years	Exchange rate	Interest rate (%)	Inflation rate (%)	Wide money supply (million diners)	Agricultural imports (million dollars)	Agricultural exports (million dollars)
1990	0.3108	6.13	53.65	248691.00	185159.00	25169.00
1991	0.3108	6.13	180.95	352455.00	1692.00	97
1992	0.3108	6.13	83.61	64314.00	19665.00	859.00
1993	0.3108	6.50	207.69	132434.00	94124.00	4.00
1994	0.3108	6.50	448.50	314035.00	5853.00	762.00
1995	0.3108	7.25	387.31	886894.00	63845.00	7.00
1996	0.3108	7.25	-16.11	1154627.00	44557.00	952.00
1997	0.3108	7.25	23.06	1340262.00	27899.00	1624.00
1998	0.3108	7.25	14.76	1787895.00	9719.00	2182.00
1999	0.3108	7.35	12.57	2047438.00	16141.00	1552.00
2000	0.3108	7.35	4.97	2445551.00	18794.00	625.00
2001	0.3108	7.35	16.37	2849598.00	24187.00	833.00
2002	0.3108	6.35	19.31	3871069.00	164573.00	3298.00
2003	1836.00	6.35	33.16	6953420.00	158766.00	4039.00
2004	1453.00	6.00	26.96	12254000.00	227416.00	9869.00
2005	1469.00	7.00	36.95	14684000.00	304201.00	3016.00
2006	1467.00	10.42	34.74	21080000.00	308529.00	18.00
2007	1255.00	20.00	30.80	26956000.00	295129.00	1699.00
2008	1193.00	16.75	12.66	34920000.00	530544.00	7002.00
2009	1190.00	8.83	6.87	45438000.00	439618.00	5374.00
2010	1190.00	6.25	2.87	60386000.00	193051.00	2044.00
2011	1190.00	6.00	5.80	72178000.00	1055325.00	2044.00
2012	1190.00	6.00	6.08	75466000.00	444763.00	3412.00
2013	1190.00	6.00	1.87	87679000.00	276215.00	311.00
2014	1190.00	6.00	2.23	90728000.00	218534.00	257.00
2015	1190.00	6.00	1.70	82595000.00	290703.00	2475.00
2016	1182.00	4.33	0.55	88082000.00	192473.00	2369.00
2017	1184.00	4.00	0.20	92900000.00	365995.00	2262.00
2018	1183.00	4.00	0.40	95390700.00	744190.00	126.00
2019	1190.0	4.00	-0.19	103441100.00	946776.00	4103.00
2020	1458.0	4.00	0.60	119906000.00	959158.00	1249.00
2021	1470.0	4.00	0.60	139900000.00	359008.00	4595.00
Mean	771.06	6.9309	51.30	40263515.09	280831.31	2972.12
Min.	0.31	4.00	-16.11	64314.00	1692.00	4.00
Max.	1836.00	20.00	448.50	139900000.0	1055325.00	25169.00

Source: Central Bank reports for different years.

RESULTS AND DISCUSSION

First:

The model specification is one of the most important stages of building the econometric model, as it requires the identification of the variables that the model must contain. At this stage, it depends on the economic theory of transforming the relationship between variables into mathematical equations using codes to determine the type and direction of the relationship between economic variables and their strength (Al-Badri, 2017). At this stage, the model variables will be determined, based on economic theory, or on the available information on the phenomenon in question that we are exploring from previous research and applied studies. Table (2) includes the independent and dependent variable

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Table 2. The structure of the econometric model of the studied relationship

variable name	code	Variable type
Agricultural imports	AI	dependent
Agricultural exports	AE	dependent
Exchange rate	ER	independent
Inflation rate	INF	independent
wide money supply	M2	independent
Interest rate	IR	independent

Source from Researchers

Augmented Dicky Fuller Test (ADF)

