ECONOMIC ANALYSIS TO ESTIMATION THE IMPORTED INFLATION IN AGRICULTURAL SECTOR IN IRAQ FOR THE PERIOD 1990-2019

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ABSTRACT

This research was aimed to measure and evaluation the imported inflation in agricultural sector in Iraq. Moreover, studying and analyzing the most important factors affecting it during 1990-2019. This research reached to- via results of unit root test- that all variables were non-stationary at the level, but all of them were stationary at the 1st difference. The research conclude- through significance of parameters of agricultural trade openness in the model. That the imported inflation can be rising in agricultural sector after the trade liberalization and interring to WTO and increasing of dumping policy in agricultural products, whereas found when measuring the imported inflation the high dependency of agricultural sector in Iraq on the imported equipment's and agricultural and foods products, and influence of rising of global prices in it especially after 2003.The research recommended to controlling the rates of imported inflation by using studied import policies and not allowed of randomized of importing agricultural products, the research recommends also to reduce the impact of dumping policy in agricultural products.

Keywords: agricultural imports, exchange rate, agricultural trade openness, marginal propensity of imports.

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تحليل اقتصادي لتقدير التضخم المستورد في القطاع الزراعي في العراق للمدة 1990 – 2019

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المستخلص

يهدف البحث الى قياس وتقدير التضخم المستورد في القطاع الزراعي في العراق ودراسة وتحليل اهم العوامل المؤثرة عليه للمدة 1990-2019، ولقد توصل البحث من خلال نتائج اختبار جذر الوحدة الى أن المتغيرات كلها غير مستقرة عند المستوى ولكنها استقرت عند الفرق الأول لها. كما استنتج البحث ومن خلال معنوية معلمة الانفتاح التجاري الزراعي في الانموذج المقدر الى إمكانية ازدياد نسب التضخم المستورد في القطاع الزراعي لا سيما بعد تحرير التجارة وانضمام العراق الى منظمة التجارة العالمية وازدياد أثر سياسة الإغراق للمنتجات الزراعية، حيث وجد عند قياس التضخم المستورد الاعتماد الكبير للقطاع الزراعي في العراق على مستلزمات الإنتاج والمنتجات الغذائية والزراعية المستوردة وأثر الزيادة في الأسعار العالمية لها على التضخم المستورد في القطاع الزراعي في العراق ولا سيما بعد عام 2003. وأوصى البحث بضرورة السيطرة على معدلات التضخم المستورد في القطاع الزراعي في العراق من خلال وضع سياسات واستراتيجيات استيرادية مدروسة وعدم السماح بعشوائية الاستيرادات الزراعية، كما أوصى بضرورة الحد من سياسة الإغراق التي يتعرض لها العراق في السلع والمنتجات الغذائية والزراعية.

كلمات مفتاحية: الاستيرادات الزراعية، سعر الصرف، الانفتاح التجاري الزراعي، الميل الحدي للاستيرادات.

