

**AN ECONOMIC ANALYSIS OF THE IMPACT OF THE IRAQI DINAR EXCHANGE RATE
ON THE IMPORTED QUANTITIES OF RICE DURING THE PERIOD 1990 - 2020**

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ABSTRACT

This research was aimed to analyze the impact of the Iraqi dinar exchange rates for the period 1990-2020 on the imported quantities of rice crop, and to measure the price elasticity of demand for this crop. The (ADRL) model was applied to measure the impact of these prices in addition to the (international price). After conducting the statistical tests (Dickie Fuller test) to examine the stability of the time series of the studied variables included in the model, which stabilized after taking the first difference for them, the results of the analysis showed that international prices had a weak effect on the imported quantities of rice crop, and that these quantities increased at an annual growth rate 6% more than the increase in the annual growth rate of foreign prices amounting to 2%, because the rice crop is one of the basic food crops in the Iraqi consumer list and that it is included in the items of the ration card distributed to individuals and therefore it is imported by the state to meet the need regardless of the rise in its prices. The private sector also imports high-quality brands regardless of prices. As for the equilibrium exchange rate, which is usually higher than the nominal exchange rate adopted by importers in obtaining foreign currency from unofficial markets, the higher the exchange rate, the lower the quantity imported, and the fixation of the nominal exchange rate for many years had a positive impact on the quantities imported by The government, so it is necessary to set an exchange rate for the Iraqi dinar that takes into account the purchasing power towards importing basic food commodities on which the community depends entirely for nutrition.

Key words: food imports, inflation, purchasing power, world prices.

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تحليل اقتصادي لأثر اسعار صرف الدينار العراقي في الكميات المستوردة من محصول الرز خلال

المدة 1990 - 2020

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المستخلص

استهدف البحث تحليل اثر اسعار صرف الدينار العراقي للمدة 1990-2020 في الكميات المستوردة من محصول الرز، وقياس مرونة الطلب السعرية لهذا المحصول، وتم تطبيق نموذج (ADRL) لقياس تأثير تلك الاسعار الى جانب (السعر العالمي) في الكميات المستوردة من محصول الرز. وبعد اجراء الاختبارات الاحصائية اختبار (ديكي فولر) لفحص استقرارية السلاسل الزمنية للمتغيرات المدروسة التي تضمنها الانموذج التي استقرت بعد اخذ الفرق الاول لها، وقد بينت نتائج التحليل ان الاسعار العالمية كان تأثيرها ضعيف على الكميات المستوردة من محصول الرز، وان تلك الكميات ازدادت بمعدل نمو سنوي 6% اكثر من الزيادة في معدل النمو السنوي للاسعار الخارجية البالغة 2%، لكون محصول الرز من المحاصيل الغذائية الاساسية في قائمة المستهلك العراقي وانه يدخل ضمن مفردات البطاقة التموينية الموزعة للأفراد وبالتالي يتم استيرادها من قبل الدولة لسد الحاجة بغض النظر عن الارتفاع الحاصل في اسعارها، كما ان القطاع الخاص يستورد النوعيات عالية الجودة وبغض النظر عن الاسعار، اما سعر الصرف التوازني الذي عادة ما يكون اعلى من سعر الصرف الاسمي الذي يعتمدونه المستوردين في الحصول على العملة الاجنبية من الاسواق غير الرسمية وكلما ارتفع سعر الصرف كلما قلت الكمية المستوردة، كما ان تثبيت سعر الصرف الاسمي لسنوات طويلة كان تأثيره ايجابي في الكميات المستوردة من قبل الحكومة، لذا لابد من وضع سعر صرف للدينار العراقي يأخذ بنظر الاعتبار القوة الشرائية اتجاه استيراد السلع الغذائية الاساسية التي يعتمد عليها المجتمع اعتمادا كلياً في التغذية.

