

ASSESSMENT OF THE IMPACT OF AGRARIAN POLICY ON ECONOMIC GROWTH

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ABSTRACT

The article focuses on ways and approaches of how to ensure economic growth in the country. Furthermore the article investigates a scientific and theoretical interpretation of the role and place of agrarian policy in economic development, which is an important aspect of economic policy. A mathematical model is substantiated through an econometric analysis of the impact of agrarian policy on the growth in the sphere of economy.

Keywords: Economic growth, exports, investment, agrarian policy, agriculture, agricultural production

Introduction

Research by the *Organization for Economic Co-operation and Development* (OECD) has shown that the agricultural sector should not be a sector of the economy which is “reminiscent of antiquity and backwardness”, but it should be the most advanced sector in the world due to *demographic and environmental* conditions that it can create. The new structure, foundations and specific aspects of agrarian policy need to be addressed clearly. This has been revealed recently.

Experts of the German company GIZ studied the role of agrarian policy in the country's economic growth and compared the effect of industrialization policy, which began in the 1950s, on economic growth, and asserted that if agrarian policy is considered as an industrial policy, world economic growth, living standards, prices will be better and desirable than today's indications. It was the conclusion that they drew. [1]

Here it should be noted that some sources have commented comments and their own ideas on the issue from a social point of view, including the *New Encyclopedia Dictionary* [2]. The *New Encyclopedia Dictionary* describes agrarian policy as a field of activity related to relations between social groups and layers, the essence of which is to determine the form, functions and content of the state.

Academician V.I.

Nazarenko believes that agrarian policy, due to its specificity, is part of the general economic policy and political ideology [3]. According to *I.N. Buzdalov*, agrarian policy is a set of key goals of political leaders in the field of socio-economic development, if its goal is to create the necessary conditions for a decent life conditions of farmers, their entrepreneurial work, it can be applied and enforced into life. Then it can promote development in agriculture [4]. *V.V. Miloserdov* states that the main thing in agrarian policy is "solving the food problem" [5]. *E.E. Jogoleva* gives a description of agrarian policy as "... purposeful state activity aimed at ensuring food security of the country while maintaining a favorable ecological situation with limited resources, budget and time and solving social problems in rural areas" [6]. *Rumyantseva E.E.* acknowledges that "agrarian policy is a policy of dynamic and effective development aimed not only at agricultural production and other areas of agribusiness, but also on the growth of living standards and social processes in the country" [7].

When we study the concept of agrarian policy from a socio-economic point of view, we can see that broader approaches have been applied to the solution of this issue in the foreign literature.

The main priority is aimed at comprehensive state support of agricultural and agro-industrial complexes. Some sources raise the issue of achieving economic development through agrarian policy aimed at modernizing the agricultural sector [8,9]. The formation of tax discipline and tax culture is also important in ensuring economic growth [10, 11].

Material and methods of the research

Empirical research on the influence of the agricultural sector development on economic growth was first conducted in 1961 by *Johnston and Mellor* and this research was based on simple mathematical methods. The application of sophisticated mathematical and statistical methods began after the 1990s, when the factor of relationship between the agricultural sector and economic development was studied by *Torbek and Jung* in 1996, *Datt and Ravallion* in 1998, *Irts* in 2001, *Gollin, Timmer, and Zirtl* in 2002. They analyzed the matter using brand-new methods.

Scientific researches that have been led up to now confirm that the products, works and services created by the agricultural sector affect the development of the non-agricultural sector in the economy through several direct and indirect mechanisms of influence. Classical views, on the other hand, differ significantly from those of modern theory. Classical views emphasize the strong link between the sectors of the economy based on market principles. Additionally classical views reflect the value created by the agricultural sector as a secondary contribution to economic growth.

Proponents of modern theory, *Johnston and Mellor* argue that the agricultural sector affects economic growth in five ways:

- the migration of surplus labor from the agricultural sector to the industrial sector,
- the supply of primary consumer goods for domestic consumption,
- industrial products to expand the market,
- to ensure the introduction of free funds as an investment in industry,
- to increase foreign exchange earnings through the export of agricultural products.

