An analytical and quantitative study of economic shocks between the variables of Kaldor Magic Square in agricultural sector in Iraq for the period (2004-2021)

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Abstract

This manuscript systematically investigates the use of different methods of the magic square (MS) as an indicator of well-being, which is a formal system of relationships necessary to deal with conflicting social and economic goals. An application of the new concept is presented using economic data on the Iraqi agricultural sector. The study also aimed to know the nature of the relationship between variables such as the role of the agricultural sector, represented by the growth rate of agricultural domestic product, the unemployment rate, the inflation rate, and growth rate of the agricultural trade balance in Iraq, using time series data represented by the period (2004-2021). The study used modern descriptive and quantitative methods represented by the autoregressive model. (VAR) and analysis of response functions and analysis of variance, after conducting the time series stability test using the extended Dickie-Fowler test. Study variables using the effect test and the maximum value test, and from here the autoregressive model was adopted to study the relationship between the Kaldor variables. Square variables like the role is far from ideal, because the Iraqi economy is a rentier economy, that is, it depends on the oil sector and neglects other sectors such as agriculture and industry. The manuscript recommends encouraging local agricultural companies to invest money in national food security projects, such as food industries, or the production of agricultural production inputs of good quality Providing them with facilities, developing an atmosphere of constructive competition between them, and removing technical obstacles that appear in their work.

Keywords: economic shocks, Agricultural Sector, VAR model, Kaldor, Iraq.

Introduction

Kaldor Square is named after the British economist Nicholas Kaldor, who was born in 1908 and studied economics in London. Characterized by trends of liberalism and limited state activism, somewhat following the policy statements of successive British governments, Kaldor's key article deals with four macroeconomic variables (GDP growth, employment, trade balance, and inflation). are all expressed as percentages. His economic policy formula contains no equations, tables, or graphs. He argues that the successful management of an open economy implies at least the simultaneous achievement of clear goals for the variables mentioned. The reader may wonder why these four variables are relevant variables to consider. For example, why not include variables measuring fiscal policy or institutional performance? It is true that the last two variables can be linked to some of the variables that make up his field of methods. Kaldor paid little attention to the matter after successive statements by advisers in the post-World War II era with minor changes (1). shows this with a four-headed diagram containing the main economic policy objectives of 1971 (15), and he is able to define economic efficiency across four variables by calculating the angles of the variables. When the quadrilateral is located in the north and east parts of the figure and its area is enlarged, the economic efficiency is good, and vice versa, as in Figure 1.

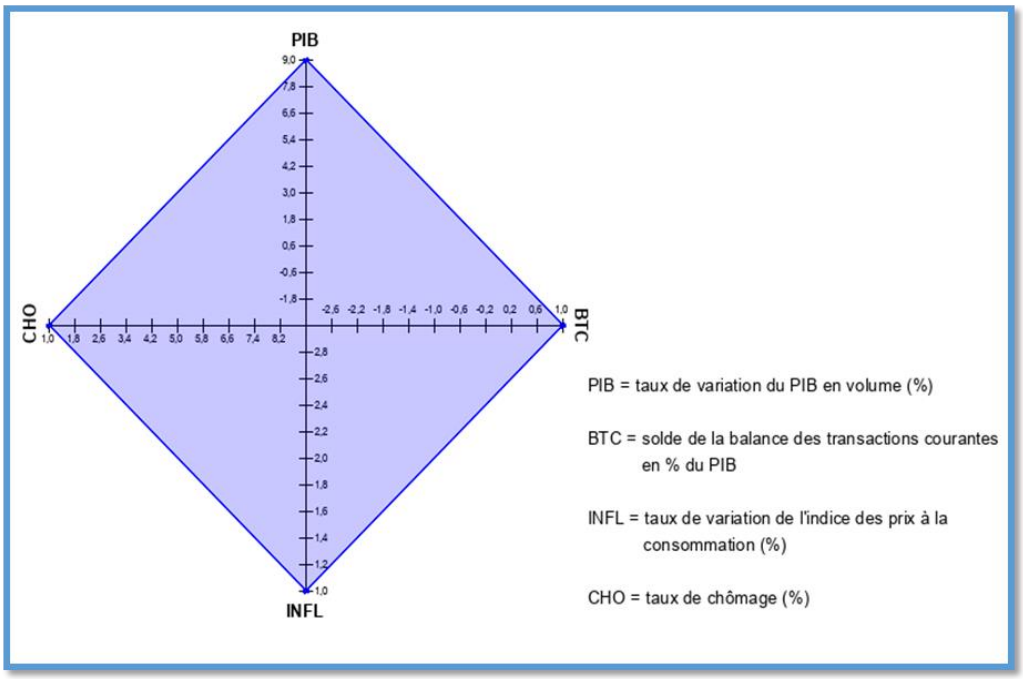

Figure 1. Graphical representation of the macroeconomic variables (1).