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INTRODUCTION

The imported inflation consider one of problems which all developing economics suffer it, and it's influence will increase when inflationary depression are grown (7). Inflation: It does not hide on one of the specialists or others what inflation has a great impact on any economy that holds the facility and limits its growth and exhausting even the power of any economy (17). Iraq's economy is high opened to the world, this is logic result because declining contributions of good sectors especially agriculture information of GDP, there are many factors causing inflation process and rising prices levels, so the state should facing and controlling the inflation. Imported inflation in agriculture sector is one of problems that Iraq's economy facing it after 2003 because of high openness of Iraq's economy on global markets because of lacking in domestic production in food products and dumping policy against Iraq's economy. Problem of the research is suffering the agricultural sector in Iraq from inflation which appears in poor distribution of resources, defect of pricing Polices and rising in costs of agricultural production, all those causing growing in imported inflation in agricultural sector, besides lacking in agricultural investments which causing decreasing in domestic agricultural production, then increasing in imports value from food and agricultural product which there prices are raising in global markets, so the imported inflation will increase. The research aims to estimate imported inflation in agricultural sector in Iraq during 1990-2019 and analyzing impact of some indicators on imported inflation in agricultural sector in Iraq during 1990-2019. Imported inflation can be define as: That inflation happen because rising the prices in global markets, and this problem will be more dangerous in any state has high trade openness especially of the trade partners have high inflation rates, then imported inflation is one of the main source of inflation in net importer in countries. It is depends on relative importance of imported in economy, nature of structural composition of these imports and nature of geographical distribution of them (3). So, imported inflation is a continuous rising in imported prices of goods and services (4). Imported inflation will increase if the marginal propensity to import, average tending to consume and ration of (exports imports)/GDP are increase (5). There are three status (6): first to increasing in costs, when cost of production rise, then prices will be rising, So it is very import distinguishing between cost push inflation and imported inflation, because imported inflation means rising in prices of imported find goods from outside which will be consumed directly (14). Second increasing money liquidity- that will change general level of prices. Third: Domestic income- increasing in foreign demand will lead to increase in wage balance, then increase in value of exports will lead to increase in national income and total domestic demand and in full employment, increase in demand will be an inflation according to foreign trade multiplier (12). This making import-related policies and decisions were weakly affecting overall agricultural economic development, and inability of agricultural imports to creating desired growth in the agricultural sector (16).

MATERIALS AND METHODS

Measuring of imported inflation: Imported Inflation will be calculated according to following formula (7):

Imported inflation in agricultural sector = value of agricultural imported × average of global inflation ×100 / agricultural domestic product.

The main reason of imported inflation in Iraq's economy because it is information from production economy to rentier economy (9). Strides indicate that 75% of vegetables and fruits are importing from Iran, Syria and Jordan (11). Table 1 Shows imported inflation in agricultural sector and its contribution, from Table 1 We can notice that rates of imported inflation was 93.8% in 1990 than declining because of economic embargo that facing by Iraq, and stopping most of Iraq's imported from agricultural and food goods. The lowest ratio was 0.004% in 2002, then the ration rising until it reached 197% in 2012 because of dumping policy, high openness of Iraq's economy and reducing the tariffs, while highest ratio of it was 741.17% in 2017 because of depending on import to importing agricultural equipment such as seeds, pesticides in large amounts (11). As for the

annual growth rate of imported inflation, it reached 27.7% during the period 1990-2019.

Table 1. Calculated imported inflation in agricultural sector in Iraq during 1990-2019

Year	Agricultural imports millions I.D. 1	Agricultural Product millions I.D. 2	Global inflation % 3	imported inflation % 4	exchange rate % 5
1990	509.10	4613.3	8.5	93.802	0.311
1991	42.10	6629.1	9.3	5.906	0.311
1992	55.40	22872.7	7.7	1.865	0.311
1993	285.15	49864.0	8.0	4.575	0.311
1994	174.89	333524.2	10.3	0.540	0.311
1995	192.15	1378274.3	9.3	0.130	0.311
1996	135.42	1208982.3	7.0	0.078	1000
1997	12.00	1276367.1	5.6	0.005	1000
1998	24.49	1868379.8	5.1	0.007	1000
1999	40.79	2482616.5	3.2	0.005	1000
2000	46.23	2327277.2	3.6	0.007	1000
2001	39.26	2863495.0	4.0	0.005	1000
2002	41.56	3512658.6	3.1	0.004	1000
2003	157.34	2486865.5	3.3	0.021	1000
2004	227.00	3693768.0	3.7	0.023	1433
2005	161.69	5064158.0	4.2	0.013	1469
2006	3411.70	5568985.7	4.5	0.276	1467
2007	487287.20	5494212.4	5.3	47.006	1234
2008	85402.40	6042017.7	8.9	12.580	1191
2009	572689.60	6832552.1	3.0	25.145	1170
2010	327785.00	8366232.4	3.5	13.713	1170
2011	1439130.00	9918316.8	5.0	72.549	1170
2012	5299120.00	10484949.3	3.9	197.107	1166
2013	3068480.00	13045856.4	2.8	65.858	1160
2014	1914330.00	13128622.6	2.8	40.828	1166
2015	657809.00	8160769.9	1.6	12.897	1167
2016	2883430.00	7832046.9	3.2	117.811	1182
2017	11928101.85	6598384.8	4.1	741.170	1184
2018	14186133.99	6322747.2	3.1	695.537	1183
2019	12842470.48	8766710.8	3.9	571.316	1182
Annual growth				27.7%	