الكلمات المفتاحية: الاستيرادات الغذائية، التضخم، القوة الشرائية، الاسعار العالمية

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INTRODUCTION

The exchange rate mechanism is considered the pivotal element in the international financial economy, and it is considered an essential element in modern financial thought (1), because of its great importance in adjusting and settling the balance of payments of the state (12). The importance of the exchange rate did not hidden, as it is a tool for linking the local economy with the global economy, so each country has its own currency that it uses in internal payments (22). The conditions of dealing between companies at home and abroad require the use of foreign currencies, as importing companies need the currency of the exporting country to pay the value of imported goods, which requires them to exchange foreign exchange with local cash (7). Currency exchange, or exchange foreign exchange for local cash means the exchange of this currency for other currencies (6). It represents the price of one unit of the foreign currency, denominated in a number of local units made at certain rates called the exchange rate (14). On the basis of it, the exchange of cash for foreign currency is the number of monetary units by which one unit of local currency is exchanged for a foreign one. (20), or it is the number of monetary units by which one unit of local currency is exchanged for another foreign curreucie (13). The exchange rate is an important means of influencing the allocation of resources between economic sectors and the profitability of industries, the cost of imported resources (11). That is the price of a commodity in the world market price and its domestic price are linked through the exchange rate (19), It is the monetary policy that seeks to stabilize it (21). The research problem is mentioned that most of the developing countries and their different economic systems, especially the oil-producing countries, suffer from an imbalance in their trade balance and a permanent deficit in their balance of payments. Oil leads to a surplus in domestic consumer demand that local production is unable to meet, which required an increase in imports of goods and services from other countries, without this being accompanied by a parallel increase in exports. The state of imbalance between imports and exports led to a continuous deficit

in both the trade account and the balance of payments in favor of imports. This resulted in a decrease in the purchasing power and the exchange rate of the local currency towards foreign currencies and a rise in the level of inflation and prices that forced those countries to change the exchange rate of their currency Towards foreign labor, and to address this phenomenon, it is necessary to determine the real exchange rate, which expresses the purchasing power of the national currency in the exchange of goods and services, and through it and in light of the flexibility of import, the quantity and quality of imported goods and services can be determined. The study aims to measure each of the nominal, parallel and real exchange rates, and determine the difference in the impact of each of them on the imported quantities of basic food commodities that have weak import elasticity and determine the role of the real exchange rate in adjusting the trade balance and the balance of payments and determining the actual need of commodities and imported services, then setting an appropriate exchange rate for the Iraqi dinar to achieve stability in the value of the national currency. So the research stems from the hypothesis that there is a positive relationship between the exchange rate of the local currency and the imported quantities of basic commodities, and that setting an appropriate exchange rate that takes into account the purchasing and exchange power of the Iraqi dinar with foreign currencies can adjust the trade balance, reduce the deficit in the balance of payments, and achieve price stability. The study followed the deductive method in measuring the relationship between the study variables based on the hypotheses of critical theory and the use of quantitative and standard methods, in addition to the use of research, studies, data and related references.

A- Nominal exchange rate: It is the price of one currency, denominated in another currency on a specific date, without taking into account Inflation rates for countries (23) it is determined according to the supply and demand for it in the exchange market at a particular moment, and for this the nominal exchange rate can change and depending on the change in demand and supply, and the

exchange rate is usually divided into the official exchange rate (the rate applicable in official commercial exchanges), and the parallel exchange rate (is the applicable price in the parallel markets). The nominal exchange rate changes daily and these changes are called deterioration or improvement, improvement means an increase in the price of the local currency in relation to the foreign currency, while deterioration means a decrease in the price of the local currency (1). It is unable to measure the real value of the currency as a result of developments and changes in interest rates and price levels in State (16), It is not considered a reliable criterion for measuring the competitiveness of countries in the foreign market(15).

B- Real exchange rate: It is the number of units of foreign goods needed to purchase one unit of domestic goods, i.e. it is a measure of competitiveness (17). It represents the ratio of the world price level of traded goods to domestic prices measured in a common currency, and the real exchange rate reflects the real amount of decrease or increase in the exchange rate of a currency, that is, its purchasing power (10).

