ECONOMIC ANALYSIS TO THE ROLE OF THE PUBLIC AND PRIVATE SECTORS IN AGRICULTURAL DOMESTIC PRODUCT IN IRAQ

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ABSTRACT

The aim of the study is determining the effect of public and private also support and government loans in Agricultural domestic product by analyzing data that got it from secondary sources to the variables contained in the model during the period (1990-2020) using Autoregressive Distributed Lag model (ARDL) with software Eviews 10. The study finds that positive relationship between agriculture domestic product and explaining variables. We find significant parameters in the short and long run, explained that is the increase in agricultural loans with 1% lead to an increase in agricultural domestic product with 14%. Also, an increase in agricultural support with 1% lead to an increase in agricultural domestic product with 8%. Furthermore, an increase in private agricultural investment with 1% lead to increase in Agricultural domestic product with 3% and Increase in public agricultural investment with 1% lead to increase in Agricultural domestic product with 7% and that is refer to the importance role of public sector with the importance of private sector with agricultural policies as investment and financing policies as well as government support policy which works of expand production capacities and support the private sector .the study is recommended to expansion the function of the Agricultural mutual Bank and to provide capital to producers by the agricultural initiative and to put a strategy to development and give an incentive the private sector.

Key words : Agricultural loans, agricultural support, ARDL model, gross domestic product.
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تحليل اقتصادي لدور القطاعين العام والخاص في الناتج المحلي الزراعي في العراق

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المستخلص

استهدف البحث تحديد اثر الاستثمار الزراعي العام والخاص والدعم والاقراض الحكومي في الناتج المحلي الزراعي عن طريق تحليل البيانات التي تم جمعها من مصادرها الثانوية للمتغيرات التي تضمنها النموذج للمدة (1990–2020) بإستخدام انموذج الانحدار الذاتي للأبطاءات الموزعة (ARDL) بالبرنامج الاحصائي (Eviews10). وقد توصل البحث الى وجود علاقة ايجابية ومعنوية بين الناتج المحلي الزراعي والمتغيرات المستقلة في كلا الاجلين القصير والطويل. واتضح ان زيادة القروض الزراعية بنسبة 1% يؤدي الى زيادة الناتج المحلي الزراعي بنسبة 14% وان زيادة الدعم الزراعي بنسبة 1% يؤدي الى زيادة الناتج المحلي الزراعي بنسبة 8% وان زيادة الاستثمار الزراعي الخاص بنسبة 1% يؤدي الى زيادة الناتج المحلي الزراعي بنسبة 3% وان زيادة الاستثمار الزراعي العام بنسبة 1% يؤدي الى زيادة الناتج المحلي الزراعي بنسبة 7% وهذا يشير الى اهمية دور القطاع العام مقارنة بالقطاع الخاص من خلال السياسات الزراعية المتبعة والمتمثلة بالسياسة الاستثمارية والتمويلية وكذلك سياسة الدعم الحكومي، حيث إنها تعمل على توسيع الطاقات الانتاجية وكذلك دعم القطاع الخاص، لذا يوصى بضرورة تطوير دور المصرف الزراعي التعاوني وتوفير رؤوس الاموال للمزارعين من خلال المبادرة الزراعية ووضع استراتيجية لتحفيز وتنمية القطاع الخاص.

الكلمات المفتاحية: القروض الزراعية، الدعم الزراعي، إنموذج ARDL، الناتج المحلي الاجمالي.
***البحث مستل من اطروحة دكتوراه للباحث الاول.**