With a view to showing the calm of the indicators, the unit root test of ADF was used, as the results were as shown in table 3, representing variables (agricultural imports AI, agricultural exports AE, exchange rate ER, inflation INF, wide money supply M2, interest rate IR). The results indicate that the time series of three study variables were static in their levels (agricultural exports, agricultural imports and inflation). The ADF test indicated that the test values calculated for each variable in absolute terms were higher than the scale values in their absolute value, at the level of a significant of 5% or 10%. Thus, zero hypothesis that stipulated the population of the variables at their levels was rejected, after taking the first difference of the other variables (interest rate, exchange rate, wide money supply), all the variables were static, with the absolute values of all variables being greater than the scale values of 5% or 10%,they were integrated I(0) and I (1).

		UNIT ROOT TEST (ADF)					
	At Level	IA	AE	ER	INF	M2	IR
With Constant	t-Statistic	-3.1475	-11.0348	-1.4889	-2.5199	-0.8508	-3.2738
	Prob.	0.0336	0.0000	0.5254	0.1210	0.7851	0.0257
		**	***	no	no	no	**
With Constant & Trend	t-Statistic	-3.6083	-10.6826	-2.4293	-3.2318	-0.9580	-3.2983
	Prob.	0.0460	0.0000	0.3582	0.0975	0.9316	0.0865
		**	***	no	*	no	*
Without Constant & Trend	t-Statistic	-1.2300	-8.1980	-0.4022	-2.3125	-0.8669	-0.7938
	Prob.	0.1956	0.0000	0.5302	0.0223	0.3296	0.3631
		no	***	no	**	no	no
	At First Difference	d(IM)	d(EX)	d(ER)	d(INF)	d(M2)	d(IR)
With Constant	t-Statistic	-6.4729	-5.7912	-6.4142	-5.4174	-1.0402	-5.0104
	Prob.	0.0000	0.0001	0.0000	0.0001	0.7208	0.0004
		***	***	***	***	no	***
With Constant & Trend	t-Statistic	-6.5364	-5.6461	-6.2959	-5.3112	-3.9048	-4.9993
	Prob.	0.0000	0.0005	0.0001	0.0009	0.0279	0.0021
		***	***	***	***	**	***
Without Constant & Trend	t-Statistic	-6.5983	-5.9179	-6.3776	-5.4989	0.2261	-5.1027
	Prob.	0.0000	0.0000	0.0000	0.0000	0.7429	0.0000
		***	***	***	***	no	***

Table 3. ADF test of unit root of study variables

Source: Eviews 10.

Second: - Impact of monetary policy indicators on agricultural exports:- The results of the analysis of some of the monetary policy indicators (exchange rate, inflation rate, wide money supply and interest rate) on agricultural exports, shown in table (4).

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Table 4. Analyzing the impact of monetary policy indicators on agricultural exports in Iraq during the period 1990-2021

Dependent Variable: LOGAE

Method: ARDL
Date: 10/27/23 Time: 22:56
Sample (adjusted): 1992S1 2021S2
Included observations: 60 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): IR INF ER M2
Fixed regressors: C
Number of models evaluated: 2500
Selected Model: ARDL(4, 2, 4, 0, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGAE(-1)	0.466343	0.128968	3.615954	0.0008
LOGAE(-2)	-1.032699	0.162487	-6.355591	0.0000
LOGAE(-3)	0.269537	0.152602	1.766283	0.0844
LOGAE(-4)	-0.441520	0.136692	-3.230029	0.0024
ER	0.000426	0.000176	2.415230	0.0200
INF	-0.004934	0.001373	-3.592614	0.0008
INF(-1)	0.000567	0.001559	0.363431	0.7181
INF(-2)	-0.001366	0.001552	-0.880228	0.3836
INF(-3)	0.001062	0.001555	0.683194	0.4981
INF(-4)	-0.003652	0.001390	-2.628278	0.0119
M2	2.54E-08	1.84E-08	1.381982	0.1741
M2(-1)	2.89E-09	1.80E-08	0.160160	0.8735
M2(-2)	-4.04E-08	2.00E-08	-2.025481	0.0491
IR	-0.173037	0.048908	-3.538018	0.0010
IR(-1)	0.029477	0.059244	0.497563	0.6213
IR(-2)	0.073468	0.045514	1.614204	0.1138
C	6.110703	1.052691	5.804841	0.0000

