AN ECONOMIC ANALYSIS OF THE DETERMINANTS OF DOMESTIC DEMAND FOR TEA IMPORTS IN IRAQ USING THE AUTOREGRESSIVE DISTRIBUTED LAG TECHNIQUE (ARDL) FOR THE PERIOD (1990-2020)

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ABSTRACT
This study was aimed to estimate the domestic demand function on tea imports in Iraq using the Autoregressive Distributed Lag model (ARDL) for co-integration during the period 1990-2020.The data are verified for stationary by using unit root tests basis on Augmented Dickey - Fuller Test. The existence of a long-run equilibrium relationship among tea import quantity, current prices of tea and coffee buying, gross national income, and number of buyers is proved using bounds test method to co-integration. Results of estimating short and long-run models of the demand of tea imports by using the unrestricted error correction approach showed that the error correction parameter is adjusted annually by 140%. Results of estimating price elasticity of demand in the short run showed that the absolute coefficient of price elasticity of demand is less than one and more than zero, which means that tea is a necessary commodity for the Iraqi shopper. Additionally the cross elasticity coefficient had a positive sign in the short and long run, which means that coffee, is an alternative good for tea from the viewpoint of the Iraqi consumer. With regarding to the coefficient value of the income elasticity of demand, it was positive and less than one in the short and long run, which means that tea, is a necessary normal commodity for Iraqi buyers. The study recommended that it is necessary to diversify the sources of national income in the local economy by utilizing all available resources in order to reduce dependence on oil revenues, which were a major source of financing imports in the country.
Key words: augmented Dickey-Fuller test, bounds test for co-integration, parameter of adjustment speed, price elasticities of demand, income elasticity of demand.

تحليل اقتصادي لمحددات الطلب المحلي على استيرادات الشاي في العراق بأستعمال تقنية الانحار الذاتي ذو الفجوات الموزعة

للمدة (1990 . 2020)

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المستخلص

هدفت هذه الدراسة الى تقدير دالة الطلب المحلي على استيرادات الشاي في العراق باستخدام تقنية نموذج الانحدار الذاتي ذو الفجوات الموزعة للتكامل المشترك خلال المدة 1990 . 2020. تم التحقق من استقرارية بيانات السلسلة الزمنية باستخدام اختبارات جذر الوحدة استنادا الى اختبار ديكي فولر الموسع، وتم اثبات وجود علاقة توازنية طويلة الاجل بين الكميات المستوردة من الشاي وكل من السعر الجاري لشراء الشاي والسعر الجاري لشراء القهوة (كسلعة بديلة) واجمالي الدخل القومي وعدد المشترين باستخدام طريقة اختبار الحدود للتكامل المشترك. اظهرت نتائج تقدير دوال الطلب على استيرادات الشاي للمدين القصير والطويل، بأستخدام نموذج تصحيح الخطأ غير المقيد، ان معلمة تصحيح الخطأ تعدل سنويا بمقدار 140% اي ما يعادل حوالي سبعة اشهر. أظهرت نتائج تقدير مرونة الطلب السعرية على المدى القصير أن المعامل المطلق لمرونة الطلب السعرية أقل من واحد وأكثر من الصفر، مما يعني أن الشاي يعد سلعة ضرورية للمتسوق العراقي. بالإضافة إلى ذلك كان لمعامل المرونة العبورية اشارة موجبة على المدى القصير والطويل، مما يعني أن القهوة تعد سلعة بديلة للشاي من وجهة نظر المستهلك العراقي. اما فيما يتعلق بقيمة معامل مرونة الطلب الدخلية، كانت موجبة وأقل من واحد على المدى القصير والطويل، مما يعني أن الشاي يعد سلعة طبيعية ضرورية للمشترين العراقيين. واوصت الدراسة بضرورة تنويع مصادر الدخل القومي في الاقتصاد المحلي من خلال استغلال كافة الموارد المتاحة بهدف تقليل الاعتماد على عوائد النفط التي تشكل مصدرا رئيسا لتمويل الاستيرادات في البلد.