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INTRODUCTION

Investment is the main factor and dynamic motive for the economy and growth. The international economic truth emphasized that, as countries are competition for the largest number of investments to get economies by self-moving and able to development (1, 27). Therefore, investment is assumed the basis for any growth plan, assuming the agricultural sector as one of the leading sectors that make economic development. The activates of this sector have been related to the provision of basic, human needs and the achievement of food security through adoption by the state of appropriate policies (2,9,11,21). There was no obvious development in the agricultural processes and food industries, nor action or innovations, and the agricultural reality continued to suffer primarily from decrease of technic agricultural requirements such as seeds, pesticides, and improved agricultural practices as technic plowing, technic irrigation methods, fertilizers using, technologies, especially through economic sanctions imposed after 1991 (10). Iraq is yet facing many challenges in agricultural technologies and inability, the failure of government policies to get the aims of agricultural development because of balanced plans and programs. Agricultural domestic product rates do not vary (28)(20). The higher the growth rates of domestic production and the limitedness of the market is one of the main impediments to development, and it has become clear that the growth and increase of external demand for export products leads to the stimulation and channeling of investment in them to introduce better methods in the production and marketing of their products (8, 36). So, economic growth explains quantitative changes in production ability and the extent of exploitation of this energy, whenever the use of available production capacity has increased level in all the sectors increased the rate of growth and the rates of domestic product and vice versa (5,33). Development prepares the needs of the present people without harming the needs of future people (23). Agricultural activity is one of the main basic of economic development agricultural development has an important status because of its important role in economic and social life and achieving agricultural development makes food security (4,7,14,15). Economic growth is concerned with increasing the ability of the economy to provide goods and services for a period, no matter what. The development of agricultural production in general and the development of human food in particular is a major concern for agricultural economic policy planners, especially in developing countries (24). Economic growth is heeded with increasing the ability of the economy to get goods and services for a period, whatever its source is locally or externally (18)(35). And provide the advanced agricultural supplies of reclaimed lands and water and human resources, as to as the Iraqi agricultural sector is a fertilizing area to investment (30). Which encourages agricultural investment projects, and we do not expect from these agricultural project's investment connected with livestock not only locally, but also at the external level by exporting the products of this wealth after filling a need local consumption, also fish resource and investment success (29,40). Iraq have good ambience to improve this wealth and increase investment in it due to improve agriculture sector in the country progress by product, marketing, machinery and others else to growth, the depend on public investment basically by structure, human investment scientific research and training and education do not sufficient but must contribution the private investment in the capital stock (25,37) This can get efficiency for both public and private investment agriculture in increase agriculture domestic product with increase productive efficiency for investment capital of public and private agriculture which have importance to get level growth in agriculture domestic product so get agriculture power to of public and private agriculture sector which measure with increase agriculture domestic product because many investment towards it (19,31). The decrease in public investment as investment government expenditure connected with investment allotment It (26,32).

MATERIALS AND METHODS

The model was estimated by ARDL method, as this model takes enough lag periods to obtain the best set of data within the general framework model and gives the best results for

long-term parameters also realistic diagnostic tests (13)(17). The ARDL methodology differs from other methods with a number of advantages on the level of stability of time series and the econometric problems meet by the economic researcher in analytical or econometric economic studies and research, they can collect more variables than the level of stability such as (0) and (1) and it is not required that all of them be stable at the same level such as (0), but the only condition for the application of this test, the time series is not integrated of the second degree (1), and its condition is that it stabilize at the first (16). The ARDL methodology works at estimating the model by determining the complementary relationship between the dependent variable and the independent variables in the long and short run in the same equation for the model, in addition to estimating the parameters of the independent variables in the short and long run. ARDL results are considered efficient and unbiased (22). Diagnostic tests were conducted for standard problems and the optimal lag period for the model was chosen. The program automatically chooses the best lag period to reach the best model from a statistical, economic and econometric point of view (17). Where the economic model is expressed to explain the economic relationship as follows: Difference (12):

$$LNY1=B+B_1lnAS+B_2LNAL+B_3LNAGC+B_4LNAPC$$

LNY1: The natural logarithm of agricultural domestic product in Iraq for a period (1990-2020).

LNAS: The natural logarithm of agricultural support for a period (1990-2020).

LNAL: The natural logarithm of agricultural loans for a period (1990-2020)

LNAGC: The natural logarithm of public agricultural investment loans for a period (1990-2020).