R-squared	0.710770	Mean dependent var.	3.000000
Adjusted R-squared	0.603149	S.D. dependent var.	0.822435
S.E. of regression	0.518102	Akaike info criterion	1.756234
Sum squared reside	11.54249	Schwarz criterion	2.349631
Log likelihood	-35.68701	Hannan-Quinn criter.	1.988344
F-statistic	6.604405	Durbin-Watson stat	1.967279
Prob.(F-statistic)	0.000000		

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

Source: EViews 10

After assessing the relationship between the variables, the results of the analysis showed that the Auto-Regressive Degradation Lagged model estimated to be good interpretive. The estimated model is of high interpretive strength. The R^2 factor value was 0.71. This percentage indicates that 71% of the changes that occurred were due to the effect of the independent variables (exchange rate, inflation rate, wide money supply and interest rate) and (0.29%) is due to other factors that not measured, with F statistics of (6.604), significant (0.00), and the test indicating the significate of the model as a whole. For independent variables, the effect was on the dependent variable, with an exchange rate parameter of (0.004), with %5, an annual inflation parameter of (0.004) and %1 per cent significant inverse relationship with agricultural exports. The wide money supply parameter came with a value of (2.54), an emotional relationship with agricultural exports, an interest rate parameter of (-0.17) and an interest rate parameter of %1 and an inverse relationship with agricultural exports. The results indicated that independent variables lagged in time, except for the exchange rate, which considered one of the variables that affected the same year independently. The results are consistent with the logic of economic theory. The exchange

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rate, has a tangential effect ,in the case of depreciation of the domestic currency, which leads to higher exports, meaning that changes in the exchange rate variable make a moral contribution to the improvement of exports in short run, in the case of devaluation of the domestic currency, the prices of domestic goods fall compared to other countries, the increase in foreign demand for them, an increase in the exchange rate by (%0.0004) leads to an increase in agricultural exports by one million dollars. Annual inflation, however, agricultural exports are adversely affected and competitiveness is reduced by the constant rise in prices, the negative impact of annual inflation (%-0.004) leads to a weakness in the competitiveness of agricultural exports. Wide money supply, the supply of money has an impact on the overall demand for agricultural goods and products, and the inflexibility of the agricultural sector production apparatus has increased the import of agricultural goods and products to meet the increase in demand for agricultural products. On the other hand, the increase in the supply of money is due to the monetary effects of fiscal policy and to the large expansion of government expenditure, most of which goes to the operating sector because of the expansion of government employment as well as the distribution of social welfare salaries. This is one of the most important reasons why the agricultural sector and rural-urban migration have reduced agricultural production and reflected such exports, the direct effect of the wide money supply is (2.54) and is insignificant. Interest rate, the interest rate parameter had an inverse effect and amounted to (-0.17), meaning that the lower the interest rate, the greater the value of agricultural exports through the increase in agricultural investments.

Table 5. Error Correction Model

ARDL Error Correction Regression

Dependent Variable: D(LOGAE)
Selected Model: ARDL(4, 2, 4, 0, 2)
Case 2: Restricted Constant and No Trend
Date: 10/27/23 Time: 23:01
Sample: 1990S1 2021S2
Included observations: 60

