ECONOMIC ANALYSIS OF THE IMPACT OF ECONOMIC VARIABLES ON AGRICULTURAL INVESTMENT IN IRAQ FOR THE PERIOD 1990-2020

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ABSTRACT

This research aimed to study the effect of some economic variables (agricultural output, interest rate, agricultural exports, and imports) in determining the volume of agricultural investment in Iraq during the period (1990-2020) by conducting a dynamic econometric analysis of the data collected from its secondary sources. The Error Correction Model (ECM) was employed, and the statistical analysis was performed using EViews 12 software. The results revealed a positive and significant long-term relationship between the explanatory variables and the dependent variable, agricultural investment. Its equilibrium value in the long term is one unit, and 7% of the divergence from the equilibrium between the long term and the short term can be adjusted during the same period. The agricultural domestic product and agricultural exports for the previous year have a significant positive effect on agricultural investments, whereas agricultural imports have a negative sign. There is no effect of the interest rate on agricultural investments. The results also showed that there were no structural changes in the model variables during the study period.

Keywords: Investment, agricultural imports, cointegration, interest rate, ECM.

تحليل اقتصادي لأثر بعض المتغيرات الاقتصادية في الاستثمار الزراعي في االعراق للمدة 1990–2020

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المستخلص

استهدف البحث بيان اثر بعض المتغيرات الاقتصادية والتي تشمل الناتج الزراعي، سعر الفائدة ، الصادرات والاستيرادات الزراعية في تحديد حجم الاستثمار الزراعي في العراق للمدة (1990–2020) وذلك باجراء تحليل ديناميكي قياسي للبيانات التي تم جمعها من مصادرها الثانوية وتم أستخدام انموذج تصحيح الخطأ (ECM) وبرنامج Eviews12. وتوصل البحث الى وجود علاقة ايجابية معنوية طويلة الأجل بين المتغيرات التفسيرية وبين الاستثمارات الزراعية (كمتغير تابع) وبلغت معامل سرعة التعديل (0.07–) وهو يشير الى مقدار التغير في الاستثمارات الزراعية نتيجة لإنحراف قيمة المتغيرات المستقلة بالاجل القصير عن قيمتها التوازنية في الاجل الطويل بمقدار وحدة واحدة، وان 7% من التباعد عن التوازن بين الأجل الطويل والأجل القصير يمكن تعديله خلال المدة نفسها، وان للناتج المحلي الزراعي والصادرات الزراعية لسنة سابقة تأثير معنوي موجب على الاستثمارات الزراعية فيما جاءت الاستيرادات الزراعية بأشارة سالبة. ولم يظهر تأثير لسعر الفائدة على الاستثمارات الزراعية. كما اظهرت النتائج عدم وجود تغيرات هيكلية في متغيرات الأنموذج اثناء مدة الدراسة.

كلمات المفتاحية: الاستثمار، الاستيرادات الزراعية، التكامل المشترك، معدل الفائدة، انموذج تصحيح الخطأ.