In recent years, a number of papers presented at international conferences and seminars and published in journals have taken the Medrano-B & Teixeira approach

as their theoretical framework. Consequently, Firme and Teixeira published a macroeconomic analysis focusing on Brazil and another group of countries using this approach uses the same analytical framework to provide a composite index that measures aggregate performance including economic and social activities as well as environmental sustainability for China and the United States (4). In addition,Kučera also introduces an alternative mathematical formula for the magic square (9). As mentioned, Kaldor's pioneering analysis made use of neither quantitative nor graphical tools. This absence was addressed by introducing the so-called "magic square" (MS), which is a graphical representation of Kaldor's approach. According to] Firme , the credit for this goes to Karl Schiller, a German politician and leader of the Social Democratic Party (from 1966 to 1972) who was also Minister of Economics of the Federal Republic of Germany (17) and (23). Since the 1970s, economists in the Organization for Economic Co-operation and Development have begun to use this tool, with slight modifications, to deal with the performance of a single country or the comparative performance of a group of countries or regions (19) and (20).

This manuscript aims to know the extent of the stability of the agricultural sector in Iraq during the study period by analyzing the Kaldor Magic Square The manuscript also aims to know the nature of the economic shocks relationship between the magic Kaldor variables using the vector autoregressive model (VAR).

Material and Methods

According to Junker, VAR models follow three fundamental principles: The system has no internal or external presuppositions, no zero-type limitation, and no solid core economic theory upon which to establish the model. The univariate autoregressive (AR) model is a type of econometric model that is generalized by the VAR model. Each variable in the model is treated symmetrically, with an equation for each one detailing how it changed over time based on its model lag and the lags of all other variables. VAR modeling's primary goal is to disclose connection between variables in terms of delays in addition to their one-way relationships, the benefits of the technique are highlighted by VAR proponents (1) and (1), as follows:

There are no limitations necessary for the VAR model: Since all variables are endogenous, it is not required to identify whether ones are exogenous or endogenous. This is crucial because the definition of each system variable affects the predictability of structural models in concurrent equations.

•VAR models are more adaptable than single variable AR models because they let the value of a variable to depend on more than just its own delayed values or combinations of noise factors.

VAR model estimates are typically superior to those produced by conventional structural models. The VAR model, however, has a few issues (5): The largest practical issue in VAR modeling is picking the right lag length. VAR model is atheistic because it needs less previous information. When the sample size is not

excessive, all the issues that many people have

The simplest possible VAR features two variables and one lag:

$$y_{1t} = a_{11}, y_{1,t-1} + a_{12} y_{2,t-1+e_{1t}}$$

$$y_{1t} = a_{21}, y_{1,t-1} + a_{22} y_{2,t-1+e_{2t}}$$

The most compact way to express a VAR system like this is to use matrices, which can be written as: $Y_t = AY_{t-1} + e_t$

This function tracks the time course of the various sudden shocks that the different variables in the VAR model are exposed to, and reflects how each of these variables responds to any sudden shock in any variable in the model with the passage of time. The impact of the shock on the random variable on yt and for a certain period of time (s) can be predicted by the following equation (21):

$$AS = (\partial y_{t-1})/\partial v$$

As the AS :matrix represents the response of the model to a shock of one standard deviation in the duration t in each of the model variables. It reflects the relative contribution of the change in a variable in explaining the change in other variables separately. The contrast components and impulse response functions can be obtained by the following model:

$$\mathrm{Yt} = \mu + \sum_{i=0}^{\infty} \mathrm{M_i}\, \mathrm{Vt} - 1$$

Where Mi represents the model coefficient matrix (n×n), V represents the structural shock vector or the random error limit vector (n×1).

Granger Causality Test Granger causality test is a test used to determine the direction of causality of the relationship in the presence of delayed relationship between two variables.

Results and Discussion

Fig. 1. Shows a schematic diagram of MS as it was used traditionally in the 1980s (1). The annual variables considered in this Cartesian level were: GDP growth rate (%), trade balance (as a percentage of GDP), unemployment rate (%), and inflation rate (%). Note that, when measured from the original, the growth rate is assumed to have values from 0 to 10, trade balance values from -2 to 4, inflation from 10 to 0, and unemployment from 12 to 0 (the last two variables on an inverted chart). scale, given that higher values are less desirable than lower values). Unfortunately, in such a simple representation, the authors did not care about the different measures of the variables, but rather simply related the four variables according to the axes. The ranges assigned to macroeconomic variables are somewhat arbitrary, but in order to construct the magic square, it is clear that some ranges had to be chosen. In addition, the correlation between some variables is recognized (eg, Okun's law - unemployment versus real GDP; Phillips curve - inflation versus unemployment).