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGAE(-1))	1.204681	0.190096	6.337242	0.0000
D(LOGAE(-2))	0.171982	0.134839	1.275467	0.2090
D(LOGAE(-3))	0.441520	0.121394	3.637084	0.0007
D(IR)	-0.173037	0.041975	-4.122353	0.0002
D(IR(-1))	-0.073468	0.040981	-1.792759	0.0800
D(INF)	-0.004934	0.001153	-4.278333	0.0001
D(INF(-1))	0.003956	0.001174	3.370941	0.0016
D(INF(-2))	0.002590	0.001215	2.131960	0.0388
D(INF(-3))	0.003652	0.001157	3.157891	0.0029
D(M2)	2.54E-08	1.28E-08	1.982372	0.0539
D(M2(-1))	4.04E-08	1.33E-08	3.050311	0.0039
CointEq(-1)*	-1.738338	0.234550	-7.411378	0.0000
R-squared	0.681244	Mean dependent var.		0.011167
Adjusted R-squared	0.608196	S.D. dependent var.		0.783419
S.E. of regression	0.490376	Akaike info criterion		1.589567
Sum squared resid.	11.54249	Schwarz criterion		2.008436
Log likelihood	-35.68701	Hannan-Quinn criter.		1.753410
Durbin-Watson stat	1.967279			

*** P-value incompatible with t-Bounds distribution.**

Source: Software outputs E-views 10

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Table 6. Bounds test for joint integration according to the boundary test methodology

Test Statistic	Value	K
F-statistic	8.201133	4
	Critical Value Bounds	
Significance	I(0) Bound	I(1) Bound
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Researchers work based on E-Views 10 outputs.

Error correction model and F-Bounds Test:

The model indicates that in the error correction model, the error correction limit) was (-1.73) and conforms to the error correction limit requirements, so it is negative and significant, and the existence of a common integration relationship indicates that the short-term imbalance is corrected in the long-term (Ali & Ahmed, 2023).The common integration test between the independent variables of the model and the dependent variable of the ARDL Auto Regressive-Distributed Lag model by means of the border test, which compares the statistical value (F) with the lower and upper limits and distributed within four significant levels, as shown in table (6). We note from table (6) that statistical value (F) has reached (8.201), which is higher than all levels of the lower and upper limits, which means that there is an interrelationship between the independent variables and the dependent variable. The long-term equation between independent variables using ARDL model Table 7. shows the long-term of ARDL model and notes the positive significate relationship of each of the independent variables (exchange rate, inflation rate, wide money supply and interest rate) at a significate level of 1%.

Table 7. long-term ARDL

Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ER	0.000245	9.39E-05	2.606937	0.0125
INF	-0.004788	0.000579	-8.267213	0.0000
M2	-7.01E-09	1.57E-09	-4.458927	0.0001
IR	-0.040321	0.016024	-2.516203	0.0157
C	3.515256	0.160274	21.93278	0.0000
EC = LOGAE – (0.0002*ER -0.0048*INF – 7.01 *M2 -0.040*IR + 3.5153)				

Source: Researchers work based on E-Views 10 outputs

Validity test of the estimated model

After assessing the relationship between the independent variables and the ARDL, tested to ensure that the estimated model was free of econometric problems, where the Hetero test performed. In order to detect the problem of Heteroscedasticity in the model, there are several tests that show us the homogeneity or otherwise of errors, including the ARCH test, which relies on the probability value of Chi-Square, the probability value of Chi-Square which in the table, is (0.239) for our acceptance of the non-existent hypothesis that the model is not unstable, and our rejection of the alternative hypothesis that the model suffers from the constant homogeneity of the variation, because it is larger than(0.05) (Al-Sahoo & Al-Badri, 2016).

Table 8. Test the problem of Heteroscedasticity

Heteroscedasticity Test: ARCH			
F-statistic	1.366410	Prob. F(1,57)	0.2473
Obs*R-squared	1.381242	Prob. Chi-Square(1)	0.2399

Source: Researchers work based on E-Views 10 outputs

The LM Test: which also relies on the probabilities value Chi-Square, which indicates the probability value of Chi-Square in the table was (0.961), is used to accept the

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premise that the model does not suffer from Autocorrelation, and our rejection of the alternative hypothesis that the model suffers from the autocorrelation, because it is larger than (0.01) .