***البحث مستل من اطروحة دكتوراه للباحث الأول.**

Received: 27/2/2023, Accepted:21/6/2023, Published:October 2025

INTRODUCTION

Agricultural investment is one of the basic elements that contribute to building the infrastructure of the agricultural sector (7), through the establishment of projects with high production capacity and various agricultural activities, which in turn lead to an increase in agricultural production in quantity and quality, to achieve food security in the country, and to provide hard currency that contributes to the well-being of citizens and decrease Unemployment rate and the stability of rural communities (31). Agricultural investment is the employment of capital in agricultural projects, whether intentional or animal, for the purpose of obtaining a satisfactory return for the individual or the company or seeking to provide the country's needs of basic and necessary foodstuffs that contribute to achieving food security and economic and social development. This is done by exploiting the available factors of production in agriculture (36). It is one of the factors affecting agricultural growth (32). Economists through the classical and Keynesian schools dealt with investment (11). Both Keynes and classical economists generally agreed that investment is a function of the interest rate and between Keynes the relationship between the interest rate and investment through the marginal efficiency curve of capital and that the interest rate is not determined by the intersection of both the saving and investment curve as the classic confirmed (27), but rather by the intersection between the demand for money and the money supply, as some field studies that began in at the end of the thirties, there were many theories for investment, including the accelerator theory, the internal financing theory and the neoclassical theory (12). The agricultural sector in Iraq suffers from poor productivity and its negligible contribution to the formation of the gross domestic product (6), a decrease in the growth rate of agricultural output, and dependence on the external market system in the country, which is a pessimistic indicator in the Iraqi trade balance, despite the availability of many elements of agricultural development, which can be promoted through agricultural investment in various aspects, including investment in scientific research, given that research is the main engine for productivity growth in agriculture in high-income countries with a low contribution of agriculture to national economies (23). Many public agricultural research systems face stagnant or declining financial support. In contrast, research costs continue to rise (21), (3), and investing in infrastructure projects and basic services creates an appropriate atmosphere for the start of the economic development process. The implementation of investing in these projects rests with the state because it requires huge sums that the private sector cannot afford due to inadequate funding; in addition, it does not yield a direct or low return in the long term. (39). Therefore, in the long term, the return and costs must take into account the time factor and the use of an appropriate cost for the invested capital (26), and that there is an impact and a positive relationship between investment in infrastructure and agricultural productivity, as there are three factors associated with each other that affect The growth rate, the first of which is the extent of expansion in reclaimed lands, the second is the extent of change in the gross domestic product. The third is the extent of improvement in agricultural production (4). There is an urgent need for considerable investments in agriculture to help reform the broken food system, with a focus on private sector investment for its vital role in achieving comprehensive economic growth, environmental sustainability, reducing poverty, focusing on local markets, and respecting the rights of small producers, workers, and communities (35). Therefore, it is crucial to stimulate private investment and enhance its contribution to capital stock (38). Relying on government investment only, which represents investment in infrastructure and scientific research Training and education programs are not sufficient to form net investment and increase capital stocks with the aim of correcting structural imbalances in the Iraqi economy (2), and agricultural loans are of great importance in stimulating investment opportunities for the agricultural sector, due to the low volume of savings in developing countries in general, including Iraq (15), Agricultural loans rise in the event of their decrease and vice versa economic units (25),

especially small and medium enterprises, are also faced with the provision of sufficient guarantees to obtain loans, so these restrictions must be eased (8), and there is also a close relationship between agricultural investment and foreign trade of agricultural products, and the increase in external demand for products intended for export leads to stimulating and directing investment towards taking the necessary means to expand its production and developing marketing methods for these products (22), which results in an increase in income and then saving, so national investment (1) and foreign trade has moving benefits in the formation of capital represented in the export markets expanding the total the market for the country's products. Therefore, if production is in the stage of increasing returns to scale, the total returns from trade will exceed the static returns from allocating resources. Thus, capital formation is faster with the presence of increasing returns to scale (5). Agricultural investment in Iraq suffers from the weakness of its resources, both public and private, as its relative importance during the study period reached 10.64% of the total investment. and a weakness in the volume of direct government and private investments, due to economic, political, and security factors, which led to the deterioration of local production, resulting in Iraq's dependence on global markets for agricultural commodities to meet local demand (24),(20). Therefore, the research aimed to study the effect of certain economic variables on agricultural investment during the period mentioned above, utilizing time series data sourced from the Ministry of Planning / the Central Statistics Agency.