The agricultural sector is the focus of the structural adjustment process, but its annual growth rate is in a state of continuous decline, and this is evident from Table (1), which divided the square variables such as the magic role of the agricultural sector into three periods by taking the average for each variable, with

regard to the annual growth rate of the domestic product Agricultural sector, which amounted to (%1.14) in average (2004-2009), to gradually decrease as a result of the multiple problems that this sector suffered from and is still suffering from, the lack of appropriate environmental conditions as a result of bad weather conditions, which led to a decrease in rainfall rates or frequent dust storms. , and the decline in soil fertility and salinity as a result of poor management of irrigation operations, which caused a decline in yield rates per unit of agricultural area. In addition to the financial reasons, such as the low allocations that the state sets for this sector, and despite the support provided by the state on the prices of agricultural inputs, especially fertilizers, pesticides, and seeds. In addition to other reasons, the low level of agricultural management due to reliance on traditional and backward methods and the lack of modern technological mechanization due to the dominance of small production units, not to mention the dumping policy that led to the Iraqi market being satisfied with foreign food products (Unified Arab Economic Report, 334: 2010).

Table 1. Kaldor magic square variables for the agricultural sector in Iraq for the period (2004-2021)

Year	Annual growth rate of agricultural output %	Inflation rate	Unemployment rate	Growth rate of the agricultural trade balance
2004	5.68	26.80	72.90	-3.11
2005	3.09	37.10	42.90	-3.24
2006	0.48	53.10	60.90	-3.35
2007	-1.96	30.80	65.80	-2.93
2008	-1.07	12.70	19.80	80.90
2009	0.61	8.30	81.80	7.07
Average	1.14	28.13	57.35	8.43
2010	0.8	2.5	58.8	14.51
2011	0.27	5.6	19.8	9.64
2012	1.67	6.1	97.7	22.89
2013	1.76	1.9	20.8	-0.46
2014	0.24	2.2	93.7	-9.49
2015	-1.41	1.4	80.8	-27.02
Average	0.555	3.28	61.93	1.68
2016	0.32	0.5	90.8	-11.14
2017	-0.13	0.2	89.7	13.98
2018	0.13	0.4	12.9	23.18
2019	-0.03	-0.9	12.8	2.30

2020	-0.03	0.6	13.7	2.25
2021	-0.18	-0.15	13.1	-16.54
Average	-0.004	0.07	35.21	3.42

Source:

- The World Trade Organization - The organization's website on the international information network www.wto.org/ English statistical program /International Trade statistics

- Food and Agriculture Organization of the United Nations (FAO) - Yearbook of statistics and the organization's website on the international information network www.fao.org.faostat - Years of study.

- Ministry of Planning / Central Statistical Organization / Trade Statistics Directorate. Central Bank of Iraq, General Directorate of Statistics and Research, Annual Economic Report, 2020, p. 2.

The double crisis that occurred in 2014 and 2019 contributed to deepening the problem of decline in agricultural and industrial production, after large areas of agricultural land fell out of government control, and industrial facilities (Bayji refinery) and infrastructure that had an important role in industrial production were destroyed, although the launch of the budget was delayed in most cases. The years and not launching them, as happened in the years 2014, 2020 and 2022, and the political tensions and quotas in taking over the Ministries of Industry and Agriculture deepened the problem of these two sectors, and the dumping policy also played its role in deepening the problem of agricultural and industrial production, especially after lifting protection for them as is evident from Table (1).

As for the annual growth rate of the trade balance, it was characterized by fluctuation. A major change occurred in the Iraqi agricultural foreign trade balances after the American occupation in 2003. The reason for this is due to the openness of Iraq to the outside world on a large scale, and there has become great freedom for all sectors involved in trade, which are (the foreign sector and the foreign sector). the private and mixed sectors) to play its role in importing and exporting various commodities, as is evident from Table (1).

Also note from table (1) that the inflation rate was (26.80%) in 2004, i.e. the inflation trends in Iraq after 2003 were characterized by a rise, and this is a result of Iraq's transition towards a market economy and integration into the global economy, which led to an increase in inflation rates, after that the inflation rate began to rise Until it reached (53.10%) in 2006, which is the highest level of inflation in Iraq throughout the study period, if the annual rate of the general consumer price index rose to (76.4) after it was (49.9) in 2005, and this is due to the increase in government expenditures and the increase in consumer demand without a parallel increase on the supply side (Central Statistical Organization, 2020).

