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ANALYSIS OF INVESTMENT EFFICIENCY IN THE AGRICULTURAL SECTOR OF UKRAINE ON THE BASIS OF SUSTAINABLE DEVELOPMENT

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Abstract

In the article we study the specifics of assessing investment activity in the agricultural sector of Ukraine's economy in terms of ensuring high efficiency of state regulation in this area. We have identified and substantiated the need for the use of special indicators to assess the impact of public policy on the investment process in agriculture in general and on the investment policy of agricultural producers. It is determined and substantiated that the most significant influence on the regulation of investment activity in the agricultural sector of Ukraine is exerted by the volume of state funding of investment management bodies and the level of financial incentives for investment. According to the results of the study, we substantiated the need to increase the efficiency of reforming the agricultural sector of Ukraine and the need and attraction of additional investment resources to ensure the implementation of the process of improving the functioning of agricultural producers in Ukraine.

Key words**:** *agricultural sector, agricultural enterprises, investment activity, strategic management accounting, management system*

INTRODUCTION

Agricultural production is one of the most important sectors of the national economy of Ukraine, as it has a significant share in the structure of exports, and also plays a key role in ensuring food security. At the same time, intensive and effective development of this area is impossible without a significant amount of investment, the main purpose of which is to increase the overall efficiency of agricultural enterprises. It should be noted that after signing the Association Agreement with the European Union, Ukrainian agricultural enterprises managed to significantly upgrade their production base and achieve high production efficiency due to entering new solvent markets. However, such an upgrade has become more possible for large agricultural holdings and large farms. At the same time, a significant number of small agricultural enterprises are in dire need of investment.

The key problems of agricultural production in Ukraine are the low level of labor productivity and significant material costs for production. This is due to the long-term underfunding of the agricultural sector and the unprofitable management model, which was focused on significant government subsidies.

Therefore, in order to restructure the system of agricultural production, it is necessary to make changes, first of all, in the technical equipment of enterprises. In addition, in order to achieve high competitiveness in the world market, it is necessary to focus on the production of biologically clean products and the introduction of resource-saving technologies in the production process. With the appropriate level of funding, this will allow in a relatively short time to transfer the agricultural sector of Ukraine to a qualitatively new level of its development. That is why, as well as taking into account the best world experience, we state that the issue of determining the basic principles of investment activities of agricultural enterprises and identifying promising areas of capital for these investments is especially relevant in today`s realities.

Studies of the intensification of investment processes in the agricultural sector in the context of improving the efficiency of investment activities of agricultural enterprises are widely disclosed in the works of researchers such as O. Agres [1], I. Balaniuk [3], O. Binert [4], Y. Chaliuk [6], A. Marcuta [16], A. Popescu [17-26], T. Shmatkovska [27-29], O. Vovchak [39], Y. Yanyshyn [41], and others. It should also be noted the significant contribution to the study of issues related to the nature, mechanisms, and features of formation, as well as ways to improve investment at the level of individual territories and the agricultural sector as a whole, which was carried out in O. Apostolyuk [2], A. Boiar [5], M. Dziamulych [7-14], T. Kravchenko [15], R. Sodoma [30-33], O. Stashchuk [34-36], I. Yakoviyuk [40], O. Yatsukh [42], I. Zhurakovska [43] and others.

MATERIALS AND METHODS

The interaction of the resulting indicator (Y) with the factor features (X_1, X_2….X_n) is traditionally reflected by us by constructing a linear multifactor regression equation determined by the formula:

$$\hat{Y} = \widehat{a_0} + \sum \widehat{a_i} x_i$$

Note that the simplest mathematical model that uses the closeness of the relationship between two variables is linear regression:

$$y_t = ax_t + b, \quad t = 1, \dots, n$$

where:

$a = r\frac{\delta_y}{\delta_x}$ – coefficient characterizing the angle of inclination of the regression line to the axis *OX;*

$b = \bar{y} - a\bar{x}$ – coefficient characterizing the distance from the regression line to the axis *OX;*

x – known variable (*predictor*), taken at time *t;*

y – unknown or predicted variable *(predictor), taken at the appropriate time t;*

$\bar{y}$ and $\bar{x}$ – the average values of statistical series are compared to variables;

r – correlation coefficient;

δ_y and δ_x – root mean square deviations of statistical series are compared to variables;

n – standard deviations of statistical series of comparable variables; *n* are the length of statistical series.