LNAPC: The natural logarithm of private agricultural investment loans for a period (1990-2020). We used ARDL model after making sure that the variables are not integrated in the second order, using unit root tests (34). The objective of the unit root test is to measure the stability of time series using extended Dicky Fuller test (6). The appropriate lag period for the model was determined and the model errors were self-independent and the model was dynamically stable. The bounds test was carried out to see if there was evidence of a long-run relationship between the variables. variables dynamically in both tests (Philips perron and Dickey Fuller) due to the importance of these tests in determining the degree of integration of the variables of the econometric model also able to identify the problem of false correlation between the independent variables and the dependent variable resulting from the instability of the time series used in estimating the econometric model when inconsistency Dickey-Fuller and Philips-Perron test results (16).

RESULTS AND DISCUSSION

By using the ARDL model, the results of the quantitative analysis of the impact of a number of variables on the agricultural domestic product for a period (1990-2020) were the independent variables represented by agricultural support, agricultural loans, public agricultural investment, private agricultural investment and their effect on agricultural domestic Product ,make test unit root of Dickey Fuller and Philips-perron to model variables the results stability in first difference Where the economic variables did not constant at the level, but stabilized at the first difference, where the calculated value of t was less than the critical or tabular value of (T), as the economic tests assume that most of the variables were not constant at the level, but become constant at the first difference, as in Table (1) .

Table 1. results of unit root of test ADF

		AT level				
With constant	t-statistic	LNY1	LNAS	LNAL	LNAGP	LNAPC
	Prob.	-2.6086	-3.4008	-1.2126	-1.6540	-0.5832
		0.1024	0.0189	0.6539	0.4435	0.8596
		NO	**	NO	NO	NO
With constant	t-statistic	-2.4759	-2.8960	-0.5909	-3.0380	-1.9417
& trend	Prob.	0.3367	0.1778	0.9714	0.1391	0.6073
		NO	NO	NO	NO	NO
Without	t-statistic	-0.0113	1.1290	0.5275	0.1288	0.1996
& constant	Prob.	0.6710	0.9291	0.8234	0.7158	0.7370
trend		NO	NO	NO	NO	NO
		AT First Difference				
With constant	t-statistic	d(LNY1)	d(LNAS)	d(LNAL)	d(LNAGP)	d(LNAPC)
	Prob.	-6.0611	-3.0081	-4.2647	-6.7155	-9.6734
		0.0000	0.0468	0.0026	0.0000	0.0000
		***	**	***	***	***
With constant	t-statistic	-6.2571	-4.1909	-2.8646	-6.6258	-9.9438
& trend	Prob.	0.0001	0.0144	0.1891	0.0000	0.0000
		***	**	NO	***	***
Without	t-statistic	-6.1711	-5.4185	-4.2197	-6.7376	-9.7704
& constant	Prob.	0.0000	0.0000	0.0002	0.0000	0.0000
trend		***	***	***	***	***

Source: from researcher work based on output of program Eviews10

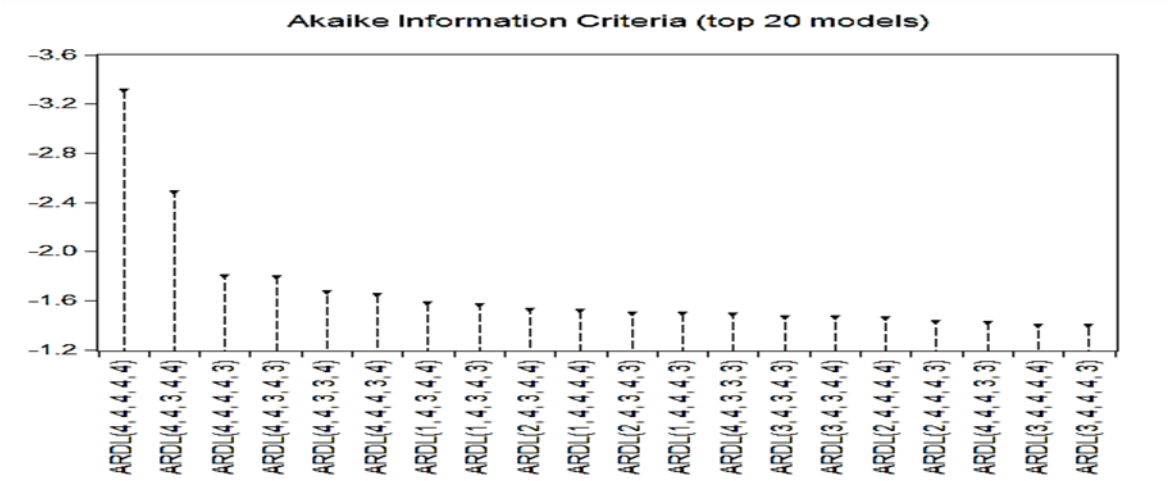

Fig. 1. possible models according to akaike criteria

Source: from researcher work based on output of program Eviews10.