MATERIALS AND METHODS

The descriptive analysis method and the quantitative statistical method were adopted in building the standard model. The function was estimated according to the error correction model (VECM) to analyze the relationship between the variables (30), as it is used to correct the balance between the long-term behavior and the short-term behavior of the time series variables that have the character of cointegration (29), as it is corrected deviation from equilibrium in the long term gradually from partial adjustments and corrections in the short term, and this is why it is called the limit of error correction or the limit of joint integration (Co-Integration) (19). An augmented Dickey-Fuller test (ADF) was conducted to demonstrate the stability of the time series and to detect the unit root (10), (33). The stability of time series is a prerequisite in applied studies that use time series data. The time series must be stable to avoid regression. The pseudo, which is characterized by a large R^2 coefficient and a significant increase in the estimated parameters, with a serial autocorrelation that appears in the value of D.W., and the non-stationary series is converted into a static series by means of the first difference and the second difference, etc., until a static series is obtained (13). The augmented Dickey-Fuller test is used to deal with serial autocorrelation between the residuals, as it allows the inclusion of several differences with a time gap m for the time-slowed dependent variable, according to three formulas: $\Delta Yt = \gamma\ Yt\text{-}1 + \varepsilon t$ $\Delta Yt = \alpha 0 + \gamma\ Yt\text{-}1 + \varepsilon t$ $\Delta Yt = \alpha 0 + \alpha 1t + \gamma\ Yt\text{-}1 + \sum \alpha j\ \Delta\ Yt\text{-}j+1 + \varepsilon t$ (16), (32):1- Without categorical and without a general direction. 2- In the presence of a categorical, but without a general direction. 3- In the presence of a cutter and a general direction (17), (14) and that determining the rank of stability is very important in determining the standard model that should be used to study the relationship between two or more variables (18). A co-integration test was conducted between the model's variables before estimating the standard model to avoid cases of false regression. There are several tests to detect the presence of cointegration, including the Engle-Granger Test for Cointegration and the Johansen-Juselius Cointegration test (37). It confirms the validity of the results of the Granger test and that it analyzes the effect of overlapping or mutual interaction between variables and takes the following mathematical form (34)

$$Y_t = A_1 y_{t-1} + A_2 Y_{t-2} + \ldots\ldots + A_p y_{t-p} + BX_t + E_t$$

This means that we have a system consisting of a set of equations, where each internal variable has its own equation, ensuring that the number of equations in the model equals the number of internal variables (40). Each internal variable is treated as a function of the

slowing values of all internal variables and any external variables, such as:

Yt = vertical vector for k of internal variables and any other external variables.

A = Matrix of estimated parameters of internal variables (A1, A2,…, Ap).

Xt = the vector of the external variables, and P = the length of the delays for the variables.

Et = random boundary vector.

Before conducting the Johansen cointegration test, it is required to determine the time lag periods according to (Estimation VAR) for the model to be estimated, as it is essential to confirm the validity of the model, as it shows us the accuracy of the Granger causality test, which is one of the most sensitive models for the period of deceleration. The Granger causality test is used to determine the existence of a causal relationship between economic variables and to identify their direction, if it exists. Based on the foregoing, the mathematical model was described and formulated using time series data for the period (1990-2020) to show the factors affecting agricultural investment, including agricultural domestic product and agricultural exports. For the previous year, agricultural imports and the interest rate were analyzed using a double logarithmic function to exclude inflationary effects and reduce and smooth out the variance.

LAINV=F(LAP,LEXP,LAIM,LINT,E)

Whereas:

LAINV = agricultural investments (the dependent variable), while the independent variables are:

LAP = agricultural domestic product in Iraq for the period (1990-2020).

LEXP = Iraqi agricultural exports for a year before the period (1990-2020).

LAIM=Iraq agricultural imports for the period (1990-2020).

LINT = interest rate on agricultural loans for the period (1990-2020).

E = Error Term.

RESULTS AND DISCUSSION

First, the stability of the time series was tested using the Augmented Dickey-Fuller (ADF) method to assess the stability of the model variables.