In order to optimize the calculations in the research process was used an effective means of avoiding cumbersome calculations, namely the package "Data Analysis" software MS Excel, which allows high-quality economic and mathematical calculations, and builds multifactor linear and nonlinear econometric models.

RESULTS AND DISCUSSIONS

The investment activity of agricultural enterprises is an integral part of their overall financial activity, so the criteria for assessing the effectiveness of investment are based on generally accepted approaches to the level of their profitability. However, the specifics of investments in agriculture in Ukraine are a significant amount of public funding for the agricultural sector, which is manifested in direct subsidies for agricultural production and targeted funding for agricultural development programs. As a result, state aid accounts for a significant share of the overall structure of investment in Ukraine`s agricultural sector.

Therefore, the evaluation of the effectiveness of agricultural enterprises in terms of studying the overall effectiveness of investment in agriculture should be carried out by determining the ratio of performance of agricultural enterprises to total direct and public investment (Fig. 1).

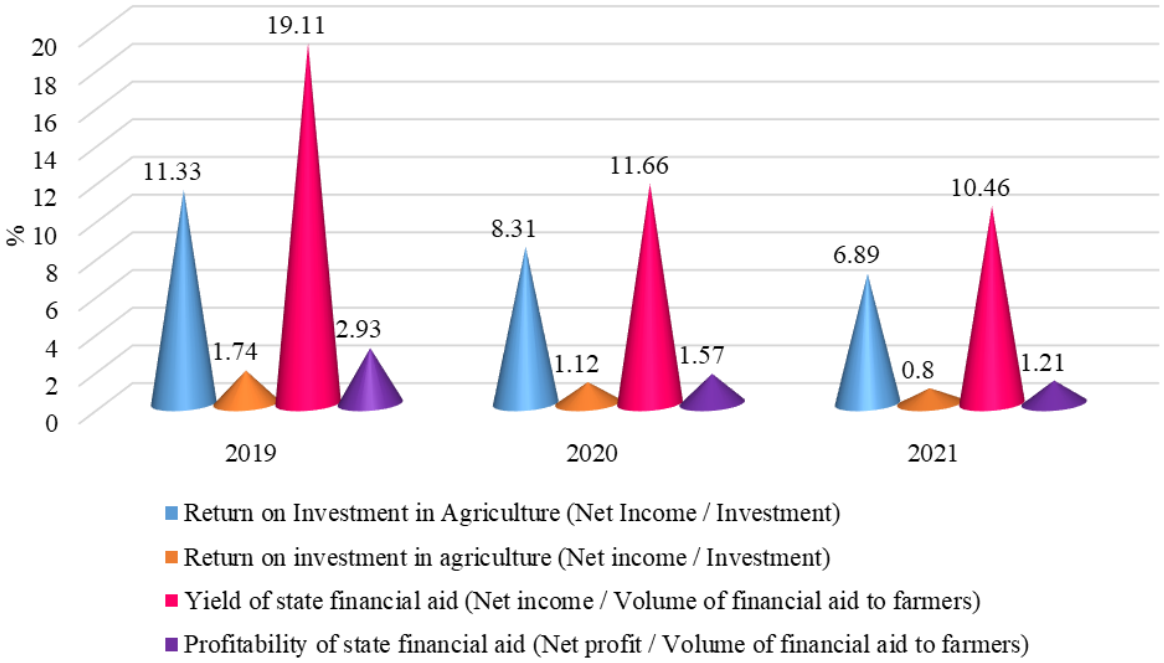

Fig. 1. Indicators of profitability and profitability of agricultural enterprises of Ukraine for 2019-2021
Source: calculated and constructed according to data [37].

As we can see from Fig. 1, during the analyzed period the level of profitability and profitability of investments in the agricultural sector of Ukraine gradually decreased. At the same time, this applied to both direct investments of enterprises and state funding of targeted programs for the development of the agricultural sector. However, the main reason for this was not objective economic factors, but the negative impact of the COVID-19 pandemic, which hit all sectors of the economy. As a result, despite rising market prices for agricultural products during the same period, return on investment fell due to constant restrictions on the movement of capital and material resources in the fight against the pandemic.