The Akaike criteria is a tool utilized to determine the optimal lag period and estimate the rank of a model. The Akaike criteria is used to select the model (3,4,4,4,3) with the best fit among a set of (20) models. To determine a relationship between the dependent variable and the independent variables, the cointegration test and the bound test were adopted for the model through table (2):

Table 2. results cointegration test for used Bound test

F-Bounds Test		Null Hypothesis :No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F- Statistic	15.23045		Asymptotic :n=1000	
		10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Actual Sample Size	27		Finite Sample: n=35	
		10%	2.46	3.46
		5%	2.947	4.088
		1%	4.093	5.532

Source: From researcher work based on output of program Eviews10

Table (2) explains the calculated value of F-statistic. It has been found that the F-value is (15.23), which is higher than the upper critical value at a significance level of 1%. This indicates that there is a long-term relationship between agricultural Domestic Product and the independent variables, represented by agricultural loans, agricultural support, private agricultural investment, and public agricultural investment. as explain in Table (2), rejecting the null hypothesis, which states that there is no cointegration, and confirming the existence of cointegration. The short-run function was estimated, and the results were obtained after estimating the model using the ARDL method. The research concluded, after considering the lag period, and the value of R^2 was (0.89), it indicates the changes in the dependent variable are cause of the independent variables included in the model and that 11% of the explanatory variables that were not included in the model, the effect of the random variable was absorbed. After making sure that the model is free of econometric problems, the short-run function and the variables affecting the agricultural domestic product were estimated. The parameter of government agricultural support explains that it had a positive and significant effect at the level of 1%. When government support increased by 1%, the agricultural domestic product increased by (0.083), while the parameter of agricultural loans provided by the agricultural cooperative bank had a positive and significant effect at the level of significance of 1%. This indicates that an increase in agricultural loans by 1% will lead to an increase in agricultural output by (0.143), which is consistent with economic logic, since Farmers need capital to implement agricultural projects and pay the costs of various agricultural operations as purchasing seeds and fertilizers, and for this we find that the impact of loans was significant on the agricultural domestic product. The volume of these investments by 1% leads to an increase in the agricultural domestic product by (0.072), as most of these investments are directed towards the reclamation of agricultural lands, the construction of infrastructure and the construction of irrigation canals, as well as facilities that benefit agricultural production in both its plant and animal parts. also investing in increasing plant and animal assets. The value of the private investment parameter amounting to (0.034) indicates a positive and significant effect on agricultural domestic product at the level of 1%. An increase in private investment by 1% leads to an increase in agricultural domestic product by (0.034), as explained in Table (3).

Table 3. Results of short- run function estimated of model ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNAL)	0.143027	0.011433	12.50960	0.0063
D(LNAS)	0.083383	0.010071	8.279862	0.0143
D(LNAPC)	0.034094	0.004333	7.869113	0.0158
D(LNAGC)	0.072708	0.016272	4.468425	0.0466
COINTEq(-1)*	-0.182770	0.122051	-17.88406	0.0031
R-squared	0.890376	Mean dependent var		0.000226
Adjusted R-squared	0.870490	S.D. dependent var		0.178765
S.E. of regression	0.036051	Akaike info criterion		-3.676204
Sum squared resid	0.009098	Schwarz criterion		-2.716325
Log likelihood	69.62876	Hannan-Quinn criter.		-3.390782
		Durbin-Watson stat		2.185242