There are also a number of economists who oppose the development and expansion of the agricultural sector, which constitute a holistic stream. In particular, *Kyong* (2009) proved empirically that stimulating the export of agricultural products can make a country more vulnerable to various adverse conditions in the global economy.

In addition, another group of scholars argues that the return to the agricultural sector in the post-industrial economy is a drawback of the country's population to the medieval way of life, while optimists suggest increasing the role of this "classic" sector in economic growth by creating an integrated innovative agricultural sector in the post-industrial economy. We have developed an economic-mathematical model of econometric analysis, taking into account the views of both trends, based on the specifics of the economy of Uzbekistan.

Based on this situation, special attention was paid to the use of advanced econometric methods in the development of economic mathematical model. And this model has helped us to analyze the impact of the agricultural sector on economic growth. In it, we examined the short- and long-term relationship between economic growth and agrarian sector performance using the ARDL (*autoregressive distributed lag*) method.

Initially, an economic-mathematical expression of the econometric model was compiled. In this case, the method of econometric analysis and its requirements were considered and applied by the ARDL method. The following aspects were taken into account when choosing the **ARDL** method:

- Correlation test procedures do not require the variables in the same order of the objects of this study unlike the Johansen test. Regressors can satisfy the conditions of the dependence test even when they are in order I (0), I (1) or mutually cointegrated.
- The correlation test is suitable for usage in the analysis of small and finite periodicity data and differs in this respect from the conventional cointegration method.

The dependency test is a simple method that allows the calculation of cointegration relationships using the simplest least squares method. The lag order is defined differently from other multivariate cointegration methods.

- It is also possible to identify short-term and long-term relationships at the same time.

In the next step, a research hypothesis was formulated for the model. At the same time, the zero hypothesis that there is no cointegration between agrarian policy indicators and economic growth is expressed as follows:

$$H_0: \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4$$

An alternative hypothesis that there is a cointegration between agrarian policy indicators and economic growth is expressed as follows:

$$H_a: \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4$$

An F-test is conducted to determine the validity of the hypotheses. Regardless of the order of the variables 0 (1) or 1 (1), the F-test has a non-standard distribution. According to the *Pesaran* rule, the polished critical values are determined by dividing the set into two sets showing the lower and upper limits for the error. The first set assumes all variables as 1 (0) and the second as 1 (1). If the F-statistic exceeds the upper limit, the zero hypothesis is inappropriate and an alternative hypothesis is accepted. If the F-statistic is less than the lower limit of the critical value, the zero hypothesis is considered reasonable. If the critical value is between the lower and upper values, the conclusion is considered inappropriate. The optimal lag length is determined using the *Akaike* data criterion.

The relationship between economic growth, the volume of products and services created by the agricultural sector, the volume of investment in the agricultural sector, the export of agricultural products is expressed by the following formula:

$$ECG = f(AGP, AGI, AGT) \quad (1)$$

According to the *Pesaran* rule, the above model formula is expressed in terms of the ARDL test as an unrestricted error grinding model (UECM):

$$\begin{aligned} \Delta \ln ECG_t &= \varphi_0 \\ &+ \sum_{i=1}^p \varphi_1 \Delta \ln ECG_{t-i} + \sum_{i=0}^p \varphi_2 \Delta \ln AGP_{t-i} + \sum_{i=0}^p \varphi_3 \Delta \ln AGI_{t-i} \\ &+ \sum_{i=0}^p \varphi_4 \Delta \ln AGT_{t-i} + \beta_1 \ln ECG_{t-1} + \beta_2 \ln AGP_{t-1} + \beta_3 \ln AGI_{t-1} + \beta_4 \ln AGT_{t-1} \\ &+ u_t \end{aligned}$$

$$ECG = f(AGP, AGI, AGT) \quad (1)$$

Results

While the dependency test does not require checking the variability of variables, the ARDL model requires that variables have a unit root only in the order I (0) and I (1), i.e., in degree and primary difference, not in the second or subsequent order. Because F named tests are only relevant in terms of degree and primary difference. Therefore, we perform extended *Dickey-Fuller and Phillips-Perron* unit root tests on the variables:

Results of the Advanced Dickey-Fuller unit root test

Table 1.