It should also be noted that at the same time in the national economy of Ukraine there were no macroeconomic trends that could hinder the return on investment or artificially limit their profitability due to the adverse effects of environmental factors. On the contrary, if we evaluate the dynamics of the Doing Business rating published by the World Bank, we will see that in the analyzed period Ukraine`s position on ease of doing business was constantly improving, and in 2020 it took the highest place for the entire rating period (Fig. 2).

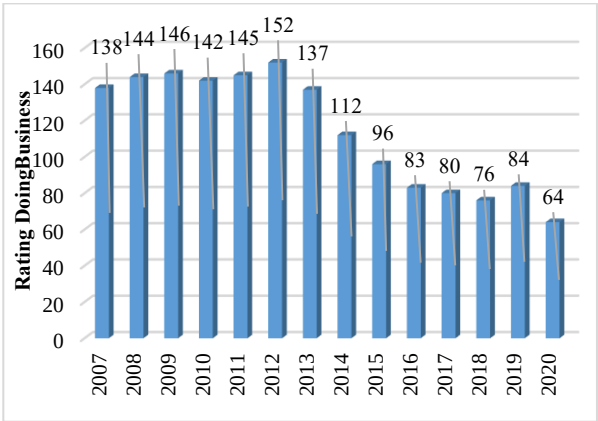

Fig. 2. Changing the position of Ukraine in the Ease of Doing Business Index for 2007-2020.
Source: [38].

It should be noted that determining the effectiveness of commercial investments is

based on the analysis of net indicators of their profitability and profitability. At the same time, assessing the effectiveness of public investment in agriculture is more difficult, as they are not implemented through direct financing of enterprises, but through integrated distribution through specialized programs to support the agricultural sector. In this regard, the funds received by different companies are different in volume, and some share of business entities remains outside the target programs. Therefore, to increase the reliability of assessing the effectiveness of public investment programs in agriculture, it is necessary to use an indirect assessment of investment performance using specialized coefficients.

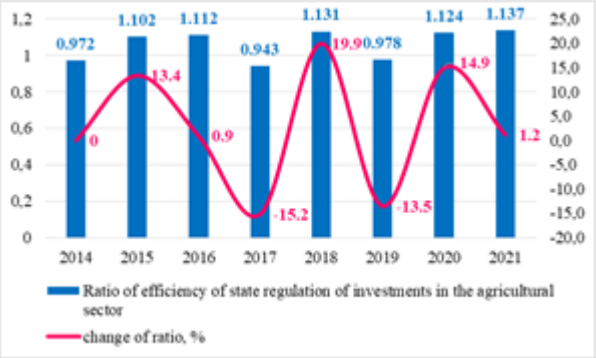

Fig. 3. Dynamics of the coefficient of efficiency of state regulation of investments in the agricultural sector in Ukraine for 2014-2021.
Source: calculated and constructed according to data [37].

One of such important indicators is the efficiency of state regulation of investment and the agricultural sector, which is the ratio of changes in investment in agriculture to the rate of change in expenditures on the financing of state institutions involved in regulating investment processes in agriculture. The critical value of this indicator is 1, and its dynamics are shown in Fig. 3.

The dynamics of this indicator show that during the analyzed period the overall level of impact of public financial assistance on investment activity in agriculture was positive. The values of this coefficient fell below the critical level only in some periods, and over the past two years, it has had a steady upward trend. This indicates a generally active influence of state regulation on investment activity in the agricultural sector. In addition, it should be noted that an additional incentive to increase this indicator was the adoption in 2021 of the Law on Private Land Ownership, which led to an additional influx of financial resources into the agricultural sector.

It is also advisable to use for the analysis of the coefficient of efficiency of public investment, which is the ratio of the rate of the overall growth of investment in the agricultural sector to the rate of increase in public funding for agriculture in the country. At the same time, the efficiency of public investment on this indicator is determined by its excess over the normative value, which is equal to one. The dynamics of this coefficient are shown in Fig. 4.

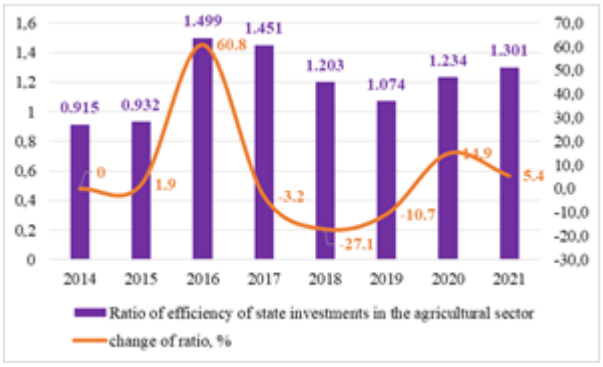

Fig. 4. Dynamics of the efficiency ratio of public investment in the agricultural sector in Ukraine in 2014-2021.
Source: calculated and constructed according to data [37].