Table 9. Test Breusch-Godfrey Serial Correlation LM

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.001619	Prob. F(1,42)	0.9681
Obs*R-squared	0.002313	Prob. Chi-Square(1)	0.9616

Source: Researchers work based on E-Views 10 outputs

Impact of monetary policy indicators on agricultural imports:- The results of the analysis of some of the monetary policy indicators (exchange rate, inflation rate, wide money supply and interest rate) on agricultural imports, shown in table (10).

Table 10. Analyzing the impact of monetary policy indicators on agricultural imports in Iraq during the period (1990-2021)

Dependent Variable: LOGAI				
Method: ARDL				
Date: 10/27/23 Time: 23:23				
Sample (adjusted): 1992S1 2021S2				
Included observations: 60 after adjustments				
Maximum dependent lags: 4 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (4 lags, automatic): ER INF IR M2				
Fixed regressors: C				
Number of models evaluated: 2500				
Selected Model: ARDL(4, 0, 1, 0, 0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGAI(-1)	0.731536	0.133264	5.489366	0.0000
LOGAI(-2)	-0.511373	0.153998	-3.320648	0.0017
LOGAI(-3)	0.257254	0.125939	2.042689	0.0464
LOGAI(-4)	-0.207067	0.110805	-1.868748	0.0675
ER	0.000391	0.000121	3.235433	0.0022
INF	-0.000858	0.000595	-1.442396	0.1554
INF(-1)	0.000863	0.000598	1.442764	0.1553
M2	4.41E-09	1.91E-09	2.310042	0.0251
IR	0.017471	0.013322	1.311467	0.1957
C	3.118058	0.760233	4.101447	0.0002
R-squared	0.848682	Mean dependent var.		5.160000
Adjusted R-squared	0.821445	S.D. dependent var.		0.626018
S.E. of regression	0.264529	Akaike info criterion		0.329277
Sum squared resid.	3.498768	Schwarz criterion		0.678334
Log likelihood	0.121698	Hannan-Quinn criter.		0.465812
F-statistic	31.15896	Durbin-Watson stat		1.904890
Prob.(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection.				

Source: Researchers work based on E-Views 10 outputs

After assessing, the relationship between the variables using ARDL, the results of the analysis showed that ARDL model was estimated to be highly interpretive. The estimated model is of high interpretive strength, with the R^2 coefficient value being (0.84). This indicates that 84% of the changes that occurred were due to the effect of independent variables (exchange rate, inflation rate, wide monetary supply and interest rate), 0.16% rest to other factors that not measured, with the F statistics of (31.158), its significant (0.000), it indicating the significant of the model as a whole. In the case of independent variables, the exchange rate parameter at (0.0003) it significant at 1%. In the case of agricultural imports, the annual inflation was marked parameter is (0.008), it was significant and counter-productive. The wide money

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supply (4.41) and 5%, it is in an exotic relationship with agricultural imports, the interest rate parameter came at (0.017) and it has significant relationship with agricultural imports .The results indicated that the independent variables (exchange rate, wide money supply and interest rate) that considered to be independently affecting the same year not lagged in time. The results are consistent with the logic of economic theory, The exchange rate has an exogenous effect, meaning that changes in the exchange rate variable make a significant contribution to improved imports, in the case of devaluation of the local currency, the prices of domestic goods fall compared to other countries, and foreign demand increases, thus leading to higher imports, the importance of the exchange rate is based on linking the domestic economy to the global economy, because the exchange rate represents exchange of currency with another currency, as reflected in the impact of trade through exports and imports. As for the interest rate, higher interest rates will reduce the volume of loans and investments and will therefore adversely affect agricultural imports, as well as the wide money supply In the event of a reduction in the money supply, there would be a surplus in the current balance. The effect of the money supply on the trade balance can be seen from another angle, as the increase in the money supply will pay for the devaluation of the currency, which increases exports and occurs in the trade balance, thereby showing positive excess relationship between them, and thus depends on the balance between interest rates and the price level (money value). If the national economy is experiencing inflationary pressures, there is a persistent balance-of-payments deficit, with increased monetary incomes increasing demand for imports, and absorbing goods available for export on the one hand. On the other hand, higher domestic prices transform domestic demand from domestically produced goods into their imported substitutes, where their price becomes relatively cheaper, the prevalence of inflation in the national economy can generate a continuing deficit because it encourages imports and impedes exports (Al-Sabaawi & Abtan, 2013).