C- Effective exchange rate: It expresses the indicator that measures the average change in the exchange rate of a currency in relation to several other currencies in a certain period of time(4), and therefore the actual exchange rate index is equal to the average of several bilateral exchange rates (24). It indicates the extent to which the currency of a country has improved or developed. In order for this indicator to be an appropriate indication of the country's competitiveness towards abroad, this nominal rate must be subject to correction by removing relative price changes.

D- Equilibrium exchange rate: It is the rate in force in parallel markets, which is not officially announced, is not fixed and changes from currency to currency and from customer to customer (18) It is widely used domestically

and abroad by the private sector (2). It is determined by the strength of supply and demand when there is complete equality between the quantity demanded and the quantity supplied of a currency, regardless of the effect of speculation and unusual capital movements (3).

MATERIALS AND METHODS(1)

rice crop was chosen as one of the basic food commodities that are imported from other countries that are dealt with commercially, and which are not produced entirely(8) or some of them are produced locally in insufficient quantities(9), and it is a commodity that has continuous demand throughout the year. It has no alternative in most cases, and it has multiple uses, so it is assumed that the flexibility of importing it will be low. In general, the import elasticity can be calculated according to the following formula:

$$M = \frac{\partial y}{\partial p} \cdot \frac{p}{y}$$

Where : M = Import elasticity

Y = Imported quantities

P = Import price (x_1).

The elasticity could be calculated directly when using the double logarithmic formula in estimating the relationship between the imported quantity and the price, as the value of the regression coefficient (B) represents the elasticity as well. Rice was chosen as a basic food commodity for this purpose. In order to ensure the importance of this target commodity in the research, the import elasticity was calculated, and the results were as follows:

Rice: To measure the elasticity of demand for the imported commodity, it was found that the double logarithmic function gives the best estimate of the relationship between the imported quantities of rice and the corresponding foreign prices, in light of the information contained.

Table 1. Imported quantities of rice per ton for the period (1990-2020)

year	Y	X1	X2	X3
1990	380000	270.85	3.6	4.09
1991	300000	293.28	7.9	10
1992	450000	268.22	22.8	21
1993	655000	235.41	74.3	74
1994	200000	267.59	478.9	458
1995	225000	320.96	1674	1674
1996	214000	338.88	1170	1170
1997	684000	303.51	1470	1471
1998	629000	305.16	1620	1620
1999	781000	248.42	1972	1972
2000	1200000	172.84	1938	1930
2001	1278167	202.4	1929	1929
2002	1162000	191.87	1957	1957
2003	433500	197.62	1936	1896
2004	651641	237.67	1452	1453
2005	830639	286.27	1472	1472
2006	1329089	304.88	1475	1475
2007	735900	326.43	1267	1254
2008	1051916	650.19	1203	1262
2009	1099560	554.99	1182	1009
2010	1854525	488.91	1185	1170
2011	2674720	543.03	1196	1170
2012	2643064	562.98	1233	1166
2013	3084500	505.89	1232	1166
2014	3025581	391	1214	1166
2015	1059008	395	1247	1167
2016	1720905	420	1275	1182
2017	1164431	363.2	1259	1184
2018	2783889	406.1	1209	1182
2019	1636011	346.7	1196	1182
2020	1252280	424.8	1234	1148

Source // Prepared by the researchers based on

1.y,x1: Ministry of Planning \ Central Statistical Organization.

2.x2,x3: Central Bank of Iraq.