Source: 1,2 central statistic organization -CSO -Directorate of trade statistic and Directorate of national accounts- study years- Baghdad.

3: from- data.worldbank.org/indicator/FP.CPI.TOTL.ZG

4: Calculated by researches depending on fallowing from of:

Imported inflation in agricultural sector = value of agricultural imported × average of global inflation ×100 / agricultural domestic product.

5: Central Bank of Iraq, Department of Statistics and Research.

Indicators of imported inflation: All the indicators below give impression in imported inflation in agricultural sector. All of then when rising will reflect rising in imported inflation and vice versa.

Marginal propensity to agricultural imports -MTI: it is the change in agricultural imports causing by change in income, rising in income will lead to rise in agricultural imports and vice versa. This indicator has high importance because it is shows extent depending of state on outside, and it is reflects trade openness of state, most studies consider the economy is open if the imports exceeds 40% from GDP at current prices (13). Table 2 Shows values of -MTI, the highest value was 20163.22% in 2006 while the lowest was -8399.48% in 2017 and the negative sing indicate declining value of agricultural Imports for the previous year (8). The rising in prices of agricultural and food product globally will transform to exporting state, and the imported inflation will transport to it.

Rates of agricultural imports to GDP : The economist Hinrex was specified 20% to judge if the economy it is closed or opened, if the percentage exceeds 20% it is opened (15). From Table 2 We can notice that minimum percentage of ratios of agricultural imports to GDP was 0.0009% in 1997 because of economy is opened.

Table 2. Indicators of imported inflation in agricultural sector in Iraq during 1990-2019

Year	Agricultural Product millions I.D. 1	change in Agricultural Product % 2	Agricultural imports millions I.D. 3	change in Agricultural imports % 4	Marginal tendency to Agricultural imports % 5	Ratio of Agricultural imports to Agricultural Product % 6
1990	4613.3	-	509.100	-	-	11.0355
1991	6629.1	43.70	42.100	-91.73	-209.93	0.6351
1992	22872.7	245.03	55.400	31.59	12.89	0.2422
1993	49864.0	118.01	285.150	414.71	351.43	0.5719
1994	333524.2	568.87	174.89	-38.67	-6.80	0.0524
1995	1378274.3	313.25	192.15	9.87	3.15	0.0139
1996	1208982.3	-12.28	135.42	-29.52	240.37	0.0112
1997	1276367.1	5.57	12	-91.14	-1635.16	0.0009
1998	1868379.8	46.38	24.494	104.12	224.47	0.0013
1999	2482616.5	32.88	40.794	66.55	202.42	0.0016
2000	2327277.2	-6.26	46.233	13.33	-213.08	0.0020
2001	2863495.0	23.04	39.263	-15.08	-65.43	0.0014
2002	3512658.6	22.67	41.563	5.86	25.84	0.0012
2003	2486865.5	-29.20	157.344	278.57	-953.91	0.0063
2004	3693768.0	48.53	227	44.27	91.22	0.0061
2005	5064158.0	37.10	161.692	-28.77	-77.55	0.0032
2006	5568985.7	9.97	3411.7	2010.00	20163.22	0.0613
2007	5494212.4	-1.34	487287.2	14182.83	-1056312.34	8.8691
2008	6042017.7	9.97	85402.4	-82.47	-827.17	1.4135
2009	6832552.1	13.08	572689.6	570.58	4360.90	8.3818
2010	8366232.4	22.45	327785	-42.76	-190.51	3.9180
2011	9918316.8	18.55	1439130	339.05	1827.57	14.5098
2012	10484949.3	5.71	5299120	268.22	4694.86	50.5403
2013	13045856.4	24.42	3068480	-42.09	-172.34	23.5207
2014	13128622.6	0.63	1914330	-37.61	-5928.69	14.5813
2015	8160769.9	-37.84	657809	-65.64	173.46	8.0606
2016	7832046.9	-4.03	2883430	338.34	-8399.48	36.8158
2017	6598384.8	-15.75	11928101.85	313.68	-1991.42	180.7731
2018	6322747.2	-4.18	14186133.99	18.93	-453.17	224.3666
2019	8766710.8	38.65	12842470.48	-9.47	-24.50	146.4913