Variables	Advanced Dickey-Fuller Test	Lag Length	Critical Value in 5% Interval Confidence	Stationary
Degree				
LnECG	-1.937438	0	-3.020686	Not stationary
LnAGP	-9.185672	0	-3.020686	Stationary
LnAGI	-4.809813	0	-3.020686	Stationary
LnAGT	-5.334471	0	-3.020686	Stationary
The primary difference				
Δ LnECG	-7.042020	0	-3.029970	Stationary
Δ LnAGP	-12.42771	0	-3.029970	Stationary
Δ LnAGI	-5.556478	1	-3.040391	Stationary
Δ LnAGT	-7.979049	0	-3.029970	Stationary

EVIIEWS 9.5 was calculated in the econometric analysis program

The result of Phillips-Perron unit root test

Table 2.

Ўзгaрувчи	Phillips-Perron test	Garden	Critical value in the interval of 5 % confidence	Stationary
Degree				
LnECG	-1.937438	0	-3.020686	Not stationary
LnAGP	-7.843367	2	-3.020686	Stationary
LnAGI	-4.796268	2	-3.020686	Stationary
LnAGT	-5.344471	0	-3.020686	Stationary
The primary difference				
Δ LnECG	-7.844940	4	-3.029970	Stationary
Δ LnAGP	-18.71644	5	-3.029970	Stationary
Δ LnAGI	-21.94838	12	-3.029970	Stationary
Δ LnAGT	-20.27627	18	-3.029970	Stationary

EVIIEWS 9.5 has been solved in econometric analysis system

The extended Dickey-Fuller and Phillips-Perron tests showed that only LnECG I (0) was stationary in the zero order, the remaining variables were LnAGP, LnAGI, LnAGT in the primary difference, i.e., stationary in the first order, and the values satisfied the feasibility conditions of the F-statistic. Under the terms of the dependency test, all variables are stationary in the first place.

In the next step, we check the existence of a cointegration relationship between the variables using *ARDL* bonds. To do this, we calculate the eigenvalue of the F-statistic for the econometric model variables we constructed. Using the Microfit 5.0 econometric analysis program, we calculate the $F_{ECG}(AGP, AGI, AGT)$ expression in the 5% confidence interval.

Table 3.

Level correlation test between variables in the ARDL model			
F-statistics	95% Lower limit	95% Upper limit	
6.8023	5.2974	6.7398	
W-statistics	95% Lower limit	95% Upper limit	
27.2094	21.1896	26.9590	

This was calculated in a Microfit 5.0 econometric analysis program.

According to the Pesaran rule, if the F-statistic is between the lower and upper limit values, the test is considered to have given an unpredictable result. If the F-statistic is greater than the upper limit value, the zero hypothesis that there is no effect of degree dependencies is not valid. If the F-statistic is less than the lower limit value, the zero hypothesis that there is no effect of degree dependencies is valid. The result of the correlation test we performed showed that the F-statistic was greater than the upper limit of the critical value in the confidence interval of 0.05. Here, the value of the F-statistic is 6.8023 and the upper limit of the critical value is 6.7398. At this point, the zero hypothesis is not appropriate for the model we propose, and the conditions of the alternative hypothesis are satisfied.

There is a cointegration between economic growth, agricultural output, investment in the agricultural sector and exports of agricultural products.