The results show that the elasticity of rice is less than the correct one, that is, the demand for imported rice is inelastic, so, it is considered a necessary commodity and that local production is not sufficient to meet the continuous demand throughout the year. Mathematical and statistical methods were used to study the relationship between the imported quantities of basic food commodities and each of the import price and the exchange rates (nominal and equilibrium) individually to clarify the relationship between the imported quantities of each commodity and foreign prices and then measure the effect of each exchange rate on the imported quantities of those commodities. After that, those prices are studied together on the imported quantities in

order to get rid of some of the problems of regression analysis and to determine the effect of each type of those prices simultaneously and the extent of conformity with the results of the individual analysis for each commodity as follows:-

1 - Change in the real exchange rate: Due to the testing of individual commodities, the best way to calculate the real exchange rate of the Iraqi dinar against the US dollar is the direct method according to the formula

$$RE = \frac{E.p^*}{P}$$

Where: RE = Real exchange rate

E = Nominal exchange rate

p* = Cost price per unit of the imported good

As for the nominal exchange rate and the equilibrium exchange rate, they were calculated from the opposite value of the officially announced US dollar exchange rate. Despite the significant decrease in the value of

the Iraqi dinar during the study period, the differences between the value of the three exchange rates can be noted and that there is a clear difference between the real exchange rate and both the parallel and nominal exchange rate and the value of the Iraqi dinar, meaning that the price is less than the exchange rate announced by the state or the Central Bank of Iraq, and this difference negatively affected both the trade balance and the balance of payments and created a continuous surplus in demand for the dollar and a scarcity in the local money supply, which prompted the monetary authorities to find what is known as the selling window for the US dollar in the Iraqi Central Bank. Estimating the relationship between exchange rates and imported quantities.

Table 2. the growth rate of the variables included in the model during the study period

variablx	growth rate%
imported quantities y	0.06
global rates x ₁	0.02
Nominal exchange rate x ₂	0.09
Equilibrium exchange rate x ₃	0.09

Source // Based on the results of Eviews outputs

The growth equations showed: positive growth for all the research variables, as it was found that the imported quantities of the rice crop grew at a rate of 6% and world prices at a rate of 2%, due to weak local production and water problems as well as market openness, as for exchange rates (nominal and equilibrium), they grew at the same rate 9 % due to international changes and changes in monetary politics of Iraq govermen.

Verify the existence of a relationship between the dependent variable and the independent variables in the model

The effect of foreign prices and exchange rates on the imported quantities of rice was

Table 3. Results of the extended Dickey Fuller test for time series stability of wheat yield

Time series	T-Statistic At Level			T-Statistic At First Difference		
	with constant	with constant & trend	without constant & trend	with constant	with constant & trend	without constant & trend
LN Y	-2.083	-3.258	0.294	-6.94*	-6.926*	-7.037*
LN X ₁	-1.495	-1.922	0.338	-5.273*	-5.166*	-5.347*
LN X ₂	-6.270*	-4.478*	1.020**	-2.301**	-3.956**	-2.315**
LN X ₃	-6.049*	-4.3298'	1.003	-2.490**	-2.774**	-2.525**

Significant at the 10% level, ** Significant at the 5% level.*

Source // Based on the results of Eviews outputs

measured during the study period, and the results were as follows:

$$Y = X_1, X_2, X_3$$

Y = Imported quantity of wheat (tons).

X₁ = import price (dollars/ton).

X₂ = equilibrium Exchange Rate (ID US \$).

X₃ = Nominal exchange rate (ID US \$).

1- The effect of the international price (X₁) on the imported quantity as follows:

$$Ln y = 7.456 + 1.082 L X_1 \text{ -----(1)}$$

t (3.405) (2.915)

2- The effect of the equilibrium exchange rate (X₂) on the imported quantity (Y) :

$$Ln y = 12.425 - 0.197 Ln X_2 \text{ -----(2)}$$

t (22.243) (2.405)

3- The effect of the nominal exchange rate (X₃) on the quantity imported (Y)

$$Ln y = 12.421 + 0.198 L X_3 \text{ -----(3)}$$

t (21.742) (2.358)