Table 1: Results of the unit root test ADF

		At Level				
		LAINV	LAP	LEXP	LAIM	LINT
With Constant	t-Statistic	-2.1389	-4.8818	-0.7838	-0.4849	1.6324
	Prob.	*0.2317*	*0.0005*	*0.8093*	*0.8808*	*0.9992*
		n0	***	n0	n0	n0
With Constant & Trend	t-Statistic	-1.1002	-3.0398	-2.4307	-2.5351	-2.8325
	Prob.	*0.9123*	*0.1387*	*0.3576*	*0.3103*	*0.1974*
		n0	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	0.8092	2.2587	0.2957	0.7242	-2.8962
	Prob.	*0.8818*	*0.9928*	*0.7648*	*0.8660*	*0.0053*
		n0	n0	n0	n0	***
		At First Difference				
		d(LAINV)	d(LAP)	d(LEXP)	d(LAIM)	d(LINT)
With Constant	t-Statistic	-7.0152	-2.9279	-4.6465	-6.1611	-8.4824
	Prob.	*0.0000*	*0.0544*	*0.0009*	*0.0000*	*0.0000*
		***	*	***	***	***
With Constant & Trend	t-Statistic	-9.7797	-3.6555	-4.5845	-6.0367	-6.0525
	Prob.	*0.0000*	*0.0423*	*0.0053*	*0.0002*	*0.0002*
		***	**	***	***	***
Without Constant & Trend	t-Statistic	-6.4079	-2.5676	-4.6179	-5.8466	-6.7722
	Prob.	*0.0000*	*0.0122*	*0.0000*	*0.0000*	*0.0000*
		***	**	***	***	***

Source: Eviews 12 output

It appears from Table 1 that the variables used in the model are not stable at the level but are stable at the first difference. This leads us to test the standard model using the error correction model (VECM) or the Unrestricted VAR model.

Second: Testing the optimal idle period

Table 2. VAR test results for the deceleration period.

Lag	Logl	LR	FPE	AIC	SC	HQ
0	-212.0809	NA	2.185514	14.97110	15.20684	15.04493
1	-91.71100	190.9316*	0.003135*	8.393862	9.808306*	8.836848*
2	-65.40541	32.65522	0.003393	8.303822*	10.89697	9.115963

Source: Eviews 12 output

It appears from Table 2 that three tests (LR, FPE, SE, HQ) determined a single lag time, while the Akaike test (AIC) determined two lag times; therefore, the latter was adopted for the Johansson test (9).

Third: Johanson cointegration test

Table 3. Results of the Johansen co-integration test between the variables of the model

Date: 06/01/23 Time: 13:00
Sample (adjusted): 4 31
Included observations: 28 after adjustments
Trend assumption: Linear deterministic trend
Series: LAINV LAP LEXP LAIM LINT
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.916535	141.3105	69.81889	0.0000
At most 1 *	0.761440	71.77727	47.85613	0.0001
At most 2 *	0.544407	31.64953	29.79707	0.0302
At most 3	0.182615	9.637166	15.49471	0.3097
At most 4 *	0.132847	3.991113	3.841465	0.0457

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.916535	69.53328	33.87687	0.0000
At most 1 *	0.761440	40.12773	27.58434	0.0007
At most 2 *	0.544407	22.01237	21.13162	0.0375
At most 3	0.182615	5.646053	14.26460	0.6590
At most 4 *	0.132847	3.991113	3.841465	0.0457

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews 12 program output.

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

1- The (Trace) test. The results of the test showed that there are 3 vectors of co-integration between the mentioned variables, as the Trace values (At None At most 1, At most 2, At most 4 > (critical values) were (141.31 > 69.81, 71.77 > 47.85, 31.64 > 29.79, 3.99 > 3.84) respectively, at a significant level (1%, 5%).

2- (Max-Eigen) test results showed that there are 3 vectors of co-integration between the variables, as their values were (At None, At most 1, At most 2, At most) > critical values (69.53 > 33.87, 40.12 > 27.58, 22.01 >21.13, 3.99 > 3.84), respectively, at a significant level (1%, 5%), which means an integrative relationship in the long term between the variables used in the model. Based on the results of the above tests, a standard analysis can be carried out using the Vector Error Correction Model (28).

