MODELING THE IMPACT OF CAPITAL INVESTMENTS ON THE FINANCIAL SECURITY OF AGRARIAN ENTERPRISES

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Abstract. *The article reveals the essence of capital investments and the importance of this category for the development of agricultural enterprises. It has been proven that they influence the economic development of the studied enterprises and the level of their financial security. The conducted analysis established that during the last five years there is no clear tendency to increase the volume of investments, which led to the need for certain internal factors that affect investment attraction. With the help of economic and mathematical methods, the influence of internal factors, namely the company's income and the amount of equity capital, on the amount of investment was determined. In the process of research, it was determined that the volume of involved investments and the financial results of the enterprises have a close relationship, which showed their influence on the level of financial security of agricultural enterprises.*

The article also defines a number of other factors that testify to the economic development of enterprises, the impact on the volume of investments, which is quite significant. The purpose of the article is to assess the influence and closeness of the relationship between the volume of investments and factors that indicate the level of financial security of agricultural enterprises. In conducting the research, general scientific and special research methods were used. which, method of scientific knowledge, analysis and synthesis, graphic method, generalization method, factor analysis, economic and mathematical research methods.

As a result of the research, the author determined the main factors influencing the economic development of enterprises and the level of their financial security. In order to determine the closeness of the relationship, economic models were built between the studied categories, which are based on the levels of the power function. It has been proven that there is a close connection between investments and the volume of output and exports and a significant impact on financial results and gross added value. The author assessed the influence of internal factors on the investment attractiveness of agricultural enterprises and substantiated the need to take into account external factors, which is promising for further research.

Key words: *investments, financial results, financial security, agricultural enterprises, closeness of communication.*

Introduction.

The European development vector of Ukraine involves reforming all spheres of activity with the aim of increasing its economic potential. Based on the experience of the world's leading countries, we can confidently say that at this stage Ukraine needs to attract significant investment resources. Undoubtedly, investments, on the one hand, are the cause, and at the same time, the consequence of ensuring the development of the country's economy, increasing the innovative potential and increasing the competitiveness of both the country as a whole and individual industries. The agricultural sector occupies a leading place in the development of the economy of Ukraine, therefore it is important to increase the efficiency of agricultural enterprises and ensure their financial security. Investments play a significant role in solving this issue. In today's economic conditions, the question of attracting domestic and foreign investments in the agricultural sector, as well as their rational use, is becoming particularly relevant.

Literature review

The works of the following scientists are devoted to the study of factors influencing the volume of capital investments, as well as their classification: 5], T. Pogorelova [6], G. Fedorov [7]. The question of the impact of investments on the level of financial security of enterprises, as well as their development, was studied by many scientists, in particular: G. Anilovska [8], V. Boronos [9], N. Davydenko [10], V. Kyrylenko [11], Yu. Kim [12], L. Mohylina [13]. However, the systematization of influencing factors and the study of the closeness of their connection require additional research.

The purpose of the article is to determine the main factors affecting the amount of capital investments involved in agricultural enterprises, as well as to study the impact of capital investments on the economic development and financial security of agricultural enterprises.

Presenting main material.

The main goal of investment support is to create competitive investment objects on a new innovative and technological basis to ensure the development of the agricultural sector of the economy, strengthening of positions in the domestic market and entering the foreign market; development of social infrastructure of the village; implementation of environmental and food security of the state. This also determines the peculiarities of innovation investment and provides an opportunity to scientifically substantiate the directions of innovative activity, the structure and sources of investment, contributes to increasing the competitiveness of production and products [14, p. 24].

The level of investment attractiveness of agricultural enterprises plays an important role in attracting investments. Investors must clearly understand the strengths and weaknesses of the enterprise, its level of competitiveness, development prospects and the possibility of obtaining the maximum amount of profit per unit of invested funds. To ensure the appropriate level of investment attractiveness, it is necessary to develop a strategy for the development of the enterprise, which should be based on the consolidation of its financial resources, which will contribute to the strengthening of financial security and provide favorable conditions for attracting investments.

The conducted analysis of the volumes of investments in fixed capital

shows that there is no clear trend in the growth of investments during the studied period. Thus, in general, capital investment in Ukraine increased by more than 1.5 times in 2021 compared to 2017, however, in recent years there has been a heterogeneity of dynamics due to the Covid-19 pandemic and its impact on the development of the world economy. As for agriculture, there is a rapid growth of investments until 2018, but in the following years their decline is followed, and in 2021 they were slightly higher than the level of 2017, by 7%. As for the specific weight of investments in agriculture in general, there is a tendency to decrease starting from 2019 and in 2021 was only 10.4%, while in 2017 their share was 15%.