In 2009, the inflation rate reached (8.30%). This decrease is due to the success of the monetary policy in achieving stability in the general level of prices as a result of the

deflationary policy pursued by the monetary authority through selling the currency window as well as reducing the interest rate, and this decrease is positive for the monetary policy after that the inflation rate Oscillating between rise and fall, until it reached (1.90%) in 2013, and the inflation rate continued to decline until it reached (0.5%), as the annual rate of the general index of consumer prices decreased (104.1) in 2016 after it was (148) in 2015, and this is due to the decrease Oil prices in the global markets, in addition to the security conditions due to the war on terrorism and its occupation of some regions. In 2019, the inflation rate decreased (-0.19), which is the lowest rate throughout the study period, and this is mainly due to the fact that oil prices remained at their low level [4].

As for the year 2020, it reached (3.6%) the inflation rate in Iraq, and this is due to the spread of covid-19, which led to a decline in the demand for oil, and on the other hand, a rise in food prices as a result of a shortage in the supply of goods, in addition to the partial and total closure of the borders (we conclude that Iraq witnessed severe fluctuations in inflation rates throughout the period 2004-2020, and this is a result of Iraq's transition towards an open economy and integration with the global economy, which led to fluctuations in the inflation rate, in addition to the lack of seriousness in implementing economic and investment programs and plans, represented by the failure to implement the economic development plan.

Table (1) shows that the agricultural unemployment rate in Iraq reached (72.2%) in 2004, and this rise is a result of the conditions that Iraq is going through after the occupation in 2003, which disrupted the movement of economic activities as a result of the infrastructure destroyed by the war and the subsequent acts of sabotage and looting of all State property, which doubled the measures taken by the occupying power to dissolve many state institutions, which led to the involvement of many workers in the labor market, and then the unemployment rate in Iraq decreased to (19.80%) in 2007, due to the high demand for employment during that period. Especially the increase in employee salaries and wages, and then it began to vary between the rise due to obtaining some security stability in a relative way, and thus reflected positively on the economic situation .However, in 2014 the unemployment rate rose to (93.7%), which is a high rate, and this is a result of the wars that Iraq waged against terrorist gangs, and this matter led to a significant decline in investments, in addition to the funds that were not directed towards creating operational capacities, but rather directed to support the Iraqi military capacity to fight Terrorism, that is, the government's authority followed a restrictive financial policy by increasing fees and taxes and stopping hiring after 2014 in light of the Cabinet's decision. After that, the unemployment rate continued to rise, reaching (89.7%) in 2017, then the unemployment rate decreased in 2018, reaching (12.9%). This is mainly due to the fact that the Ministry of Planning did not have a role in coordinating the outputs of the Ministry of Education and dilapidated government institutions, as well as the lack of organizational capacity that helps discover new investment opportunities and activate the agricultural sectors that help absorb

unemployment through expansion in the volume of employment [6], and continued to decline until 2021, reaching (13.1%). The agricultural sector witnessed a decline in the labor force due to the displacement of the majority of workers from the countryside to the cities and their emigration to work in this sector and then move to other activities that generate higher profits due to the decrease in the returns achieved in this sector.

From Figure (2) we note that the specifications of the Kaldor square were in a state of contraction during three periods, i.e. a percentage that is not ideal according to the Organization for Co-operation and Development, meaning that the agricultural sector, according to the variables of the Kaldor square, is far from ideal, because the Iraqi economy is a rentier economy, that is, it depends on the oil sector and neglects the sector We also note that the average agricultural domestic product during the study period was weak, while the inflation rate was fluctuating due to Iraq's transition towards integration with the global economy and exposure to imported inflation. The unemployment rate did not improve, and this is a result of administrative and financial corruption in most state institutions. As for the trade balance It was not positive because the volume of imports is greater than the volume of exports, that is, in general, if we want to compare the level of improvement during the past three periods, we notice that the averages of the periods were gradually improving, as the last period was better than the first period, and the second is better than the first period, and this can be seen Positively if we represented the three figures graphically and