Simple regression shows that there is a significant relationship between the dependent variable and the independent variables. Estimating the relationship between quantities and prices on the other hand, as shown in , the results of the estimation show a negative and statistically confirmed relationship between the imported quantities of rice and each of the exchange rates (equilibrium, nominal). The equilibrium exchange rate is more influential than the nominal exchange rate. This is due to this commodity, which may be imported by the private sector as well as the government (especially high-quality items outside the region) which confirms the decrease in the purchasing power of the Iraqi dinar during the study period, and in general, the results also do not agree with the hypothesis of the research. The general analysis of the impact of prices on the imported quantities of basic food commodities:-

Table 4. autoregressive distributed error model

Dependent Variable: LY
Method: ARDL
Date: 11/25/22 Time: 12:46
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LX1 LX2 LX3
Fixed regressors: C
Number of models evaluated: 500
Selected Model: ARDL(2, 1, 2, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LY(-1)	0.191183	0.168276	1.136130	0.2693
LY(-2)	0.334220	0.155153	2.154130	0.0436
LX1	-0.605029	0.421190	-1.436476	0.1663
LX1(-1)	1.424316	0.478861	2.974383	0.0075
LX2	-6.125842	2.421318	-2.529962	0.0199
LX2(-1)	-0.554959	0.404542	-1.371821	0.1853
LX2(-2)	0.605676	0.218491	2.772092	0.0118
LX3	5.934895	2.410486	2.462116	0.0230
C	3.116651	2.022694	1.540841	0.1390
R-squared	0.826803	Mean dependent var		13.80161
Adjusted R-squared	0.757524	S.D. dependent var		0.758138
S.E. of regression	0.373321	Akaike info criterion		1.116371
Sum squared resid	2.787374	Schwarz criterion		1.540704
Log likelihood	-7.187379	Hannan-Quinn criter.		1.249267
F-statistic	11.93444	Durbin-Watson stat		2.310251
Prob(F-statistic)	0.000004			

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

Source // Based on the results of Eviews outputs

Table 5. Test the limits between the independent variables and the dependent variable

ARDL Bounds Test
Date: 11/25/22 Time: 12:48
Sample: 1992 2020
Included observations: 29
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.440031	3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Source // Based on the results of Eviews outputs

The F statistic appeared (5.44), which is significant at the level of (5%), and thus rejects the null hypothesis, which states that there is no long-term relationship between the independent variables and the dependent variable, and accepts the alternative hypothesis

that there is a long-term equilibrium relationship among the explanatory variables towards the dependent variable (the amount of imports). That is, there is a cointegration relationship between the variables in the model.