Error correction model and F-Bounds Test

The model indicates that the error correction model (the error correction limit) was (-0.72) and conforms to the requirements of the error correction limit, and indicates that the short-term common integration relationship is corrected in the long-term (Kadhim, 2022).

Table 11. Error Correction Regression

ARDL Error Correction Regression				
Dependent Variable: D(LOGAI)				
Selected Model: ARDL(4, 0, 1, 0, 0)				
Case 2: Restricted Constant and No Trend				
Date: 10/27/23 Time: 23:27				
Sample: 1990S1 2021S2				
Included observations: 60				
ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGAI(-1))	0.461186	0.151208	3.050013	0.0037
D(LOGAI(-2))	-0.050187	0.103061	-0.486963	0.6284
D(LOGAI(-3))	0.207067	0.099413	2.082905	0.0424
D(INF)	-0.000858	0.000537	-1.598947	0.1161
CointEq(-1)*	-0.729650	0.160407	-4.548744	0.0000
R-squared	0.455870	Mean dependent var.		0.038833
Adjusted R-squared	0.416297	S.D. dependent var.		0.330126
S.E. of regression	0.252218	Akaike info criterion		0.162610
Sum squared resid.	3.498768	Schwarz criterion		0.337139
Log likelihood	0.121698	Hannan-Quinn criter.		0.230878
Durbin-Watson stat	1.904890			

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* P-value incompatible with t-Bounds distribution.

Source: Researchers work based on E-Views 10 outputs

The common integration test between the model's independent variables and the dependent variable of ARDL model by means of the bounding test, which compares (F) value with the lower and upper limits and distributed within four significate levels, as shown in table (12).

Table 12. Bound test for joint integration according to the boundary test

Test Statistic	Value	K
F-statistic	3.135011	4
	Critical Value Bounds	
Significance	I(0) Bound	I(1) Bound
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Researchers work based on E-Views 10 outputs

We note from table (12) that (F) value was (3.135) between than levels of the lower and upper limits, which means that there is an interrelationship between the independent variables and the dependent variable**.**

Table 13. long-run ARDL

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ER	0.000536	0.000108	4.944212	0.0000
INF	6.13E-06	0.000530	0.011572	0.9908
M2	6.05E-09	1.75E-09	3.450465	0.0011
IR	0.023945	0.016349	1.464593	0.1493
C	4.273362	0.165911	25.75699	0.0000
EC = LOGAI - (0.0005*ER + 6.13*INF + 6.05*M2+ 0.02*IR + 4.2734)				

Source: Researchers work based on E-Views 10 output

Table (13) shows the long-term results of ARDL model for the distributed periods of lagged and notes the positive and significant relationship of both the exchange rate and the wide money supply, as well as the significant exogenous relationship of both of inflation and interest rates.

Validity of the estimated model test

After assessing the relationship between the independent variables and ARDL common integration analysis method, tested to ensure that the estimated model was free of econometric problems, where the Hetero test performed. In order to detect the problem of Hetero. in the model, there are several tests that show us the homogeneity or otherwise of errors, including ARCH, which depends on the probabilistic value of Chi-Square, indicating the probability value of Chi-Square in the table was (0.305) to accept the null hypothesis that the model is not unstable, and we reject the alternative hypothesis that the model is consistent with the congeniality of the variation, because it is larger than (0.01).

Table 14. Test the problem of Heteroscedasticity

Heteroscedasticity Test: ARCH			
F-statistic	1.035097	Prob. F(1,57)	0.3133
Obs*R-squared	1.052307	Prob. Chi-Square(1)	0.3050

Source: Researchers work based on E-Views 10 outputs

The LM Test: which also relies on the probabilities value Chi-Square, which indicates the probability value of Chi-Square in the table was (0.401), used to accept the premise that the model does not suffer from Autocorrelation, and our rejection of the alternative hypothesis that the model suffers from the autocorrelation, because it is larger than (0.01) (Ali & Ahmed, 2018).