Fourth: Granger Causality Test

Table 4. Results of the causality test for the mode

Pairwise Granger Causality Tests
Date: 04/30/23 Time: 12:25
Sample: 1 31
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LAP does not Granger Cause LAINV	29	1.51533	0.2400
LAINV does not Granger Cause LAP		3.16446	0.0603
LEXP does not Granger Cause LAINV	29	0.76599	0.4759
LAINV does not Granger Cause LEXP		2.80326	0.0805
LAIM does not Granger Cause LAINV	29	0.08309	0.9205
LAINV does not Granger Cause LAIM		1.17891	0.3248
LINT does not Granger Cause LAINV	29	0.53419	0.5929
LAINV does not Granger Cause LINT		0.22334	0.8015
LEXP does not Granger Cause LAP	29	0.57828	0.5685
LAP does not Granger Cause LEXP		2.72469	0.0858
LAIM does not Granger Cause LAP	29	1.15745	0.3312
LAP does not Granger Cause LAIM		0.39154	0.6803
LINT does not Granger Cause LAP	29	1.57889	0.2269
LAP does not Granger Cause LINT		0.41033	0.6680
LAIM does not Granger Cause LEXP	29	8.82569	0.0013
LEXP does not Granger Cause LAIM		0.48219	0.6233
LINT does not Granger Cause LEXP	29	3.78832	0.0372
LEXP does not Granger Cause LINT		0.13881	0.8711
LINT does not Granger Cause LAIM	29	0.38812	0.6825
LAIM does not Granger Cause LINT		2.48424	0.1046

Source: Eviews 12 output.

The test results showed the following:

1- The existence of a causal relationship in one direction from agricultural investments to both the gross domestic product and agricultural exports for the previous year at a significant level of 10%.

2- There is a causal relationship for each of the gross domestic product, agricultural imports, and the interest rate towards agricultural exports for the previous year, at a significant level of 10% and 5%.

3- There is no relationship between the variables of imports and the interest rate on the one hand, and between agricultural investments and agricultural domestic product on the other hand, which indicates the independence of these variables.

Fifth: Estimating the agricultural investment function model according to the error correction model (VECM) test:

Table 5. The results of estimating the agricultural investment function using the error correction model.

Dependent Variable: D(LAINV)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/30/23 Time: 04:27
Sample (adjusted): 4 31
Included observations: 28 after adjustments
D(LAINV) = C(1)*(LAINV(-1) + 3.84192081378*LAP(-1) - 3.82573001008 *LEXP(-1) + 0.944819339195*LAIM(-1) - 19.015449304*LINT(-1) - 9.8230329101) + C(2)*D(LAINV(-1)) + C(3)*D(LAINV(-2)) + C(4) *D(LAP(-1)) + C(5)*D(LAP(-2)) + C(6)*D(LEXP(-1)) + C(7) *D(LEXP(-2)) + C(8)*D(LAIM(-1)) + C(9)*D(LAIM(-2)) + C(10) *D(LINT(-1)) + C(11)*D(LINT(-2)) + C(12)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.075453	0.016737	-4.508279	0.0004
C(2)	-0.522478	0.178295	-2.930411	0.0098
C(3)	-0.350579	0.138413	-2.532843	0.0222
C(4)	0.013055	0.223108	2.058514	0.0954
C(5)	-0.017551	0.207291	-0.084671	0.9336
C(6)	-0.036071	0.082965	-0.434776	0.6695
C(7)	0.037952	0.083458	2.454738	0.0655
C(8)	0.182787	0.055303	3.305207	0.0045
C(9)	0.262793	0.061165	4.296446	0.0006
C(10)	-0.912114	0.926189	-0.984803	0.3394
C(11)	-0.374604	0.835696	-0.448254	0.6600
C(12)	0.088588	0.128273	0.690620	0.4997

R-squared	0.665995	Mean dependent var	0.142567
Adjusted R-squared	0.436366	S.D. dependent var	0.522564
S.E. of regression	0.392318	Akaike info criterion	1.264038
Sum squared resid	2.462611	Schwarz criterion	1.834982
Log likelihood	-5.696527	Hannan-Quinn criter.	1.438581
F-statistic	2.900312	Durbin-Watson stat	1.716521
Prob(F-statistic)	0.026205		