When analyzing the investment attractiveness of agricultural enterprises, as a component of their financial security, it is advisable to analyze the share of investments in the value of gross production. Thus, it is worth noting that the growth rate of gross output is significantly ahead of the growth rate of investment, as a result of which the share of investment in GDP is decreasing. The value of the produced gross products as a whole increased by more than 83%, and in the field of agriculture by almost 92%, which indicates positive dynamics. In general, the share of all investments in GDP during 2017-2021 had a tendency to decrease by 18%. As for the specific weight of investments in agriculture in GDP, the specified indicator in 2021 was 11.7%, which is the lowest indicator during the studied period (Table 1).

The investment attractiveness of agriculture is influenced by a large number of various factors. Their influence is not the same and static, but on the contrary, in different periods of time, one or another set of factors affects to a greater or lesser extent. Proceeding from the fact that in the conditions of a stable economy, the efficiency of agricultural enterprises determines their investment

1. Dynamics of investments in fixed capital in the agricultural sector of the Ukrainian economy

Indicators	Years					Deviation from 2021 to 2017, %
	2017	2018	2019	2020	2021	
Investments in the economy countries in total, billion UAH	448,5	578,7	624	508,2	673,9	150,26
Including agriculture, hunting and related services	63,4	65,1	58,6	50,2	68	107,26
The specific weight of investments in agriculture in their total amount,%	14,1	11,2	9,4	9,9	10,1	71,63
GDP (in actual prices) total, UAH billion	2981,2	3560,3	3977,2	4222	5459,6	183,13
GDP (in actual prices) of agriculture, UAH billion	303,9	361,2	356,6	393,1	580,5	191,02
The specific weight of all investments in the GDP of the country, %	15	16,3	15,7	12	12,3	82,00
Specific weight of investments in agriculture in GDP, %	20,9	18	16,4	12,8	11,7	55,98

Source: calculated by the author based on the data of the State Committee of Statistics of Ukraine

attractiveness, which determines the further ability to expand reproduction and increase the level of financial security in the conditions of the complexity of the modern economy and the entire economy as a whole [15, 16].

Objectively, a radical increase in investment resources in agriculture depends on active measures to ensure business efficiency. Finding mechanisms for increasing the volume of investment resources will really contribute to the development of business processes at the sectoral and regional levels and will contribute to strengthening the level of their financial security.

The conducted studies clearly show that the volume of the involved investments is influenced by the amount of income and the amount of equity capital. Along with this, investments have a direct impact on the gross added value of agricultural enterprises, the volume of production, export of products and financial results of agricultural enterprises.

For the analysis, a power function was used, the general form of which is:

$$Y = aX^b$$

The power function describes a very wide range of economic processes. Depending on the sign of the parameter, the power function will describe different economic processes: accelerated growth, slower growth, and recession.

Coefficient of determination R^2 for nonlinear connections is the index of determination and has the same meaning as the coefficient of determination.

The coefficient of determination is a measure of the closeness of the connection of all explanatory variables with the dependent one, that is, in this case, the connection between the factors is very close. The obtained econometric model is adequate [17].

To obtain conclusions about the practical significance of the correlation ratio, the Chaddock scale is used. According to Chaddock's table, the density of the relationship between the performance indicator (investment) and the factors (income and capital) is high (coefficients 0.82 and 0.89, respectively).

In power models, the parameter of the equation (b) is the coefficient of elasticity, i.e $E=b$, which shows how much the result changes Y when the factor changes X on 1 %.

In order to assess the influence of these factors, it is advisable to conduct a correlation-regression analysis of the relationship between the volume of capital investments and the amount of income and the amount of equity capital. In order to analyze the most influential factors, we will determine the strength and direction of the effect of individual factors on the volume of capital investments. (table 2).