Source: from researcher work based on output of program Eviews10

As for the long-run function, the parameters of the function explain agricultural support, agricultural loans, and public and private agricultural investment had a positive and significant impact. The value of agricultural loan parameter has increased by 1%, resulting in a 20% increase in agricultural domestic product. Similarly, the value of agricultural support parameter shows its significance, as a 1% increase in support leads to a 42% increase in agricultural domestic Product. The significance of the private agricultural investment with a value of (0.19), indicating that the increase in private agricultural investment 1% results in a 19% increase in agricultural Domestic Product. The statistical

significance parameter of the public agricultural investment indicates that when the public agricultural investment increases by 1%, the agricultural domestic product will increase by 21%. It becomes clear the agricultural public investment had a greater effecting in the short and long run than private investment (39). This indicates the importance of the public sector and its active role in increasing agricultural domestic product (4):

Table 4. results long- run function estimated of model ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNAL	0.202149	0.048582	4.160985	0.0013
LNAS	0.424403	0.183811	2.308909	0.0414
LNAPC	0.194389	0.097948	1.984614	0.0531
LNAGC	0.216210	0.085897	2.517084	0.0203
C	14.73792	0.661941	22.26472	0.0020
EC=LNY1-(0.2021*LNAL+0.4244*LNAS+0.1944*LNAPC+0.2162*LNAGC+14.7379)				

Source: from researcher work based on output of program Eviews10

Econometric tests of the ARDL model

It is sum of criteria and tests used in econometrics for evaluating the efficiency of the model. These tests as the Lagrangian factorial test for the serial correlation of the residuals and the homogeneity of variance test for Breusch Godfrey , Harvey and ARCH. The model was free of econometric problems, as in the following tables (5) & (6). Table (5) indicates that the model has passed standard tests, such as the absence of Autocorrelation using the LM test with a probability value of (0.230). Therefore, we can accept the Null hypothesis of no autocorrelation problem in the model. Table (6) indicates that the test showed no issue of heteroscedasticity using a probability value of (0.325) and the tests of Harvey and ARCH showing no problem in heteroscedasticity with a probability values (0.421), (0.301) In sequence. The normal distribution of residuals in Fig. (2) achieved by using the Jarque-Bera (JB) test with a probability value (0.581) which is greater than 0.05 and we accept the Null hypothesis that the residuals have normal distribution

Table 5. Lagrangian factorial test for the serial correlation between the residuals LM

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	2.930797	Prob. F(1.1)	0.3366
Obs*R-squared	20.13116	Prob. Chi-Square(1)	0.2308

Source: from researcher work based on output of program Eviews10

Table 6. Heterogeneity tests

Heteroskedasticity Test Breusch-Pagan-Godfry			
F-statistic	4.961859	Prob.F(24.2)	0.1812
Obs*R-squared	26.55403	Prob. Chi-Square(24)	0.3257
Scaled explained SS	0.110197	Prob. Chi-Square(24)	1.0000

Source: from researcher work based on output of program Eviews10

Heteroskedasticity Test Harvey			
F-statistic	0.900017	Prob.F(24.2)	0.6545
Obs*R-squared	24.71190	Prob. Chi-Square(24)	0.4215
Scaled explained SS	12.23212	Prob. Chi-Square(24)	0.9772

Source: from researcher work based on output of program Eviews10

Heteroskedasticity Test ARCH			
F-statistic	1.029606	Prpb.F(1.24)	0.3204
Obs*R-squared	1.069524	Prob. Chi-Square(1)	0.3011