كلمات مفتاحية: اختبار ديكي فولر الموسع، اختبار الحدود للتكامل المشترك، معلمة سرعة التعديل، مرونات الطلب السعرية، مرونة الطلب الدخلية.

INTRODUCTION

Studies of import demand have gained special position during the past fifty years, as this is due to the importance of defining the policies that must be followed to face the balance of payments problems that most countries of the world are witnessing. Theoretical trends concerned with studying the demand for imports have developed, which has led to reaching the best economic models that reflect reality, and through which the correct policies are drawn (4). Most of the previous studies indicate that the increase in domestic demand for imported different commodities and services is one of the main issues in the economics of internal and external trade, as it is the sector responsible for meeting the demand of individuals and raising the level of their consumption to the required level (16). Development plans in Iraq highlighted on facing the increasing domestic demand for agricultural crops by taking the necessary various decisions for the success of this goal, especially since the provision of necessary agricultural commodities at the present time has become one of the basic issues related to the country's food security (2). Tea is one of the important agricultural crops globally due to its frequent use on a daily basis, as it comes in second place in drinks after water directly, and the origin of the name is in China, where it is called a tree or (shrub) and on its leaves and on the drink made from the leaves and falls under the species (Camellia) is native to East Asia. The tea crop grows to a height of nine meters, while on farms it cuts small bushes ninety to one hundred and fifty centimeters in length, and its cultivation requires light fertile soil, hot weather, humid air and abundant water, and the tea flavor is caused by volatile oil (8). As for the stimulant property, it is caused by caffeine. In 2004, a group of researchers at the Duke University Medical Center in the USA found an association between caffeine intake with meals and an increase in blood sugar and insulin levels in people with type two of diabetes (11). Some studies also concluded that there is a significant relationship between caffeine intake and improvement of bronchial and lungs function at people with asthma for a period of up to four hours (20). Tea production has set new records since 2004, as studies

dealt with by the World Food and Agriculture Organization (FAO) resulting from the meeting of government groups concerned with tea, confirmed that global tea production has continued to rise until it reached 5.5 million tons in 2017. China is at the top of the largest countries in production of tea, followed by India, Kenya, Sri Lanka, Turkey, Indonesia, Vietnam, Japan, Iran, and Argentina, while Turks are the world's most consuming people of tea (7). Tea is one of the important crops that the Iraqi population depends on as a favorite hot and cold drink mainly daily, as the local market demand for this main crop is fully met through import, as tea is not grown in Iraq due to the lack of suitable weather conditions during the growth and germination stages. It is evident from a study of the development of the quantity and price of tea imports in Iraq during the period 1990-2020, that the amount of tea imports during the 2020 year amounted to about 30.500 thousand tons, with a total value of 84.239 billion Iraqi dinars, at an average import price of 2.762 million Iraqi dinars per ton, equivalent to about 2210 US dollars, and the average per capita consumption in Iraq of imported tea is about 1,167 kg per year (15). It is also evident that there is a fluctuation in the amount of tea imports in Iraq from year to year during the study period, as tea imports reached their highest rate during the 2014 year, reaching about 221344 tons. As for the geographical distribution of Iraq's imports of tea in the 2014 year, they were distributed to nineteen main countries: Jordan, Kuwait, Saudi Arabia, the UAE, Egypt, Switzerland, China, Vietnam, South Korea, Sri Lanka, Iran, India, Indonesia, Japan, Malaysia, the Philippines, Myanmar, Thailand and South Africa, the percentage of Sri Lankan imports of which was about 95% (14). The importance of studying the domestic demand for imports lies in the impact on the sustainable growth of any country, because import is all about increasing the availability of necessary goods and services (1), so the results of this study will be a great importance to decisions makers in the Iraqi government and its agencies as well as researchers interested on studies of import demand. The continued increase in the domestic demand for tea imports in Iraq has become a problem in itself facing the Iraqi

economy, so the research problem lies in identifying the main determinants that affect the tea imports demand, nature and type of this demand for a basket of Iraqi consumers by achieving the following specific objectives:

1- To clarify the significant effect of the determinants of the demand function on tea imports in Iraq, according to the ARDL model technique.