Source: 1,3 central statistic organization –CSO - Directorate of trade statistic and Directorate of national accounts- study years- Baghdad

2,4: Calculated by researches according to:

Annual change percentage= $(A_t - A_{t-1}/A_{t-1}) \times 100$

5: Agricultural imports= Change in Agricultural imports/ Change in Agricultural Product× 100.

6: Ratio of Agricultural imports to Agricultural Product = Agricultural imports/ Agricultural Product× 100

This research depend on the analysis of each descriptive and quantitative approaches, besides some indicators to calculate imported inflation in agricultural sector, and econometric analysis via using multiple linear regression by using OLS to study in the relationship between imported inflation as a dependent variable and each of indicator of agricultural trade openness, exchange rate and agricultural imported price index as an independent variable by using Eviews-10 to time series data from 1990-2019. Stationary test was done by using ADF and PP tests to detecting in which order the variables can be stable. After transforming values of variables to logarithmic values. Table 3. Shows that all variables were unstable in level, so we reject null hypothesis and accept alternative hypothesis that all variables have unit root in I(0), but all of them were stable after first difference I(1), so here we accept alternative hypothesis in 1% significance level with constant, constant and trend and trend only by using ADF and PP. This is true with econometrical tests that assume that most economic variables are not static at the level, but become static at the first difference (10).

Table 3. Results of variables Stationary at level I (0) and first difference I (1) by using ADF and PP tests

UNIT ROOT TEST TABLE (ADF)					
At Level		**LINIM**	**LT**	**LE**	**LINM**
With Constant	**t-Statistic**	**-0.8328**	**-0.6879**	**-2.0581**	**-0.8139**
	Prob.	**0.7946**	**0.8345**	**0.2620**	**0.8001**
		No	**No**	**No**	**No**
With Constant & Trend	**t-Statistic**	**-2.6078**	**-2.8245**	**-1.7412**	**-2.0874**
	Prob.	**0.2797**	**0.2004**	**0.7065**	**0.5309**
		No	**No**	**No**	**No**
Without Constant & Trend	**t-Statistic**	**-0.8298**	**-0.7538**	**-0.1612**	**0.7228**
	Prob.	**0.3478**	**0.3810**	**0.6193**	**0.8656**
		No	**No**	**No**	**No**
At First Difference		**d(INIM)**	**d(LT)**	**d(LE)**	**d(LINM)**
With Constant	**t-Statistic**	**-4.6655**	**-5.0640**	**-5.2982**	**-5.7261**
	Prob.	**0.0009**	**0.0003**	**0.0002**	**0.0001**
		*******	*******	*******	*******
With Constant & Trend	**t-Statistic**	**-4.8794**	**-5.3460**	**-5.4958**	**-5.6013**
	Prob.	**0.0027**	**0.0009**	**0.0006**	**0.0005**
		*******	*******	*******	*******
Without Constant & Trend	**t-Statistic**	**-4.7158**	**-5.0950**	**-5.1949**	**-5.6030**
	Prob.	**0.0000**	**0.0000**	**0.0000**	**0.0000**
		*******	*******	*******	*******