Outputs of the Eviews program 12

The test results showed that the error correction component (adjustment speed coefficient C1) came with a negative sign with a significant level of 1% and a value less than the correct one (-0.075), which indicates the existence of a long-term significant relationship between the explanatory variables (domestic agricultural output, agricultural exports for a previous year, imports Agricultural investments, interest rate) and the intentional variable (agricultural investments). It refers to the amount of change in agricultural investments as a result of the deviation of the value of the independent variables in the short term from its equilibrium value in the long term by one unit, and that (7%) of the divergence from the equilibrium position between the long term and the short term is corrected during the same period. The results also showed a positive relationship between GDP and agricultural investments at a significant level of 10%. Specifically, a one-unit increase in GDP leads to a 0.01-unit rise in the volume of agricultural investments in the short term and a 3.84-unit increase in the long term. As for the variable of agricultural exports for the previous year, it came with a positive and significant relationship with agricultural investments in the short term, which indicates that the increase in the volume of agricultural investments by (0.03) was due to the rise that occurred in the volume of agricultural exports for the previous year by one unit. In contrast, it was accompanied by a negative relationship. And contrary to the logic of economic theory in the long term, that is, the increase in the volume of agricultural exports results in a decrease in the volume of agricultural investments by (3.82). As for agricultural imports, they came with a positive sign and a significant level of 1%, as an increase in agricultural imports by one unit leads to an increase in the volume of agricultural investments by (0.26) in the short term and (0.94) in the long term because of importing production requirements necessary to implement investments in the agricultural sector. Regarding the interest rate variable, its sign was negative, but it was not statistically

significant, which confirms the low volume of agricultural savings among investors. In the agricultural sector, the adoption of a policy of agricultural lending to finance productive projects, regardless of interest rates. The value of R^2 was that 66% of the changes in the dependent variable (agricultural investments) were attributed to the influence of the independent variables, and 34% represented the influence of the random variables that were accounted for in the model. The F-test showed the significance of the function at a 5% significance level.

Table 6. Results long-run function estimated in the model

Varible	coefficient	std.Error	t-statistic
prob.			
LAP	3.841921	2.493321	2.572772
0.0322			
LEXP	-3.825730	1.625631	-2.353381
0.0625			
LAIM	0.944814	0.541021	1.746360
0.0935			
LINT	-19.01544	16.42015	-1.157991
0.2572			
C	-9.823033	3.128272	3.140082
0.0062			

Sixth: Diagnostic tests were conducted to ensure the quality of the estimated model and that it is free of standard problems, as follows.

1-Standard problem test

Table 7. The results of the diagnostic statistics of the agricultural investment model

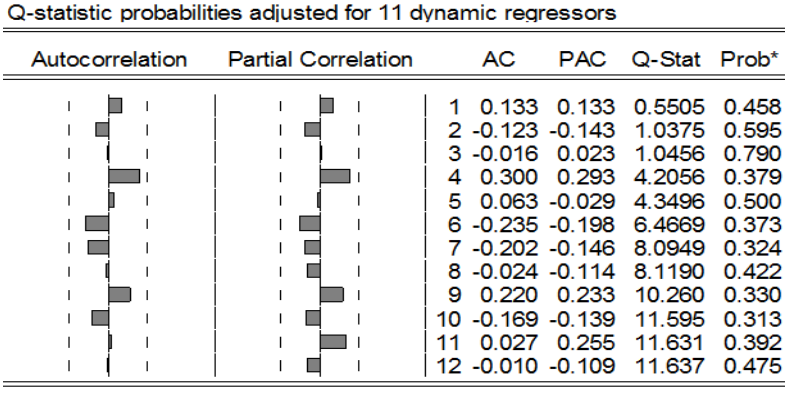
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	1.633349	Prob. F(15,12)	0.1985
Obs*R-squared	18.79458	Prob. Chi-Square(15)	0.2232
Scaled explained SS	6.095312	Prob. Chi-Square(15)	0.9781
Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.667247	Prob. F(2,14)	0.5287
Obs*R-squared	2.436718	Prob. Chi-Square(2)	0.2957

Source: Eviews 12 output

The results of the test show that the model is free of the problem of instability of variance homogeneity (Hetero) and the problem of autocorrelation, as according to the Breusch-Pagan-Godfrey test where the probability value was (0.2232 > 0.05), and the results of the LM test showed that the model was free of the problem of autocorrelation using the probability value (0.2957 > 0.05) and from them we accept the null hypothesis that the model does not suffer from standard problems.