2- To confirm the long-term relationship between the determinants of the demand function of tea imports.

3- To estimate the price (self and cross) and income elasticities of demand as a basis for formulating policies related to imports and consumption of the tea crop.

The continuation of the Iraqi consumer to purchase additional quantities of stimulating crops, especially tea, despite the relatively high prices, means that the demand for them is inelastic and that the current trend of import demand will continue in subsequent years. This requires of specialists to reconcile demand functions for the various imported crops in Iraq, in light of it, the actual needs of individuals can be determined and work to provide those needs by planning import operations, and use of these functions in the calculation of elasticities to be adopted as important economic indicators when setting a price policy for those crops appropriate with the objectives of consumption planning.

MATERIALS AND METHODS
Conceptual framework
Economic theory assumes the existence of a relationship among the quantity demanded of a commodity and its price and the prices of other commodities in addition to real income (Ceteris paribus). The true random relationship of the demand model can be described as follows (17):

$$Qd = bo - b_1Px + b_2Py + b_3I + ei$$

Where: b0 and bi represent the regression coefficients or constants, while the random variable (ei) represents the other explanatory variables that were not included in the model to be estimated. We note that the model consists of demand for a specific commodity (Qd) as a dependent variable and there are three independent variables that affect the quantity demanded, which is the price of the commodity (PX). According to the theoretical assumption that the relationship is negative between the quantity demanded and the price of the commodity itself, and we also assumed a positive relationship between the quantity demanded and the price of the other commodity (Py), which means that the other commodity is a substitute for commodity X, in addition to income I, we assumed a positive relationship, which means that the commodity is a normal. This function form indicates that the relationship is causal and in one direction, meaning that the independent variables are the cause of what happens to the demanded amount from changes and non-vice versa (17). A distinction can be made among three main models used in studies of import demand: the trend of bilateral studies model for countries, the total trade model that estimates the total functions of exports and imports for a group of countries, and the trade distribution model that defines the aggregate demand function or the demand function for groups of imported goods of the country based on the general theory of demand (4). The results of previous studies showed that the single-equation models are more appropriate, especially when their identification is good and their regressors are consistent, unbiased, and efficient, and when the dynamics are included by introducing the dependent variable as a lagging for one-year, it gave acceptable results. In the dynamic model, the volume of imports is a function of both real income and import prices, and according to recent trends in economic thought about the determinants of import demand, most economists emphasize the importance of the national income factor as a major determinant of imports in open economies, and that its link to imports is positive (6). Therefore, this research was based on the estimation of the demand function on imported quantities of tea using the dynamic demand function, which takes the following form:

$$QD_t = f (QD_{t-1}, PT_t, PC_t, NI_t, PU_t, U_t)$$

Where QDt represents the imported quantities of tea in year t, QDt-1 the imported quantities of tea in the previous year, PTt the real domestic price of tea in year t, PCt the real domestic price of coffee as a substitute good in year t, NIt the real domestic income in year t, PUt is the population in year t, Ut is the error term. The real domestic prices of tea and

coffee were calculated by dividing the import value (US dollars) of the two commodities by the quantity imported from them, and then the exchange rate was used to convert the value into the local currency. The population was also reduced by 20% as a representative factor for the number of buyers of the commodity aged two years and over. In order to test how the macroeconomic variables of demand affect the imported quantities of tea at the local level, the elasticity of demand is estimated, which is defined as the amount of change in the quantity demanded due to the change in one of the factors affecting the demand. Demand elasticities can be divided into (13):

1- Price elasticity of demand: The price elasticity of demand affects decisions makers. By studying how consumers respond to price elasticity of demand, they can understand how to price their products to ensure competitiveness. By understanding price elasticity of demand, they can invest in effective trades forecasting and manage revenue and profits. Understanding price elasticity of demand also helps decisions makers to manage their publicity strategies.