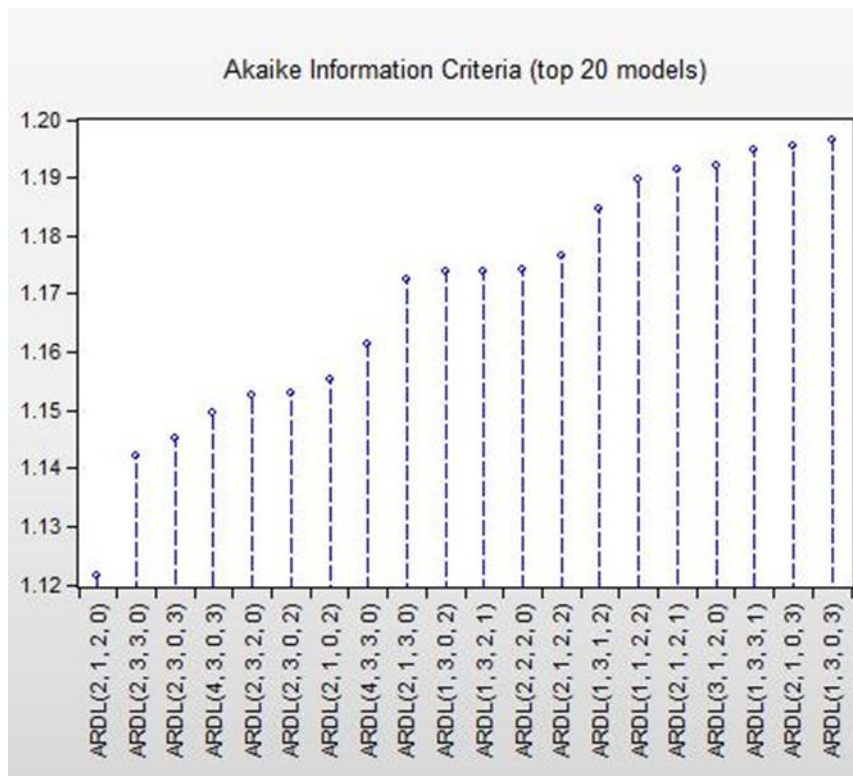


Figure 1. the best 20 models through statistics Akaike Information Criteria

Source // Based on the results of Eviews outputs.

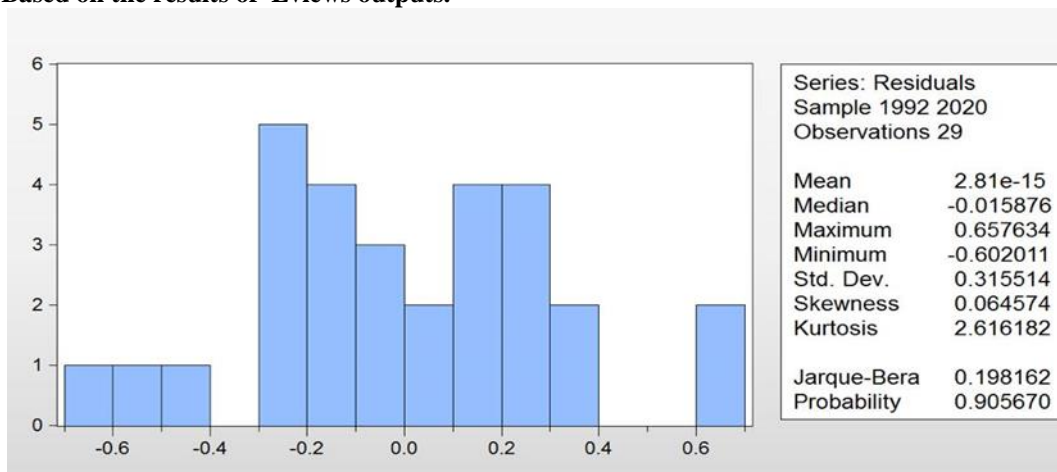


Figure 2. test for the normal distribution of the residual (cloud).

Source // Based on the results of Eviews outputs.

The residuals are distributed normally in the model, and the Jorque-Bera ratio was (0.19), which indicates the acceptance of the null

hypothesis, which states that the residuals are distributed normally, because the probability value is greater than (0.05).

Table 6. of Godfry LM Test-Breusch's Lagrangian multiple test

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.882744	Prob. F(2,18)	0.4308
Obs*R-squared	2.590330	Prob. Chi-Square(2)	0.2739

Source // Based on the results of Eviews outputs.

It is considered one of the most important test to limit the error in the model, and the test results showed that there is no self-correlation by using Lagrange's multiple test and by comparing Chi-Square statistically. Which

amounted to (0.27), which is greater than (0.05), and accordingly, the null hypothesis is accepted, which states that there is no problem of serial autocorrelation of errors in the model..

Table 7. Heteroscedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.100345	Prob. F(8,20)	0.4032
Obs*R-squared	8.863040	Prob. Chi-Square(8)	0.3540
Scaled explained SS	3.406488	Prob. Chi-Square(8)	0.9063

Source // Based on the results of Eviews outputs.

When conducting the variance test for the model and based on the Breusch-Pagan-Godfrey (B P G) test, the calculated F value was obtained, which amounted to (0.40), and its significance was (1.10), which is greater than the significant level (0.05). Also, the results of the homogeneity of variance test

confirmed the error limits that The value of the Chi-Square statistic, which amounted to (0.35), is greater than the level of significance (0.05), and therefore the null hypothesis is accepted that there is no problem of consistency of variance consistency.