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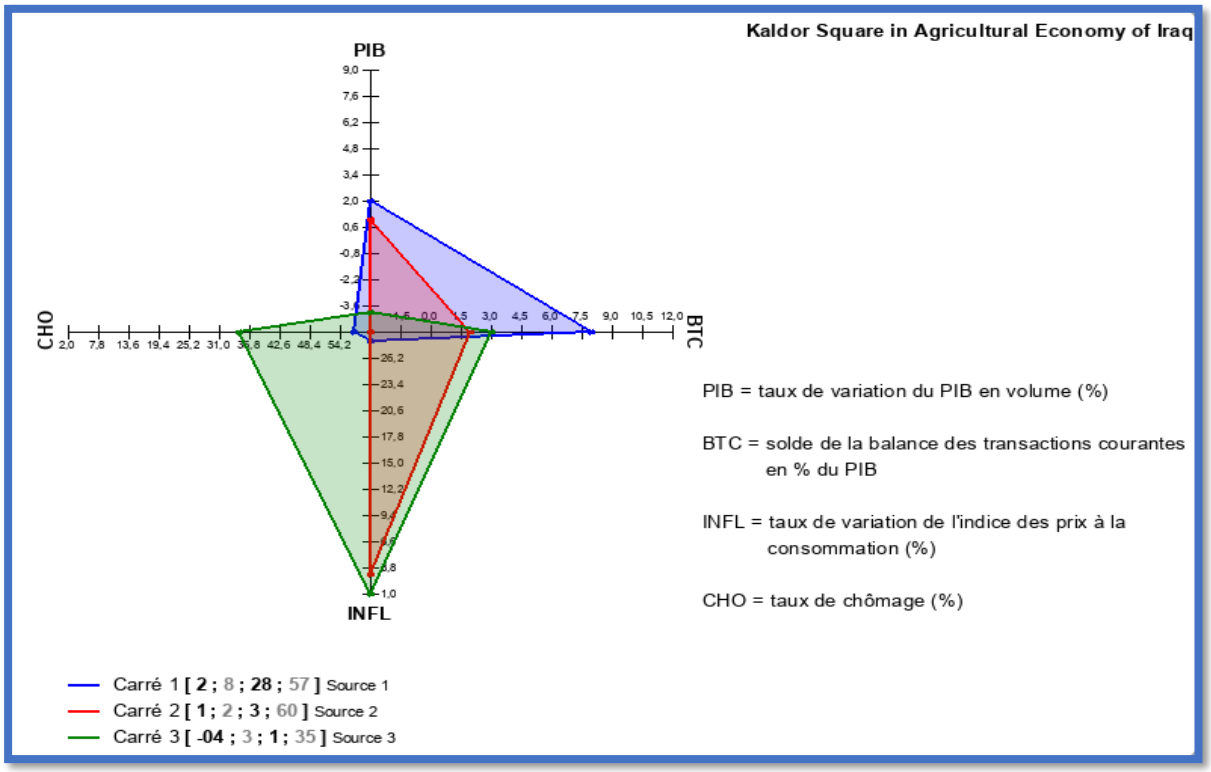

Figure 2. Kaldor square variables for the Agricultural sector in Iraq for the period (2004-2021)

Source: Prepared by the researcher based on the data of Table (1) Using the Sit: https://www.ses.ac-versailles.fr/prgs_2019/carre/carre.html

The results of the unit root test in Table (2) for most of the variables at their initial levels confirm that the characteristic of stillness has not been attained, which leads to accepting the null hypothesis that there is a unit root in the time series data. The results show that the characteristic of stillness has not been attained after taking the first difference of the variables and performing the unit root test. The time series of the variables are confirmed to be static at their first difference by rejecting the null hypothesis and accepting the alternative hypothesis at the first difference for all variables. After obtaining the rest of the time series and making sure that most of the variables used in the study are still in the first difference, we can use the cointegration test to test the existence of a long-term equilibrium relationship between the model variables.

Table 2. Unit root test results according to ADF for kaldor variables for the period 2004 -2021

Variable	At Level			At First Difference		
%	With Constant	With Constant & Trend	Without Constant & Trend	With Constant	With Constant & Trend	Without Constant & Trend
	Prob	prob	Prob	Prob	Prob	Prob
Growth rate	0.0028***	0.0380**	0.0001***	0.0161**	0.0846*	0.0007***
Agricultural trade balance rate	0.1763	0.3085	0.6580	0.0165**	0.0683*	0.0010***
Inflation rate	0.5965	0.7129	0.1079	0.0001***	0.0002***	0.0000***
Unemployment rate	0.0258**	0.0542*	0.2722	0.0000***	0.0000***	0.0000***

Source: prepared by the researcher based on the outputs of the statistical program Eviews10

The cointegration between the variables of the model will be selected using the Johansen-juselius method (1990), which is one of the best methods used to estimate the vector of cointegration and confirm its unilateralness based on the trace test (traceλ) and the Maxium Eiganvalues test (max), which show The existence or absence of a long-term equilibrium relationship between the economic variables of the study sample, and the results were as shown in Table (3).