Source: from researcher work based on output of program Eviews10

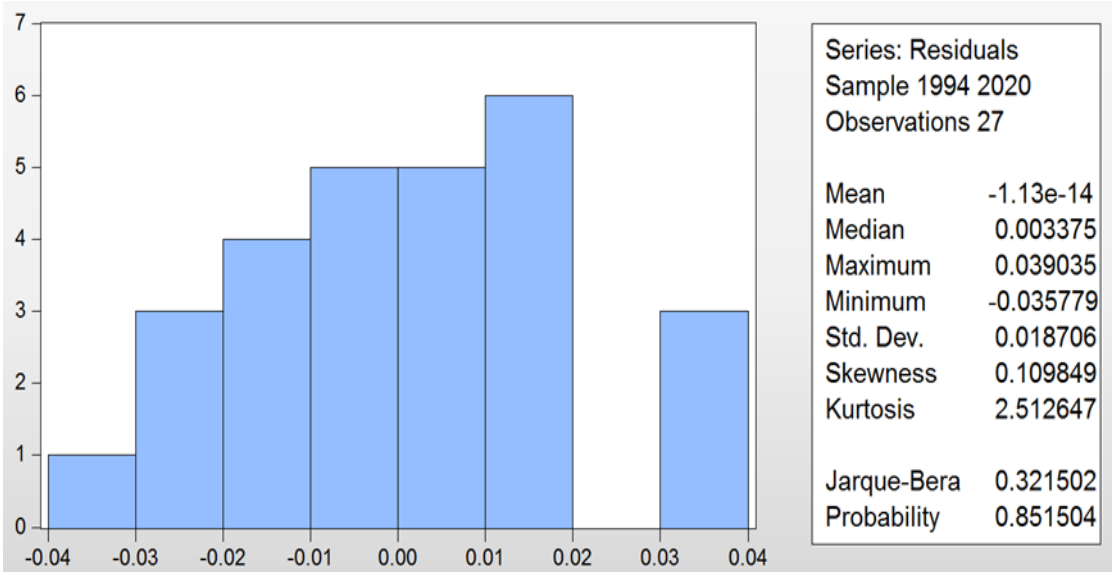

Fig. 2. test of random error distribution

Source: from researcher work based on output of program Eviews10

Results of cumulative sum and cumulative sum of squares of recursive residuals

To ensure that the data used in this study is free from any structural changes, it is necessary to employ appropriate tests such as Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUM of Squares). These tests are considered important in this field detecting the presence of any structural changes in the data and assessing the long-term stability and coherence of parameters with short-term parameters. Many studies have shown that such tests are commonly used in conjunction with the Autoregressive Distributed Lag (ARDL) methodology to achieve the structural stability of estimated parameters for error correction models. The graphical representation of both CUSUM and CUSUM of Squares tests falls within the critical boundaries at a significance level of 5%, it indicates structural stability. Based on the findings of most of these studies, we conducted the tests CUSUM in Fig. (3) & CUSUM of squares in Fig. (4) There is harmony and stability in both the short-term and long-term models.