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Table 15. Test Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.581423	Prob. F(1,49)	0.4494
Obs*R-squared	0.703597	Prob. Chi-Square(1)	0.4016

Source: Researchers work based on E-Views 10 outputs

CONCLUSION

1 .Significant impact of the exchange rate, and wide money supply on agricultural imports.

2 .Significant impact of exchange rates, inflation, interest rates and wide money supply on agricultural exports.

3 .Agricultural exports and imports do not affect wide money supply.

4 .There are long-term impact of both exchange rates and interest rates on agricultural imports.

RECOMMENDATIONS

1. Designing a monetary policy that reduces inflation and seeks to stimulate and promote economic growth that contributes to supporting foreign trade.

2. Strategy for maintaining the exchange rate of the Iraqi dinar is supported, with foreign exchange, especially the U.S. $, in order to maintain or further improve currency values and their impact on the reduction of imported inflationary pressures.

3. A clear policy to promote and support the role of agricultural exports to achieve balance foreign trade agricultural.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

DECLARATION OF FUND

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AUTHOR/S DECLARATION

We confirm that all Figures and Tables in the manuscript are original to us. Additionally, any Figures and images that do not belong to us have been incorporated with the required permissions for re-publication, which are included with the manuscript.

Author/s signature on Ethical Approval Statement.

Ethical Clearance and Animal welfare

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تحليل اقتصادي لتأثير بعض مؤشرات السياسة النقدية على التجارة الزراعية الخارجية في العراق للمدة 1990-2021

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المستخلص

هدف البحث الى معرفة تأثير بعض مؤشرات السياسة النقدية على التجارة الخارجية الزراعية في العراق وتحليل التأثيرات القصيرة والطويلة المدى للمؤشرات الاقتصادية (سعر الصرف، معدل التضخم، عرض النقد الواسع، سعر الفائدة) على التجارة الخارجية الزراعية في العراق للمدة 1990- 2021، استخدم الباحث التحليل القياسي باستخدام المنهجية الحديثة للتكامل المشترك ARDL، حيث ظهرت النتائج أن سعر الصرف كان له تأثير مضاعف سلبي على الصادرات الزراعية وبلغت (0.004-) عند مستوى معنوية2% ، وأن التضخم السنوي أثر سلباً على الصادرات الزراعية حيث بلغت (0.004-) عند مستوى معنوية 1% ، أما بالنسبة لعرض النقد الواسع فإن زيادة الأموال من شأنها أن تزيد القدرة الشرائية لكل من يملكها، وبلغت (2.54) عند مستوى معنوية 5% ، وبالنسبة لسعر الفائدة فإن ارتفاع سعر الفائدة من شأنه أن يقلل من حجم القروض والاستثمارات وبالتالي يؤثر سلبا على الصادرات الزراعية وبلغت (0.17-) عند مستوى معنوية 1 %، وظهرت نتائج التحليل ان سعر الصرف له تأثير على الاستيرادات الزراعية واضحاً حيث بلغت (0.003) عند مستوى معنوية 1%، وبالمقارنة مع سعر الفائدة حيث بلغت (0.01) غير معنوية . أما بالنسبة لعرض النقد الواسع حيث بلغت (4.41) عند مستوى معنوية 5% ، فإن الزيادة في عرض النقود سيتم دفعها من أجل تقليل قيمة العملة مما سيؤدي إلى زيادة الاستيرادات الزراعية ، أما بالنسبة لمعدل التضخم السنوي حيث بلغت (0.0008-) غير معنوية.

الكلمات المفتاحية: الصادرات الزراعية، الاستيرادات الزراعية، سعر الصرف، معدل التضخم، عرض النقد الواسع، معدل الفائدة.