Table 3. Results of the Johansen - Juselius cointegration test for kaldor variables

Critical value	Critical value	Prob	Alternative Hypothesis	null hypothesis	Decision
Trace					
3.841466	2.684218	0.0.1011	R=1	R=0	Trace test indicates no cointegrating eqn(s) at the 0.05 level.
29.79707	26.80257	0.1066	R=1	R=0	denotes rejection of the hypothesis at the 0.05 level
15.49471	7.948981	0.4709	R=1	R=0	
3.841466	1.395863	0.2374	R=1	R=0	
Maximum					
3.15832	2.684218	0.1011	R=1	R=0	Max-eigenvalue test indicates no cointegrating eqn(s) at the 0.05 level.
21.13162	18.85359	0.1012	R=1	R=0	denotes rejection of the hypothesis at the 0.05 level
14.26460	6.553118	0.5433	R=1	R=0	
3.841466	1.395863	0.2374	R=1	R=0	

Source: prepared by the researcher based on the outputs of the statistical program Eviews10

The results of the trace test provided in Table (3) reveal that there are no co-integration vectors between the variables after the co-integration test between the variables was conducted. When the statistic values are less than the critical value and the prop values are larger than 5%, as demonstrated by trace, the null hypothesis is accepted and the alternative hypothesis—that the equation is not integrated—is rejected.

Table (4) refer to the relationship between Kaldor square variables using the VAR model, it is noted from table (4) that there are reciprocal relationships between the Kaldor square variables during the study period, This model deals with all variables as internal (dependent) variables. Therefore, the model has been described by the following four equations:

$$\text{Growth\_Rate}_t = a_1 + \sum_{k=1}^{m} \beta_{11}\text{Growth\_Rate}_{t-k} + \sum_{k=1}^{m} \beta_{12}\, Agriculture\ Foreign\ Trade_{t-k} + \sum_{k=1}^{m} \beta_{13}\ Inflation\ Rate_{t-k} + \sum_{k=1}^{m} \beta_{14}\, Unemployment\ Rate_{t-k} + \varepsilon_{t1} \dots\dots\dots (1)$$

$$Agriculture\ Foreign\ Trade_t = a_2 + \sum_{k=1}^{m} \beta_{21}\text{Growth}_{\text{Rate}_{t-k}} + \sum_{k=1}^{m} \beta_{22}\, Agriculture\ Foreign\ Trade_{t-k} + \sum_{k=1}^{m} \beta_{23}\, Inflation\ Rate_{t-k} + \sum_{k=1}^{m} \beta_{24}\, Unemployment\ Rate_{t-k} + \varepsilon_{t2} \dots\dots\dots\dots\dots (2)$$

$$Inflation\ Rate_t = a_3 + \sum_{k=1}^{m} \beta_{31}\text{Growth}\ \ Rate_{t-k} + \sum_{k=1}^{m} \beta_{32}\, Agriculture\ Foreign\ Trade_{t-k} + \sum_{k=1}^{m} \beta_{33}\, Inflation\ Rate_{t-k} + \sum_{k=1}^{m} \beta_{34}\, Unemployment\ Rate_{t-k} + \varepsilon_{t3} \dots\dots (3)$$

$$Unemployment\ Rate_t = a_4 + \sum_{k=1}^{m} \beta_{41}\text{Growth}\ \ Rate_{t-k} + \sum_{k=1}^{m} \beta_{42}\, Agriculture\ Foreign\ Trade_{t-k} + \sum_{k=1}^{m} \beta_{43}\, Inflation\ Rate_{t-k} + \sum_{k=1}^{m} \beta_{44}\, Unemployment\ Rate_{t-k} + \varepsilon_{t4} \dots\dots (4)$$

Table 4. The relationship between Kaldor square variables using the VAR model

	GROWTH_RATE	AGRICULTURAL_FOREIGN_TRADE	INFLATION_RATE	UNEMPLOYMENT_RATE
GROWTH_RATE(-1)	0.557223	425.2228	4.324188	-0.711509
	(0.14660)	(1340.78)	(0.92012)	(6.24616)
	[3.80095]	[0.31715]	[4.69958]	[-0.11391]
AGRICULTURAL_FOREIGN_TRADE(-1)	-2.86E-05	0.336859	-0.000261	0.000357
	(2.6E-05)	(0.23519)	(0.00016)	(0.00110)
	[-1.11251]	[1.43229]	[-1.61798]	[0.32556]
INFLATION_RATE(-1)	-0.042617	-398.8058	0.577705	0.380909
	(0.02007)	(183.595)	(0.12599)	(0.85530)
	[-2.12294]	[-2.17220]	[4.58520]	[0.44535]
UNEMPLOYMENT_RATE(-1)	-0.003623	-39.67517	-0.056184	0.151815
	(0.00682)	(62.3612)	(0.04280)	(0.29052)
	[-0.53127]	[-0.63622]	[-1.31283]	[0.52257]
C	1.993112	40295.28	16.81041	19.77337
	(1.55220)	(14196.1)	(9.74218)	(66.1339)
R-squared	0.544979	F-statistic	3.892523	
Adj. R-squared	0.404972			