2-Test the partial correlation and autocorrelation functions of the residuals.

Date: 05/06/23 Time: 12:20
Sample (adjusted): 4 31
Q-statistic probabilities adjusted for 11 dynamic regressors



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	0.133	0.133	0.5505	0.458
		2	-0.123	-0.143	1.0375	0.595
		3	-0.016	0.023	1.0456	0.790
		4	0.300	0.293	4.2056	0.379
		5	0.063	-0.029	4.3496	0.500
		6	-0.235	-0.198	6.4669	0.373
		7	-0.202	-0.146	8.0949	0.324
		8	-0.024	-0.114	8.1190	0.422
		9	0.220	0.233	10.260	0.330
		10	-0.169	-0.139	11.595	0.313
		11	0.027	0.255	11.631	0.392
		12	-0.010	-0.109	11.637	0.475

Figure 1. Partial correlation of residuals.

It is evident from Figure 1 that the data have no self-correlation and fall within the limits of confidence.

3-Test for normal distribution

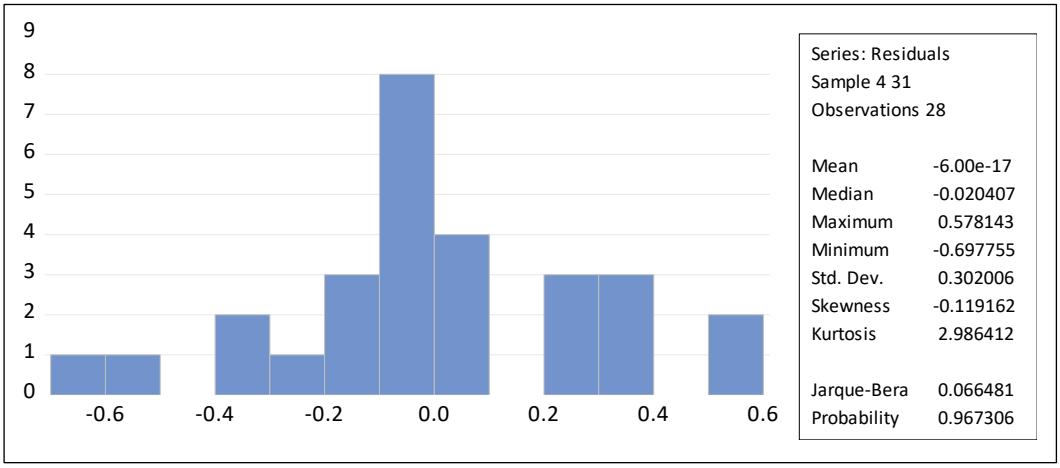


Figure 2. The normal distribution test for the residuals

It shows that the residuals are distributed normally, as the value of (JB) reached (0.066), and it is not significant (0.965).

4- Testing the structural stability of the estimated model.