As we can see, during the analyzed period, the level of efficiency of public investment in agriculture was unstable. In particular, its gradual decline in 2017-2019 led to a fall to almost a critical value of 1,074. However, since 2020, this coefficient has started to grow dynamically due to the wide entry of Ukrainian enterprises into the EU market as a result of the Association Agreement. This opening of markets gave a significant increase in sales of agricultural enterprises in Ukraine, which affected their financial performance, including – increased financial return on investment, including – public investment in agricultural production under targeted support programs.

The coefficient of investment efficiency of VAT refunds to agricultural enterprises is the

ratio of the rate of change of investments in agriculture to the rate of change of the total amount of VAT refunds to agricultural enterprises. The critical value of this indicator is 1. Its dynamics are shown in Fig. 5.

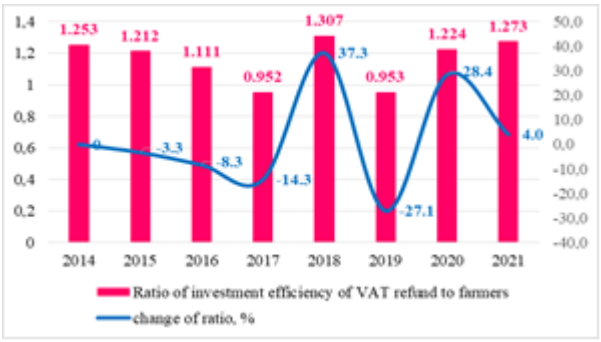

Fig. 5. Dynamics of the coefficient of investment efficiency of VAT refund to agricultural enterprises for 2014-2021.
Source: calculated and constructed according to data [37].

As can be seen from the analysis, in 2014-2017 the dynamics of this ratio was declining, due to the large-scale consequences of the economic crisis of 2014-2015 due to Russia`s military invasion of Ukraine. However, since 2018, the total amount of VAT refunds to agricultural enterprises began to increase, which indicates the intensification of export activities in the agricultural sector. At the same time, increasing the amount of refund of this tax significantly contributes to the replenishment of the working capital of agricultural producers, which directly affects the efficiency of their activities and increases the number of financial resources available for investment.

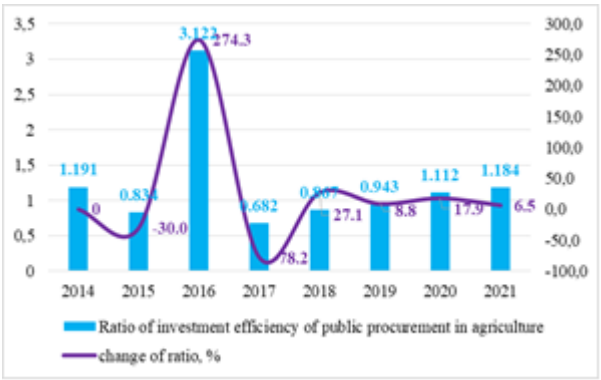

Fig. 6. Dynamics of the coefficient of investment efficiency of public procurement in agriculture for 2014-2021.
Source: calculated and constructed according to data [37].

The investment efficiency ratio of public procurement is determined by determining the ratio of the growth rate of investment in the agricultural sector to the overall rate of change in public procurement funding for agricultural producers. The critical value of this indicator is also 1. Its dynamics are shown in Fig. 6.
During the analyzed period, the dynamics of this coefficient were unstable. In addition to its sharp growth in 2016 due to increased investment in agriculture after the crisis of 2014-2015, in general, the value of this indicator was lower than critical, which indicated insufficient funding for public procurement in agriculture. At the same time, since 2017 it has been growing steadily due to the increase in the total volume of agricultural support programs, which include financing the targeted purchase of agricultural products, in particular – to replenish the State Reserve of Ukraine.
For a more detailed assessment of the effectiveness of the state`s influence on investment activity in agriculture, a correlation-regression analysis of the relationship between key indicators of the analysis. The resulting indicator is the total volume of investment in agriculture in Ukraine, and the factors considered above are the coefficients discussed above. The initial data required to build a regression model are given in Table 1.
The results of the regression calculation performed in the Microsoft EXCEL program are given in Table 2.
The regression analysis shows that the value of R2 is 0.5253. This indicates the existence of a close relationship between the overall level of return on investment in agriculture and the effective effectiveness of certain instruments of state regulation of investment activities. Based on Fisher`s criterion, it can be concluded that there is a stable relationship between indicators, as its actual value is 19.92, which exceeds the minimum allowable value.