Once the existence of cointegration was proven, the long-term relationship was determined using the conditional ARDL model:

$$\ln ECG_t = \varphi_0 + \beta_1 \ln ECG_{t-1} + \beta_2 \ln AGP_{t-1} + \beta_3 \ln AGI_{t-1} + \beta_4 \ln AGT_{t-1} + u_t$$

Microfit 5.0. A long-term correlation test was performed using the econometric program using the ARDL method:

Table 4.

The long-run dependence coefficient in the ARDL model			
Optional variable: LogECG			
Variable	Coefficient	Stan. error	T-ratio [approximately]
LogAGP	.92697	.36190	2.5614[.024]
LogAGI	.049442	.018404	2.6865[.019]
LogAGT	.015164	.0059520	2.5478[.024]

ARDL (1,0,0,1) was selected based on the *Akaike data criterion*

The results of the long-term correlation study in the ARDL model given in Table 4 showed that the dynamics of the volume of goods and services generated by the agricultural sector has a positive and relatively significant impact on economic growth with a probability of 5 percent. The coefficient of the dynamics of the volume of goods and services created by the agricultural sector (0.92697) shows that an increase in the volume of goods and products of the agricultural sector by 1 percent will lead to the economic growth of 0.93% if the remaining factors remain unchanged. The dynamics of the volume of investments in the agricultural sector (0.046442) also had a positive impact on economic growth, with its 1% growth leading to economic growth of about 0.05%. It was

found that the volume of exports of goods and services created by the agricultural sector (0.015164) had a positive impact on economic growth, and its 1% growth would lead to an increase in economic growth of 0.015%.

To achieve a perfect and detailed result in econometric analysis, it is advisable to check the short-term correlation in the ARDL model. To conduct a short-term coupling test, our econometric model is presented in the following form, which includes elements of an error correction mechanism:

$$\Delta \ln ECG_t = \varphi_0 + \sum_{i=1}^p \varphi_1 \Delta \ln ECG_{t-i} + \sum_{i=0}^p \varphi_2 \Delta \ln AGP_{t-i} + \sum_{i=0}^p \varphi_3 \Delta \ln AGI_{t-i} + \sum_{i=0}^p \varphi_4 \Delta \ln AGT_{t-i} + \delta ECM_{t-1} + u_t$$

Here, φ_0 is a constant, u_t is the standard error, $\varphi_1, \dots, \varphi_5$ is the short-term elasticity, β_1, \dots, β_5 is the long-term elasticity, ECM is the error correction coefficient, δ is the rate of change (coefficient of variability).

A short-term correlation involving elements of an error correction mechanism was investigated.

Table 5.

The mechanism of correcting errors and short-term correlation			

Optional variable: dLogECG			

Variable	Coefficient	Stan-error	T-ratio [approximately]
dLogAGP	.68100	.21763	3.1291 [.007]
dLogAGI	.036323	.0093722	3.8756 [.002]
dLogAGT	.0045731	.0020339	2.2484 [.041]
dTREND	.0018151	.8244E-3	2.2018 [.045]
ecm(-1)	-.73465	.17749	-4.1392 [.001]
ecm = LogECG -.92697*LogAGP -.049442*LogAGI - .015164*LogAGT + .038610*INPT - .0024707*TREND			
R-square .86877		R-square .80820	
S.E. of Regression .0091550 F-statistics (5,14) 17.2126 [.000]			
Free variable Free variable			
arithmetic middle indication .0030500 standard deviation .020904			
Schwartz Baes criterion for logarithmic truth 59.3130			
proximity 69.7981 Akaike data criterion 62.7981			
Balance of squares .0010896 Darbin-Watson statistic 2.3926			
ARDL (1,0,0,1) was selected based on the Akaike data criterion			
It was alculated by the author in the Microfit 5.0 econometric analysis program.			