2- Cross elasticity of demand: When deciding how much of a good they want to purchase, people take into account the prices of both substitute goods and complementary goods. The key feature of substitutes and complements is the fact that a change in price of one of the goods has a positive or negative effect on the quantity demanded for the other good.

3- Income elasticity of demand: Measuring the income elasticity of demand is important for decisions makers as they can then forecast how the demand for the products may change in response to consumer incomes. As luxury goods are more income-elastic, decisions makers of luxury goods can change their marketing and publicity strategies based on the change in consumers' income. Measuring the income elasticity can also help decisions makers to predict the products cycles of their goods and services. The characteristics of the demand for agricultural crops differ from one to another, as each agricultural commodity has features that are unique to it over other commodities. Although there is this difference among these commodities, they share a specific point, which is that the demand for agricultural commodities is considered a derivative demand, and the low elasticity of demand for agricultural commodities is due to their importance and the inability to dispense with them due to the lack of substitutes for most of the necessary agricultural commodities such as wheat and tea (12).

Study data

In order to achieve the objectives of the research in practice, the study relied on annual secondary data for the period 1990-2020, for each of the total quantities of imported tea, gross national income, rates of tea and coffee purchase prices on level of Iraq (in the current local currency) and finally the number of buyers represented by the population as a factor affecting the domestic total demand. These data were obtained from their various local and international sources, which included the Iraqi Ministry of Planning, the Iraqi Ministry of Trade, and the World Food and Agriculture Organization (FAO).

Analysis methods

The study was based on the econometric quantitative analysis method using modern standard techniques in the analysis of co-integration and error correction models, as the research adopted the ARDL model, which was developed by Pesaran and others in 2001, in which a modern methodology was presented to test the extent to which the equilibrium relationship between the variables was achieved under the unrestricted error correction model. This method is known as the bounds test method, the reason for preferring this method is due to the uncertainty problem that usually accompanies time series and the degree of their stationarity, and this test does not require that the time series be integrated of the same rank as well as the possibility of using it when the time series is short, it also gives an estimate of the short-term and long-term parameters in one equation (19). The method of bounds test of co-integration includes three main steps; determining the order of integration of the variables under study, testing the existence of a unique integral relationship, and finally estimating the unrestricted error correction model and calculating the short and long term elasticities:

Augmented Dickey - Fuller (ADF) test

One of the important problems that must be tested before starting the estimation stage is the problem of data stationarity that usually accompanies economic time series data. If the variables are used in the import demand function and they contain the unit root, it may cause a serious problem in estimating or obtaining what known as spurious regression (9). The augmented Dickey Fuller test is one of the most important tests used to detect the presence of the unit root in time series data, according to this test the random error limit is not self-related and is characterized by the desired properties or what is known as the white nose (5).

ARDL bounds test for co-integration

This test is based on Fisher's statistic. If the calculated F value is greater than the upper limit of its critical value, the null hypothesis (lack of long-term equilibrium relationship) is rejected and the alternative hypothesis is accepted with the existence of a co-integration between the study variables. If the calculated value is less than the minimum critical value, then the null hypothesis is accepted, meaning the absence of the equilibrium relationship in the long run (3).