Table 1. Indicators for the analysis of the dependence of the profitability of investments in the agricultural sector on the effectiveness of their state regulation in 2014-2021.

Indicators	Legend	2014	2015	2016	2017	2018	2019	2020	2021
Total investment in agriculture, million USD	Y	2,357	1,834	2,419	2,975	2,919	2,710	2,911	3,098
Efficiency coefficient of state regulation of investments in the agricultural sector	X_1	0.972	1.102	1.112	0.943	1.131	0.978	1.124	1.137
Efficiency coefficient of state investments in the agricultural sector	X_2	0.915	0.932	1.499	1.451	1.203	1.074	1.234	1.301
Coefficient of investment efficiency of VAT refund to agricultural enterprises	X_3	1.253	1.212	1.111	0.952	1.307	0.953	1.224	1.273
Coefficient of investment efficiency of public procurement in agriculture	X_4	1.191	0.834	3.122	0.682	0.867	0.943	1.112	1.184

Source: own calculations.

Table 2. The results of regression analysis of the dependence of the return on investment in agriculture on the effectiveness of their state regulation

Regression parameters	Regression options				
	Plural	Y from X_1	Y from X_2	Y from X_3	Y from X_4
R^2	0.5253	0.4068	0.3588	0.3057	0.2681
Fisher`s criterion	19.92 F_{min} = 4.22	17.15 F_{min} = 1.25	13.98 F_{min} = 1.25	11.00 F_{min} = 1.25	9.15 F_{min} = 1.25
Coefficients for variables, $b^1 – b^4$	X_1: b^1 = 0.919 X_2: b^2 = 1.228 X_3: b^3 = 4.141 X_4: b^4 = -0.127	X_1: B^1 = 0.995	X_2: B^2 = 0.405	X_3: B^3 = 2.501	X_4: B^4 = 0.261
Probability of error, $P^1 – P^4$	X_1: P^1 = 0.357 X_2: P^2 = 0.237 X_3: P^3 = 0.346 X_4: P^4 = 0.583	X_1: P^1 = 0.001	X_2: P^2 = 0.001	X_3: P^3 = 0.004	X_4: P^4 = 0.005

Source: own calculations.

According to the results of the analysis, the level of influence of the effectiveness of state regulation in the area of financing investment management bodies and financial incentives for investment is the highest compared to the effectiveness of other tools. At the same time, the increase in state budget expenditures on investment management bodies, as well as direct financial assistance to agricultural producers have a high positive impact on the dynamics of return on investment in agriculture.

CONCLUSIONS

Thus, in the studied period, the relative quantitative growth of investments in agriculture in Ukraine is fixed. At the same time, it should be noted that the weakness of state regulation of investment activities in agriculture is the lack of a balanced long-term policy of economic development and stable regulatory and legal support for the functioning of this area.

According to the results of the application of modern methods for the analysis of the profitability of the main economic instruments for state regulation of investment activities in agriculture, it was found that they did not fully contribute to increasing the economic efficiency of agricultural enterprises and have significant development potential. The level of influence of the effectiveness of state regulation with the use of such means as financing of investment management bodies and financial stimulation of investment development is the highest compared to the effectiveness of other instruments of state regulation.

According to the study, it can be argued that effective reform of the agricultural sector of the economy can be carried out only through a significant increase in investment activities of enterprises, as well as through the overall increase in investment resources that will be available to these entities. At the same time, there is a need to accumulate not only commercial and banking capital, but also to rely on targeted public investment in reforming priority areas of agricultural production. In addition, the increase in investment activity of agricultural enterprises will result in increased investment attractiveness in rural areas, which will contribute to their socio-economic development.

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