Table 8. ECM ARDL cointegration model

ARDL Cointegrating And Long Run Form				
Dependent Variable: LY				
Selected Model: ARDL(2, 1, 2, 0)				
Date: 11/25/22 Time: 12:49				
Sample: 1990 2020				
Included observations: 29				
Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LY(-1))	-0.334220	0.155153	-2.154130	0.0436
D(LX1)	-0.605029	0.421190	-1.436476	0.1663
D(LX2)	-6.125842	2.421318	-2.529962	0.0199
D(LX2(-1))	-0.605676	0.218491	-2.772092	0.0118
D(LX3)	5.934895	2.410486	2.462116	0.0230
CointEq(-1)	-0.474597	0.129136	-3.675179	0.0015
Cointeq = LY - (1.7263*LX1 -12.8006*LX2 + 12.5051*LX3 + 6.5669)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LX1	1.726278	0.627454	2.751243	0.0123
LX2	-12.800587	6.949601	-1.841917	0.0804
LX3	12.505114	6.829159	1.831135	0.0820
C	6.566935	3.493988	1.879495	0.0748

Source // Based on the results of Eviews outputs

D (LX1) agrees with the economic logic, but it is not significant, that is, with an increase in the exchange rate, imports decrease.

D(LX2) agrees with the economic and moral reasoning.

D(LX3) does not agree with the economic logic, but it is significant.

The reason may be due to the fact that the importer is the private sector, which imports despite the high exchange rate to meet consumer needs, as well as the state is responsible for providing individuals with the

ration of rice, so it imports it even if there is a rise in prices. Cointeg (-1) appeared negative and significant (-0.474597), thus fulfilling the necessary and sufficient conditions, meaning that there is a long-term equilibrium relationship between the variables, meaning that y causes x, which means that (0.47) errors or imbalances that occur in the short term can be corrected automatically In a period greater than a year to reach equilibrium in the long term.