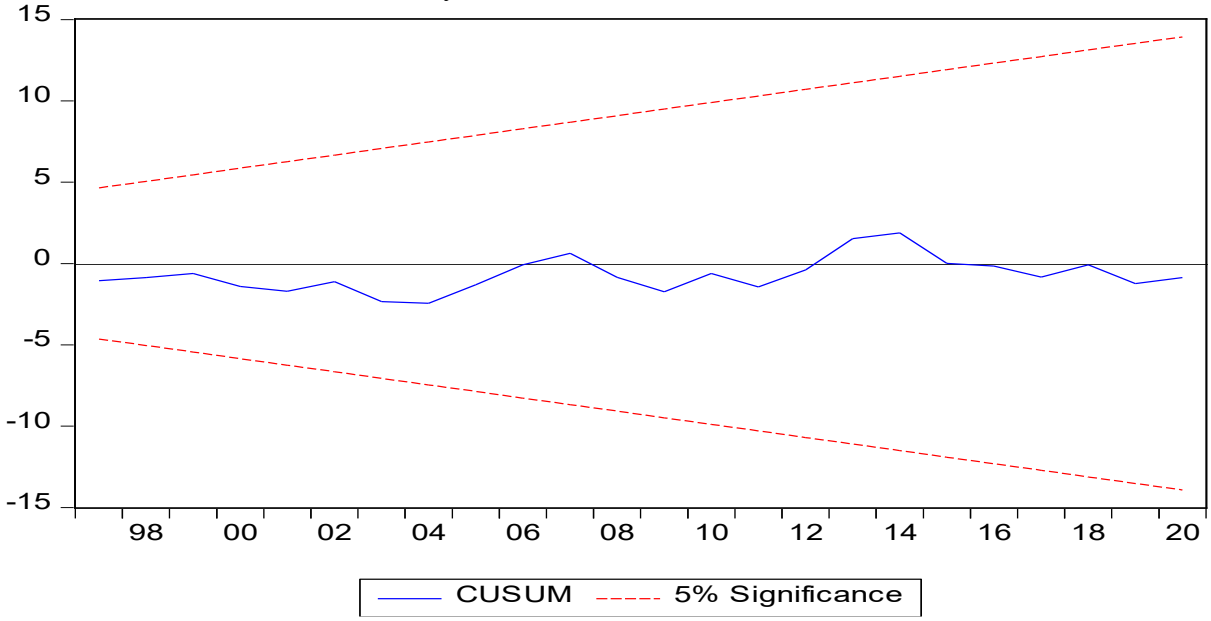

Fig. 3. structural stability CUSUM

Source: from researcher work based on output of program Eviews10

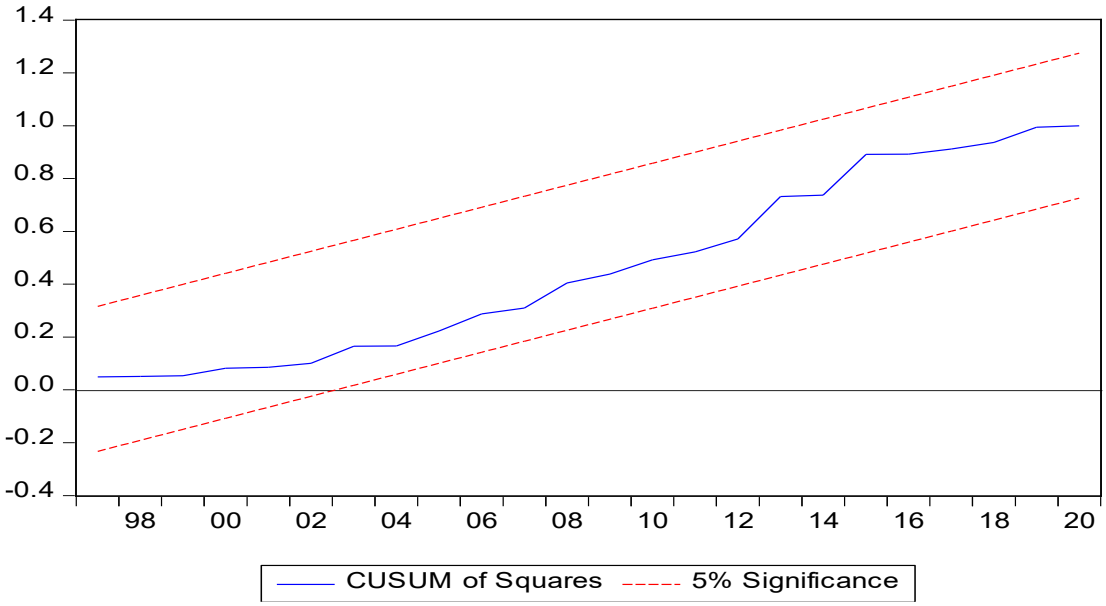

Fig. 4. structural stability CUSUM of squares

Source: from researcher work based on output of program Eviews10

correction of program Eviews.

The study concluded that farmers still need government support in all its forms as support of the prices of seeds, fertilizers, and Pesticides, because by increasing government support for farmers, agricultural product increases, and the provision of agricultural infrastructure positively affects the short and long run, but its effect in the long run period is greater. From the short-run period, because the concept of investment is a long-run concept, and most government projects need a period of more than a year in order to explain its effect on agricultural production, and that private investment has less impact in the short and long run than public investment, as this type of investment directly affects agricultural production as mechanization, machinery and equipment, or building poultry fields, animal breeding stations, houses plastic, fish tanks. The research recommends the necessity of providing the necessary loans and financing to farmers, as it is An important and necessary thing to increase production and raise growth rates and important sector, and the need to develop the role of the agricultural cooperative bank by strengthening its capital and preserving the development goal for which this bank was established and motivating commercial banks to participate in achieving agricultural development by loans provided to Farmers, in addition to the importance of continuing agricultural initiatives that provide capital to farmers through the agricultural initiative, and the need to raise the volume of investment allocations and develop a strategy to stimulate and develop the private sector and provide the appropriate legal and legislative environment.

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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