Unrestricted error correction model

Unrestricted error correction model allows the distinction between the long term and the short term, and is based on the assumption that there is a long-term equilibrium relationship in the light of which the equilibrium value of the model variables is determined in order to estimate the speed of reaching the long-term equilibrium from any short-term imbalances between the dependent variable and the independent variables including in the model (18). The error correction parameter indicates the speed of the adjustment from the short term to the long term. This parameter is expected to be negative because it indicates the rate at which the short term relationship is heading towards the long term relationship. The error correction model has complementary relationships that can approximate the long-term behavior of the explanatory variables with their complementary relationships, while at the same time allowing for short-term adaptive mechanisms. Therefore, the limit of co-integration is the same as the limit of error correction as long as deviations from the long-term equilibrium are gradually corrected through a series of short-term partial adaptations (10).

RESULTS AND DISCUSSION

Unit root tests

To ascertain the extent of the stationarity of the time series and determine the rank of integration of each variable separately, unit root tests were used to examine the properties of the time series for each of the tea imports in Iraq, the rates of purchase of tea and coffee at the level of Iraq, the total national income, and the number of buyers during the period 1990. - 2020. Table 1 shows the results of the time series stability analysis test for the variables under study according to the augmented Dickey-Fuller test.

Table 1. Results of augmented Dickey-Fuller test of time series stationarity

Null Hypothesis: the variable has a unit root// Critical Value = 3.568 at 5% level (with constant & trend)						
Time series	T-Statistic At Level			T-Statistic At First Difference			Integration Rank
	with constant	with constant & trend	without constant & trend	with constant	with constant & trend	without constant & trend	
QD	3.518*	4.006*	2.891**	5.400**	3.701*	5.515**	I(0)
PT	1.501	2.838	0.516	4.998**	4.913**	4.994**	I(1)
PC	1.042	3.497	0.064	9.038**	8.883**	8.964**	I(1)
NI	0.588	2.250	0.129	3.561*	3.418***	3.550**	I(1)
PU	0.164	3.486	0.001	4.375**	4.217*	2.253*	I(1)

* Significant at 5% level, ** significant at 1% level, *** significant at 10% level
Source// Prepared by the researcher based on the results of data analysis in Eviews program

In light of the results presented in Table 1, we note that the time series for imported quantities of tea at the level of Iraq are stable at the level (Referring to Figure 1), while the rest of the time series are stable at the first difference. These results are somewhat consistent with the logic of the econometric theory, which assumes that most macroeconomic variables are stable at the first difference.
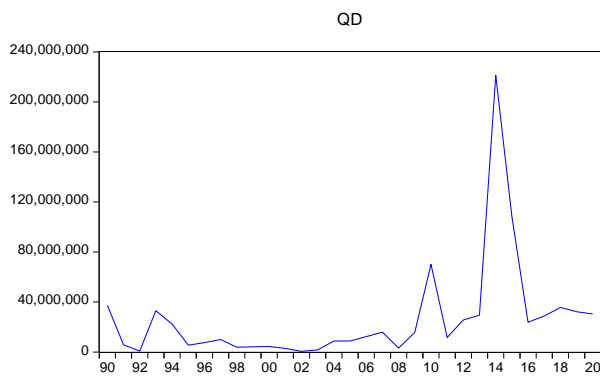
Figure 1. Stationarity graph of tea imports at the level (Original data)

Source// Results of data analysis and graph in Eviews program

Co-integration tests

A long-term equilibrium relationship was confirmed between the variables under study using the bounds test methodology; Table 2 and Figure 2 show the results of co-integration tests.

As show in Table 2, by comparing the calculated value of F with the range of potential values for Pesaran, we note that the value of F is equal to 12.559, which is higher than the upper bound of the tabular values (I1 bound) at a significance level of 1% - which means rejecting the null hypothesis (lack of co-integration between the variables of the model) and accepting the alternative hypothesis that there is a long-term equilibrium relationship between the study variables, which leads to the possibility of estimating the unrestricted error correction model to study the relationship of demand regression for tea imports on the explanatory variables under study.