Table 5 presents the short-run dynamic coefficients derived from the error correction model. The short-term dynamic dependence is fully consistent with the long-term dependence characteristics. The error correction model coefficient (-0.73465), calculated with a probability of 1 percent, is relatively significant and shows signs of rapid variability. About 73 percent of the

imbalances that occurred last year will affect this year's long-term equilibrium. The dynamics of the volume of goods and products created by the agricultural sector was 0.68, the dynamics of investments in the agricultural sector was 0.03, and the dynamics of exports of goods and products created by the agricultural sector was 0.001. It should be noted that the impact of the agricultural sector on economic growth on the indicators we are studying is positive in both long-term and short-term dependence.

Table 6.

Diagnostic test of the model

Test *	Lagrange multiplier *	Figure F *
* A: Correlation	* CHSQ (1) = 2.7532 [.097]	* F (1.12) = 1.9156 [.192] *
* B: Functional form	* CHSQ (1) = 1.7528 [.186]	* F (1.12) = 1.1527 [.304] *
* C: Normal	* CHSQ (2) = 1.0363 [.596]	* - *
* D: Heteroskedasticity	* CHSQ (1) = .20945 [.647]	* F (1.18) = .19050 [.668] *

It is calculated by the author in the Microfit 5.0 econometric analysis program.

The results of Lagrange's multiplier residual correlation, Remzi's RESET, Harke-Bera normality, and heteroskedasticity tests show that the model we constructed satisfies all test conditions and it has the correct functional form. It is also explained by the fact that in the econometric model we propose, the residues are normally distributed, not periodically correlated.

Discussion

We have studied the impact of short-term and long-term links between the volume of goods and products created by the agricultural sector, the total investment in the agricultural sector and the volume of exports of agricultural products and services for the first time, which are the main market indicators of the agricultural sector. It should be noted that such econometric analyzes in this area are poorly studied in practice. In most scientific articles we can observe that the implementation of agrarian policy is limited by scientific and theoretical aspects [3,4]

Conclusion

1. Consistent implementation of agrarian policy is required to ensure economic growth. In this regard, it is necessary to accelerate the strengthening and diversification of its material and technical base through the modernization of agriculture, the introduction of modern new advanced techniques, innovative technologies. It is also necessary to increase production in the agricultural sector, accelerate investment in the sector and further increase the export potential of the sector. In this regard, it is important today to build an econometric model of indicators of agricultural policy that affect economic growth. Particular attention was paid to the application of advanced econometric methods in the development of economic mathematical model and analyzed the impact of the agricultural sector on economic growth by cointegration and autoregressive distributed lag method.

2. Based on the results, we developed and analyzed an econometric model based on the *ARDL* model of the cointegration method in order to study the contribution of the agricultural sector to economic growth, the impact of the situation in the agricultural sector on the country's economic development. The model provides an econometric analysis of the impact of economic growth on the volume of goods and products created by the agricultural sector, the total investment in the agricultural sector and the volume of exports of agricultural products and services, and the

short-term and long-term relationship between them. The result of multi-stage complex calculations showed that the agrarian sector indicators listed above contributed to economic growth and that there was a positive long-term and short-term correlation. A diagnostic test performed at the end of the calculations confirmed that the constructed model was correctly selected and appropriate in all criteria.

3. Based on the results of econometric analysis, the direct impact of the implementation of agrarian policy on the economic growth of the country was positively assessed. Thus, today the development of agriculture and related sectors is interpreted as one of the main factors determining the socio-economic development of the country, in this regard, to further increase the production of goods and services in the agricultural sector, it is essential to diversify the export structure of the agricultural sector. It is recommended to further increase the volume of investments in the sector.

4. Short-term dynamic dependence is fully consistent with long-term dynamic dependence. The error correction model coefficient (-0.73465) calculated with a probability of 5% is relatively significant and shows signs of rapid variability. About 73 percent of the imbalances that occurred last year will affect this year's long-term equilibrium. The dynamics of the volume of goods and products created by the agricultural sector was 0.68, the dynamics of investments in the agricultural sector was 0.03, and the dynamics of exports of goods and products created by the agricultural sector was 0.001. It should be noted that the impact of the indicators of the agricultural sector on economic growth, which we are studying, is positive in both long-term and short-term dependence.

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