Source: prepared by the researcher based on the outputs of the statistical program Eviews10

The VAR model is concerned with the study of economic shocks and is not concerned with the interpretation of model parameters and is not subject to economic theory, It is an unrestricted model.

From Figure (3) it is noted that the model achieves stability due to the occurrence of points within the boundaries of the circle.

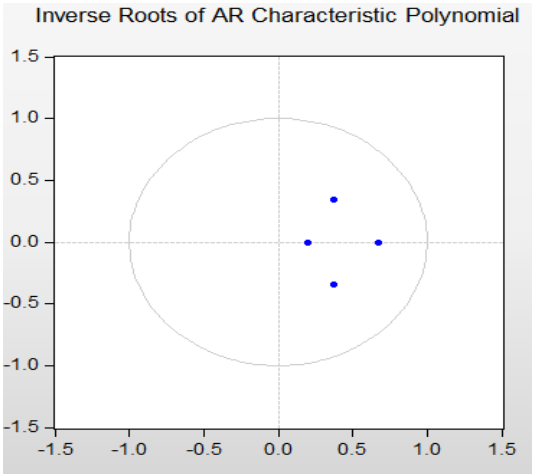

Figure 3. AR Root test results for the VAR model

Source: Prepared by the researcher based on the outputs of the statistical program (Eviews10).

Through results of table 6, it is clear that there is a kind of causal relationship between the variables of Kaldor square:

1- Agricultural growth rate as a dependent variable: There is a causal relationship between the inflation rate and the agricultural output rate at a significant level (5%). The absence of a relationship with other variables.

2- The total agricultural trade exchange rate as a dependent variable: There is a causal relationship from the inflation rate towards the trade exchange rate, which is significant at the level of (5%), and the absence of the relationship from the rest of the other variables.

3- Inflation rate as a dependent variable: There is a causal relationship from the agricultural growth rate towards the inflation rate at a significant level (1%). The absence of a relationship with other variables.

Table 5. The VAR Granger Causality Tests Results

VAR Granger Causality/Block Exogeneity Wald Tests			
Sample: 2004 2021			
Included observations: 18			
Dependent variable: Growth rate			
	Chi-sq	Df	Prob.
Agricultural trade balance rate	1.237	3	0.265
Inflation rate	4.506	3	0.033
Unemployment rate	0.282	3	0.595
Dependent variable: Agricultural trade balance rate			
	Chi-sq	Df	Prob.
Growth rate	0.100	3	0.751
Inflation rate	4.718	3	0.029
Unemployment rate	0.404	3	0.524
Dependent variable: Inflation rate			
	Chi-sq	Df	Prob.
Growth rate	22.086	3	0.000

Agricultural trade balance rate	2.617	3	0.105
Unemployment rate	1.723	3	0.189
Dependent variable: Unemployment rate			
	Chi-sq	Df	Prob.
Growth rate	0.0129	3	0.909
Agricultural trade balance rate	0.105	3	0.744
Inflation rate	0.198	3	0.656

Based on the results of a statistical program, created by the researcher (Eviews10).

note from Table (6) of the Wald test, which is related to the diagnosis of parameters using the chi-square value, where the results indicate that all parameters are significant except for agricultural labor in the VAR model, means that the estimated model has passed this test.

Table 6. The VAR Lag Exclusive Wald Test

Chi-squared test statistics for lag exclusion:					
Numbers in [ ] are p-values					
	GROWTH_RATE	AGRICULTURAL_FOREIGN_TRADE	INFLATION_RATE	UNEMPLOYMENT_RATE	Joint
Lag 1	15.57009	23.52113	115.4748	0.470562	---
	[0.0037]	[0.0001]	[0.0000]	[0.9763]	
Df	4	4	4	4	16

Source: Prepared by the researcher based on the outputs of the statistical program (Eviews10).

Table 7. The results of lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-374.3121	NA	2.12e+13	42.03468	42.23254	42.06196
1	-342.3678	46.14168*	3.82e+12*	40.26309*	41.25240*	40.39951*

Source: Prepared by the researcher based on the outputs of the statistical program (Eviews10).