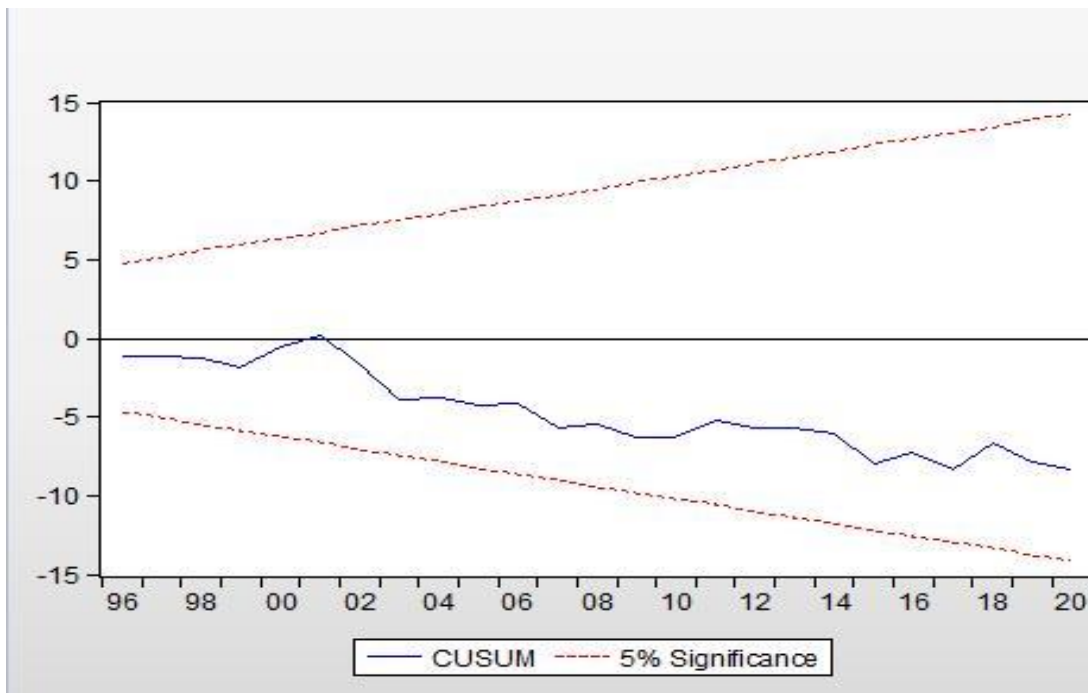


Figure 3 . Structural stability test of the cusum model

Source // Based on the results of Eviews outputs

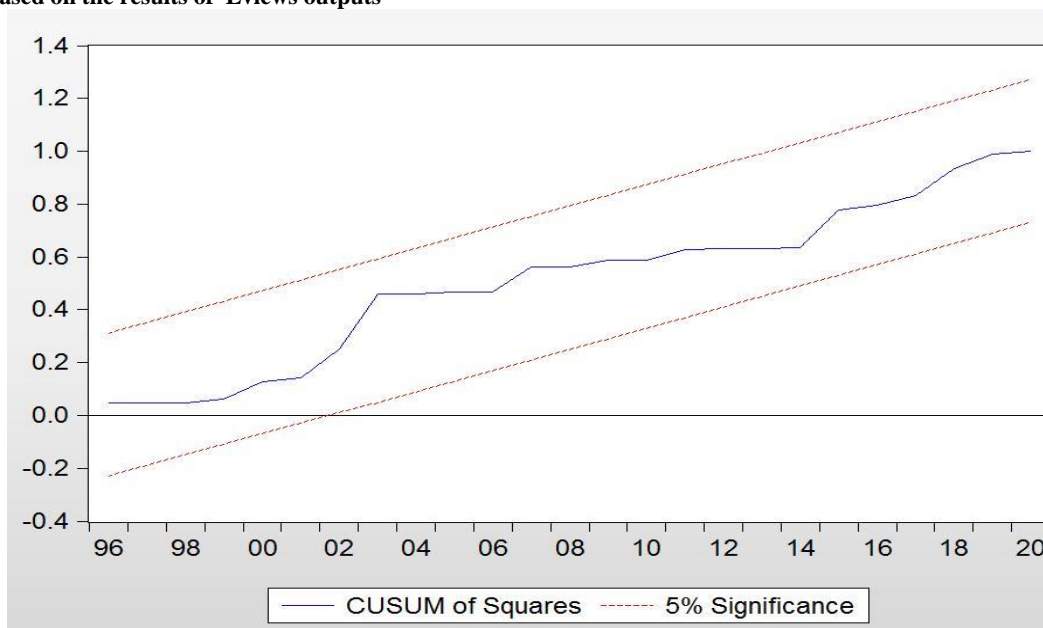


Figure 4 .Structural stability test of the cusum2 model.

Figures 3 and 4 show that the used model is structurally stable.

Conclusions

1-The results of the model analysis showed that the relationship between imported quantities and world prices is weak., as it was found that the imported quantities of the rice crop grew at a rate of 6% and world prices at a rate of 2%, Because the rice crop is one of the basic food crops in the Iraqi consumer list, and it is included in the items of the ration card distributed to individuals, and therefore it is imported by the state to meet the need regardless of the rise in its prices, and the

private sector imports high-quality brands, regardless of prices, to meet the needs of people with higher income.

2- There is a cointegration relationship between the variables in the model, which is significant at the 5% level.

Recommendations

3 - There is a long-term equilibrium relationship between the variables, meaning that y causes x, which means that (0.47) errors or imbalances that occur in the short term can be corrected automatically In a period greater than a year to reach equilibrium in the long term.

Recommendations

- 1- Work to determine the quantities imported, including basic commodities in general and foodstuffs in particular, according to the actual need for them.
- 2- Controlling the border crossing points of the state and limiting the role of the private sector in importing these goods or importing other goods in accordance with specific controls and specifications.
- 3- It is proposed to change the current national currency that has lost its value from external to internal transactions and replace it with a new currency.

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