Table 2. Results of ARDL bounds test for co-integration

ARDL Bounds Test		
Date: 03/30/21 Time: 03:43		
Sample: 1991 2020		
Included observations: 30		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	12.55900	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source// Prepared by the researcher based on the results of data analysis in Eviews program
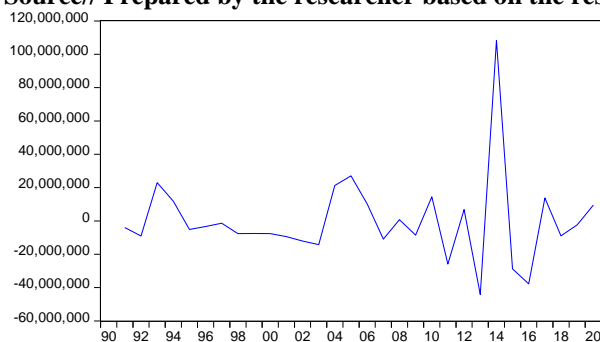

Figure 2. Co-integration graph of study variables

Source// Results of data analysis and graph in Eviews program

Estimating of ARDL model in the short run (Dynamic regression)

According to the ARDL method, the dynamic regression model of the demand for tea imports in Iraq was estimated using the linear and logarithmic formulas, and it became clear that the linear formula is the best based on economic, statistical and econometric criteria. Table 3 shows the results of estimating the linear formula.

Table 3. Results of linear formula of ARDL model in the short run

Dependent Variable: QD				
Method: ARDL				
Date: 03/30/21 Time: 03:20				
Sample (adjusted): 1991 2020				
Included observations: 30 after adjustments				
Maximum dependent lags: 1 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (0 lag, automatic): PT PC NI PU				
Fixed regressors: C				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
QD(-1)	-0.400921	0.169817	-2.360894	0.0267
PT	-47498.11	8801.739	-5.396445	0.0000
PC	56824.93	14508.13	3.916765	0.0007
NI	0.200994	0.088827	2.262754	0.0330
PU	576335.8	2146915.	0.268448	0.7906
C	2979701	47775082	0.062369	0.9508
R-squared	0.704076	Mean dependent var		26158349
Adjusted R-squared	0.642426	S.D. dependent var		43197075
S.E. of regression	25830780	Akaike info criterion		37.14889
Sum squared resid	1.60E+16	Schwarz criterion		37.42913
Log likelihood	-551.2333	Hannan-Quinn criter.		37.23854
F-statistic	11.42040	Durbin-Watson stat		2.454343
Prob(F-statistic)	0.000010			
*Note: p-values and any subsequent tests do not account for model selection.				

Source// Prepared by the researcher based on the results of data analysis in Eviews program

The results presented in Table 3 refer to estimates of the linear demand function on tea imports in the short run using the autoregressive method, and it is noticed that all signs of the independent variables are as expected according to the logic of economic theory, where the quantity demanded is affected inversely with the price of the commodity and positively with the price of the substitute good, income, and the number of buyers, as the model shows, is that 70% of the changes in the demanded quantities of tea imports in Iraq are caused by changes in the rates of purchase of tea and coffee, the total national income, the number of buyers of the commodity, and the amount of tea imports for the previous year. The results also show the significance of all regression coefficients at different statistical levels, exception of the parameter of the number of buyers. The results indicated the significance of the model as a whole at a very high statistical level, based on the F-test.

Estimating of unrestricted error correction model (UECM) and ARDL model in the long run (Co-integration regression)

After making sure that there is a co-integration relationship in the long term between the variables of the study model according to the bounds test, despite the instability of those variables in the short term of the same degree, it is possible to estimate the regression of the long-term equilibrium relationship, which is called the Cointegration equation, and then estimate a unrestricted error correction model of the variables under study:

A - Results of long-run ARDL model estimation (Cointegration regression)

The co-integration regression model of the import demand for tea in Iraq was estimated using the linear and logarithmic formulas, and it became clear that the linear formula is the best based on the criteria of economic, statistical and econometric theory. Table 4 shows the results of estimating the linear formula in the long run.