The three tests (AIC, HQ, and SC), which were used to identify the best slowing period for the vector autoregressive model, Table (7), revealed that this period is the first period for all explanatory variables because its value is the lowest in comparison to the other values in The first slowing period will be included in the vector autoregressive model that will be used to reveal the direction of the relationship between the variables under study since the three tests are in accordance with what those tests require.

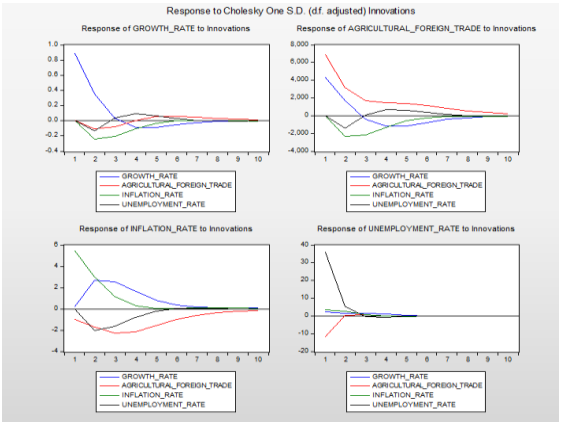

Figure 4. Kaldor variables response to shock with one standard deviation

Source: Prepared by the researcher based on the outputs of the statistical program (Eviews10).

Table 8. Results of the components analysis of variance for the shock of Kaldor variables

Period	S.E.	GROWTH_RATE	AGRICULTURAL_FOREIGN_TRADE	INFLATION_RATE	UNEMPLOYMENT_RATE
1	0.889038	100.0000	0.000000	0.000000	0.000000
2	1.002361	91.11420	1.214903	5.999749	1.671143
3	1.027694	86.76185	1.769123	9.767396	1.701629
4	1.040446	85.34295	1.726897	10.53015	2.400002
5	1.048024	84.80202	1.960279	10.47189	2.765809
6	1.051502	84.49209	2.279125	10.40314	2.825645
7	1.052799	84.33382	2.465495	10.37850	2.822180
8	1.053223	84.27226	2.537254	10.37018	2.820308
9	1.053354	84.25220	2.559638	10.36794	2.820228
10	1.053398	84.24560	2.566589	10.36772	2.820087

Source: Prepared by the researcher based on the outputs of the statistical program (Eviews10).

We find in table (8) that the annual change in growth rate of domestic agricultural product explains (100%) the components of the first year volatility when the shock of one standard deviation occurred in the same variable, then it decreased to reach (48.24%) after 10 years. For the other variable, it is the annual growth rate of agricultural foreign trade. In the first year, it does not explain any single standard deviation shock components of agricultural GDP, but in the second year it explains (1.21%) the variance components by way to achieve (2.56%) in the tenth year. The other variable is the inflation rate. In the first year, this does not explain any component of the variance of the variable Y due to the shock of one standard deviation in agricultural production. However, in the second year, it explains that the components (5.99%) of the variance will reach (10.36%) in the tenth year, while for the other variable it is the unemployment rate. In the first year, it does not account for any of the variance components of the variable Y due to the shock of one standard deviation of agricultural production, which reaches (2.82%) in year 10.

Conflict of interest

The authors declare no conflict of interest.

Conclusion

The opening of borders and the absence of customs tariffs after 2003 led to a signify can't deterioration of the agricultural sector, because the sector was protected from foreign competition, and the opening of borders exposed it to intense competition in terms of price, quantity and quality. The dumping policy is a strategy adopted by developed countries and their companies to export the surplus they suffer from to developing countries in order to destroy their national production and turn them into a market for selling their goods without a competitor. We note that the average of the three periods for the Caldor square was non-ideal proportions according to the Organization for Economic Cooperation and Development. The averages of the durations were gradually improving, as the last period was better than the first period, and the second period was better than the first period, and this can be observed positively. Therefore the manuscript is recommended to : It is necessary for the government to be from the agricultural sector, because it is at the forefront of the economic sectors in achieving development and economic diversification, as it works to provide food security, as well as entering its products as raw materials for various industries, and It is necessary to increase the rate of customs taxes on imported vegetables in a way that makes their prices close to the prices of local vegetables, and the aim of this is to increase the strength of competition for local production of imported goods and obtain revenues, especially during the current financial crisis that Iraq is suffering from. And activating the Law on Combating and Protecting the Producer and Consumer, which was enacted in the Iraqi Parliament in 2009 between them, and removing technical obstacles that appear in their work, Also the manuscript is recommended to Activating Law No. 11 of 2010 amended to protect local products and follow up and control the price system and control borders with neighboring countries and activate legal legislation that protects the agricultural sector.

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