UNIT ROOT TEST TABLE (PP)					
At Level		**LINIM**	**LT**	**LE**	**LINM**
With Constant	**t-Statistic**	**-1.0532**	**-0.8751**	**-2.0592**	**-0.7643**
	Prob.	**0.7202**	**0.7816**	**0.2616**	**0.8142**
		No	**No**	**no**	**No**
With Constant & Trend	**t-Statistic**	**-2.6631**	**-2.9599**	**-1.6695**	**-2.1374**
	Prob.	**0.2578**	**0.1600**	**0.7389**	**0.5046**
		No	**No**	**no**	**No**
Without Constant & Trend	**t-Statistic**	**-1.0552**	**-0.9313**	**-0..1612**	**0.7228**
	Prob.	**0.2561**	**0.3049**	**0.6193**	**0.8727**
		No	**No**	**no**	**No**
At First Difference		**d(INIM)**	**d(LT)**	**d(LE)**	**d(LINM)**
With Constant	**t-Statistic**	**-4.6655**	**-5.0676**	**-5.2991**	**-5.7394**
	Prob.	**0.0009**	**0.0003**	**0.0002**	**0.0001**
		*******	*******	*******	*******
With Constant & Trend	**t-Statistic**	**-4.8686**	**-5.3488**	**-6.1547**	**-5.6111**
	Prob.	**0.0028**	**0.0009**	**0.0001**	**0.0005**
		*******	*******	*******	*******
Without Constant & Trend	**t-Statistic**	**-4.7158**	**-5.0982**	**-5.1949**	**-5.6005**
	Prob.	**0.0000**	**0.0000**	**0.0000**	**0.0000**

*****significant at 1%, ** significant at 5%, * significant at 10%**
Source: Outputs of Eviews10

The research applied many formulas to specification the model and found that double logarithmic formula gives best results to analyze imported inflation in agricultural sector after passing all econometric and statistical tests, the model was as follows:

$DlogINIM = \beta_0 + \sum_{i=1}^{k} \beta_1 DlogT + \sum_{i=1}^{k} \beta_2 DlogE + \sum_{i=1}^{k} \beta_3 DlogINM + \varepsilon_i$

That is:

DlogINIM= First difference of naturel logarithm of imported inflation in agricultural sector

DlogT= First difference of naturel logarithm of inducted of in agricultural trade openness

DlogE= First difference of naturel logarithm of exchange rate of I.D. versus U.S. $.

DlogINM= First difference of naturel logarithm of agricultural imported price index

ε_i= Random variable

The equation of regression appears as follows:

DLINIM = -0.0429+1.031*DLT -0.0430*DLE +1.144 *DLINM

T= (-0.60) (23.23) (-0.92) (2.51)

R^2=0.95 F=188.24 D-W= 2.4

he economic criteria were determine by economic theory, which are concern about signs and magnitudes of the parameters (2). The parameter of constant was -0.042 and it was negative and non-significant, while parameter of agricultural trade openness indicator ATO was 1.031 was positive and significant at 1% level, and that means ATO has positive impact on imported inflation in agricultural sector, and if this indicator rising by 1% the imported inflation will rise by 1.031% and this is appropriate with economic logic. The parameter exchange rate was -0.043 it was negative and agreed with economic logic but not significant, The parameter of agricultural imported price index was 1.144, it is positive and significant at 5%, than is means agricultural imported price index has positively impact on imported inflation in agricultural sector, it means when prices of agricultural imports rising, the imported inflation will be rise and this result is computable with economic logic, so increase by 1% in prices of agricultural imports will leads to rising in imported inflation by 1.14%. The analysis of the imported inflation model in the agricultural sector in Iraq was divided into two periods of time 1990-2002 and 2003-2019 due to the difference in the two periods in terms of all the economic indicators and because the imported inflation in the agricultural sector before 2003 was not present, but the results of analysis of the two periods appeared not significant. The model should evaluation according to statistical criteria after the study has certainty about logic of estimated parameters from signs and magnitudes according to economic criteria, coefficient of determination R^2 was 0.95, That means 95% of fluctuation in dependent variable caused by independent variables and 5% of them the random variable absorb their impacts. Fisher statistic F was 188.24 and it has might significant at 1%, and exceeds value of tabulated F at 1%, that indicate significant relation between dependent and independent variables in the model. Student test T indicate that most variables have statistical significant and there values differ from zero. Durbin-Watson test indicate that the value lies between lower and wiper limits, and autocorrelation problem will detect next by using LM test. The study testing second order problem as follows:

First: Normal distribution of residuals test, to detecting from that, the value of Jarque-Bera was 0.14 and the probability value was 0.93, and it is refer to reject null hypothesis. Figure 1. Show that the residuals have normal distribution.