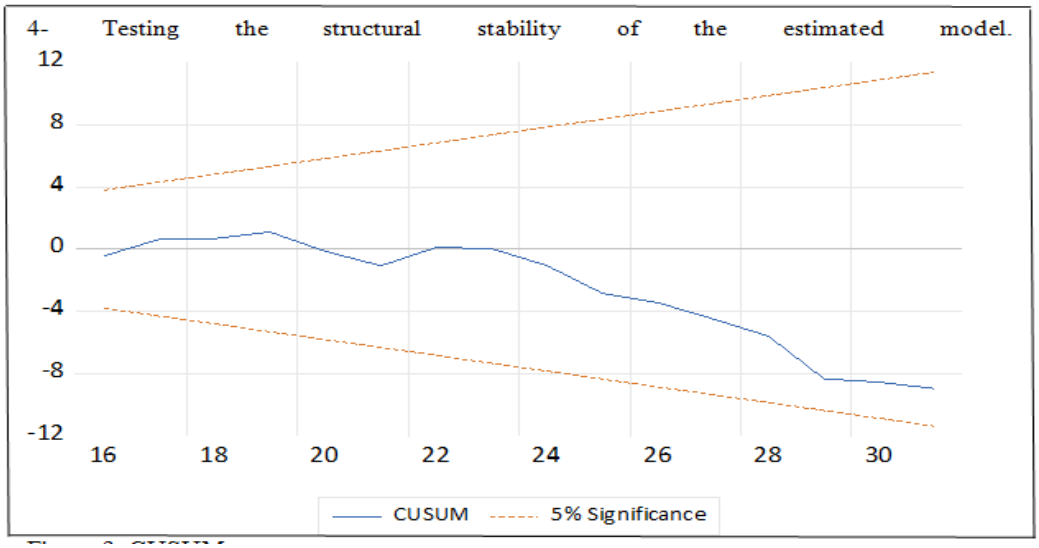


Figure 3. CUSUM test

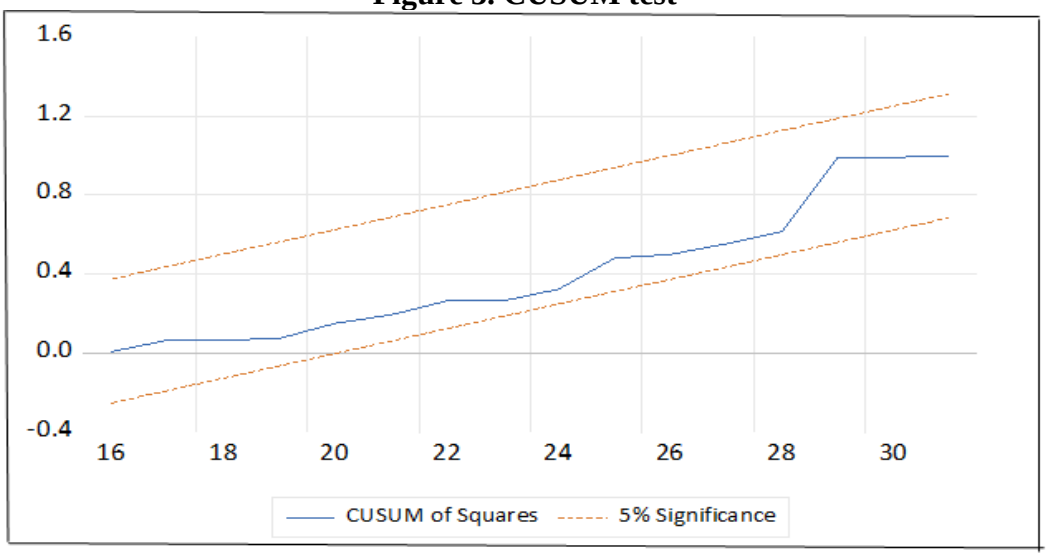


Figure 4. CUSUM test for residuals

Both figures show that the cumulative sum of squares of the residuals fell within the critical limits at a 5% significance level, indicating the absence of structural changes in the model variables during the study period.

CONCLUSION

The study concludes that the agricultural domestic product contributes to increasing the volume of agricultural investments, especially in the long term, as growth in agricultural production stimulates producers to enter agricultural investments that achieve remunerative returns. There is a limited contribution of agricultural exports to the development of investments in the agricultural sector in the short term. This is due to the limited volume of agricultural exports and their focus on specific materials, such as dates, leather, and wool. The positive impact of agricultural imports is attributed to the state's adoption of a policy that imports production requirements necessary for implementing large investment projects in the agricultural sector. The study recommends preparing plans and studies required to promote agricultural investment, both public and private, by increasing the volume of agricultural investment allocations in annual public budgets and providing material and logistical support to private sector investors and supporting the prices of production requirements necessary for investment in advanced agricultural technologies such as organic and textile farming, irrigation technologies, and modern mechanization.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

DECLARATION OF FUND

The authors declare that they have not received a fund.

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