Table 4. Results of linear formula of ARDL model in the long run (Cointegration equation)

ARDL Cointegration And Long Run Form				
Dependent Variable: QD				
Selected Model: ARDL(1, 0, 0, 0, 0)				
Date: 04/10/21 Time: 12:48				
Sample: 1990 2020				
Included observations: 30				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PT	-33904.9190	5365.348084	-6.319239	0.0000
PC	40562.55848	8190.462792	4.952413	0.0000
NI	0.143473	0.062523	2.294712	0.0308
PU	411397.8379	1538575.769	0.267389	0.7915
C	2126958.562	34070932.78	0.062427	0.9507

Source// Prepared by the researcher based on the results of data analysis in Eviews program

The results in Table 4 indicate that the demand for total imports of tea in Iraq during the study period is affected by the following variables: rates of tea purchase prices across Iraq, rates of purchase of coffee as an alternative commodity across Iraq, total national income, and the number of buyers. It is noticed that the signals of all the explanatory variables are consistent with the economic logic and have proven significant at different statistical levels excepting the parameter of the number of buyers, which may be due to the inaccuracy of the data related to this variable. The estimated model was also found to be free of econometric problems based on the second-order tests.

B - Results of the estimation of the unrestricted error correction model

Table 5 shows the results of the estimation of the unrestricted error correction model of the determinants of tea import demand in Iraq for the period 1990-2020.

Table 5. Results of unrestricted error correction model (Short run equilibrium)

ARDL Cointegration And Long Run Form				
Dependent Variable: QD				
Selected Model: ARDL(1, 0, 0, 0, 0)				
Date: 04/10/21 Time: 12:48				
Sample: 1990 2020				
Included observations: 30				
Cointegration Form (ECM Regression)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PT)	-47498.1068	8801.739411	-5.396445	0.0000
D(PC)	56824.93247	14508.13001	3.916765	0.0007
D(NI)	0.200994	0.088827	2.262754	0.0330
D(PU)	576335.7943	2146915.238	0.000000	0.0000
CointEq(-1)	-1.400921	0.169817	-8.249572	0.0000

Source// Prepared by the researcher based on the results of data analysis in Eviews program

As the results appear in Table 5, it is reviewed that the error correction parameter (ECMt-1) is significant at a very high statistical level with the expected negative signal, which confirms the existence of a long-term equilibrium relationship. The value of the estimated error correction parameter (-1.401) indicates that the quantity of imported tea is annually adjusted by 140% of its value, meaning that the imported quantity takes about 0.72 years (less than year) towards its equilibrium value in the long term after the effect of the shock in the model as a result of a change in one of the explanatory variables. The T Student statistic indicates the significance of all the estimated constants at different statistical levels, as well as Fisher's statistic indicates the significance of the estimated model as a whole at a very high statistical level. To ensure that the model is free from econometric problems, second-order tests presented in Table 6 were used.

Table 6. Results of second-order tests for unrestricted error correction model

Test	Estimated Value	Probability
Breusch-Godfrey Serial Correlation LM Test	1.765956	0.1944
Heteroskedasticity Test: Harvey	1.526068	0.2191
	4.172219 (PT)	< 10
Multicollinearity Test: Variance Inflation Factors	7.306612 (PC)	< 10
	3.846909 (NI)	< 10
	9.282814 (PU)	< 10

Source// Prepared by the researcher based on the results of data analysis in Eviews program

The results in Table 6 indicate that the model is free from the problem of autocorrelation, based on Breusch – Godfrey test; it was also evident that the model is free from the heteroscedasticity problem, based on Harvey–Godfrey test. The results of Variance Inflation Factors (VIF) test showed that the estimated model was devoid of the multicollinearity problem.