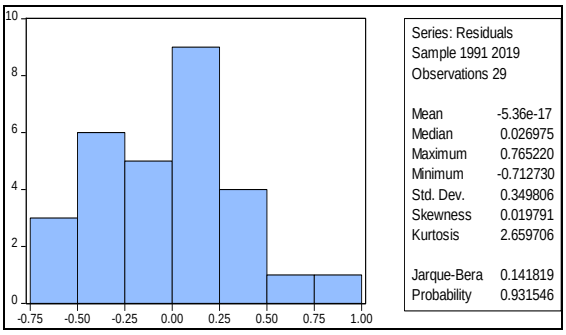

Figure 1. Test normal distribution

Source: Outputs of Eviews10

Second: Autocorrelation test breusch - godfrey: It is consider vary important test of autocorrelation by using Lagrange multiplier (1). The rustles test show there is no autocorrelation by compression chi- Square statistic, which was 0.33, so we accept null hypothesis about there is no autocorrelation as show in table 4.

Table 4. Lagrange multiplier- LM test for Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	**0.924971**	**Prob. F(2,23)**	**0.4108**
Obs*R-squared	**2.158891**	**Prob. Chi-Square(2)**	**0.3398**

Source: Outputs of Eviews10

Third: Heteroskedasticity test: The study tested this problem by using ARCH and White tests as shown in tables, from ARCH test. The calculated value of was 0.09 and their significant was 0.76, it is greater the 0.05, the Heteroskedasticity of error limits test confirm that it's significant level 0.05, White test shows that calculated F value was 1.66 and it's significant was 0.16 and it is greater than 0.05, besides error limits test confirm that chi-square statistic was 0.17 and it is greater than 0.05, so we accept null hypothesis, that there is no Heteroskedasticity.

Table 5. Test Heteroskedasticity (ARCH and White)

Heteroskedasticity Test ARCH			
F-statistic	0.095179	Prob. F(1,26)	0.7602
Obs*R-squared	0.102127	Prob. Chi-Square(1)	0.7493
Heteroskedasticity Test White			
F-statistic	1.666898	Prob. F(9,19)	0.1666
Obs*R-squared	12.79511	Prob. Chi-Square(9)	0.1721
Scaled explained SS	7.890946	Prob. Chi-Square(9)	0.5452

Source: Outputs of Eviews10

Forth: Multicollinearity test: The study used Kline Test, table 6. Shows matrix of correlation coefficients among independent variables, that simple correlation coefficients square between any two independent variables in the model is lowest from R^2 value 0.95, so the model has no Multicollinearity.

Table 6. Multicollinearity test

Correlation			
	DLogT	DLogE	DLogINM
DLogT	1.000000	-0.039714	0.089782
DLogE	-0.039714	1.000000	-0.001550
DLogINM	0.089782	-0.001550	1.000000

Source: Outputs of Eviews10

The research reached to some conclusions may be the most important of them are: the most influence variable imported inflation in agricultural sector during the research period were each of exchange rate, rates of agricultural trade openness and agricultural imported price index. The imported inflation expecting to rise in Iraq after trade liberation and inter to GATT. The research recommended the most important recommendations such as necessity of controlling imported in inflation via studied policies and strategies of import and stop in randomness in agricultural and food imports, and controlling the borders to reducing if unnecessary import of agricultural products to reducing imported inflation. In addition, necessity to activating tariffs of imported substitute goods, besides necessity to activate anti- dumping polices.

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