Estimating the elasticities of demand in the short and long run

The price and income elasticities of demand for tea imports in Iraq for the period 1990-2020 were estimated based on the results of estimating the linear formulas of the ARDL model in the short and long run, table 7 shows the results of estimating the types of demand elasticities in the short and long terms.

Table 7. Results of estimating the types of demand elasticities in the short and long runs

Type of Demand Elasticity	Elasticity in the short-run	Elasticity in the long-run
Price Elasticity of Demand	-0.47	-1.40
Cross Elasticity of Demand	0.62	1.46
Income Elasticity of Demand	0.21	0.41

**Source// Prepared by the researcher based on the results of tables four (4) and five (5).**

The results presented in Table 7 indicate that the price elasticity of demand for tea imports in the short term is equal to 0.47 and in the long run it equals 1.40, as any increase in the price of tea imports by 10% leads to a decrease in the demand quantity of tea imports by 4.7% in the short term and 14% in the long run. It is noted that the cross elasticity of demand in the short and long term is positive and reached 0.62, 1.46, respectively, which means that coffee is an alternative commodity to tea from the Iraqi consumer viewpoint. It is also noted that the income elasticity of demand in the short and long term is positive and less than one, which means that tea is a necessary normal commodity for the Iraqi consumer.

Stability tests

The last and important step after estimating the unrestricted error correction model is to test the structural stability of short and long term parameters. To achieve this step, the cumulative sum of regression residuals test (CUSUM) can be used. The structural stability of the estimated parameters in the error correction model is achieved if the graph of test statistic falls within the critical bounds at the 5% significance level (Referring to Figure 3).
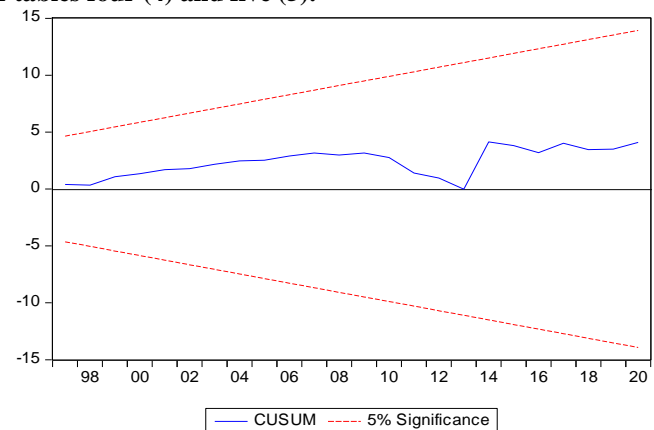
Figure 3. Structural stability graph of error correction model parameters

Source// Results of data analysis and graph in Eviews program

As show in Figure 3, the estimated parameters of the unrestricted error correction model are structurally stable during the referred study period.

CONCLUSIONS

In this study, the unrestricted error correction model was estimated by Pesaran method. The results of the assessment proved the existence of an error correction mechanism in the model. The ARDL model was estimated in the long and short run using the Pesaran method; results indicated that the gross national income, the average price of the substitute commodity (coffee) and the price of the

commodity itself are the most important determinants in the short and long term. Results of estimating price elasticity of demand in the short run showed that the absolute coefficient of price elasticity of demand is less than one and more than zero, which means that tea is a necessary commodity for the Iraqi shopper, while the price elasticity of tea import is more than one in the long run. Additionally the cross elasticity coefficient had a positive sign in the short and long run, which means that coffee is an alternative good for tea from the viewpoint of the Iraqi consumer, this agree with the logic of economic theory and the common case usual in the pattern of coffee consumption among Iraqi population. Furthermore the coefficient value of the income elasticity of demand, it was positive and less than one in the short and long run, which means that tea, is a necessary normal commodity for Iraqi buyers. Based on the findings of the study, it can be recommended to diversify the sources of national income in the local economy by utilizing all available resources in order to reduce dependence on oil revenues that have decreased in recent years for several reasons, which were a major source of financing imports.

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