The constructed power-law regression model of the dependence of the volume of capital investments on the amount of income of agricultural enterprises has the form:

2. The results of the influence of the researched factors on the volume of investments

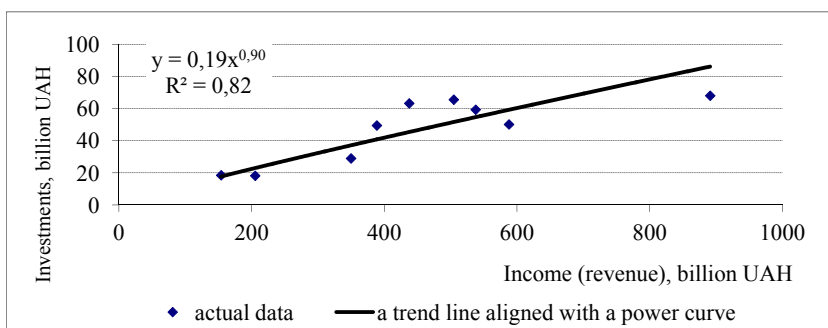| Indicator (factor)	Functional equation	Coefficient of approximation
Income (revenue)	$Y = 0{,}19\,X^{0,90}$	$R^2 = 0{,}82$
Capital	$Y = 0{,}05X^{1,02}$	$R^2 = 0{,}89$

Source: author's own development

Fig. 1. The influence of the amount of income of agricultural enterprises on the amount of capital investments, 2013–2021.

Source: author's own development

$$Y = 0{,}19\, X^{0{,}90},$$

where Y – capital investments, UAH billion;

X – the amount of income of agricultural enterprises, UAH billion.

Coefficient of determination R^2 in this model is 0,82. Therefore, the volume of capital investments depends on 82% of the amount of income received by agricultural enterprises, while the other 18% is the influence of factors that were not taken into account in the specified model. According to the obtained equation, an increase in the amount of income (revenue) of agricultural enter-

prises by 1 hryvnia means that the cost of investments of enterprises will increase by 0,9% on average (Fig. 1).

The study of the impact of the amount of capital on the volume of investments attracted by agricultural enterprises is described by the following equation:

$$Y = 0{,}05 X^{1{,}02}$$

where Y – capital investments, UAH billion;

X – equity capital of agricultural enterprises, UAH billion.

In Figure 2, we clearly observe the significant impact of the amount of equity capital used by agricultural enterprises on
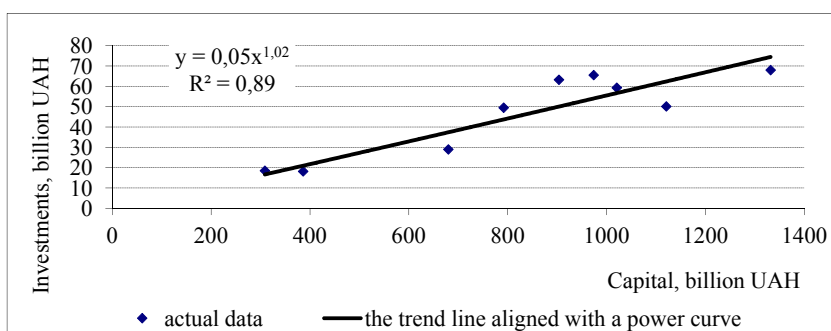

Fig. 2. The influence of the amount of capital of agricultural enterprises on the volume of capital investments, 2013–2021.

Source: author's own development

the volume of capital investments, since the coefficient of determination is 0,89. The analysis of the power function shows that with an increase in the capital of enterprises by 1%, the volume of involved investments will increase by 1,02%.

The conducted analysis shows that a number of studied factors have a significant impact on the volume of capital investment in the agricultural sector. However, it is necessary to understand that investments directly affect the efficiency of agricultural enterprises and the level of their financial security. To determine this connection, the influence of investments on the gross added value of the agricultural sector, the volume of production, the obtained financial results and the export of agro-food products were investigated.

In the table 3 shows the results of the analysis, namely the approximation co-efficient, which indicates the closeness of the relationship, and the regression equation, which shows the limit of the change of the resulting characteristic.

The model of dependence of the gross added value of the agricultural sector on the volume of capital investments is as follows:

$$Y = 13{,}59 \, X^{0{,}68},$$

where Y – gross added value of the agricultural sector, bln UAH;

X – the amount of capital investment.

Coefficient of approximation R^2 in the proposed model is 0,67, which indicates a moderate relationship between the studied factors. In addition, the conducted studies show that an increase in the volume of investments by 1% will ensure an increase in the gross added value in the agricultural sector of the economy by 0.68% (Fig. 3).

3. The influence of the volume of capital investments on the economic development and financial security of agrarian enterprises

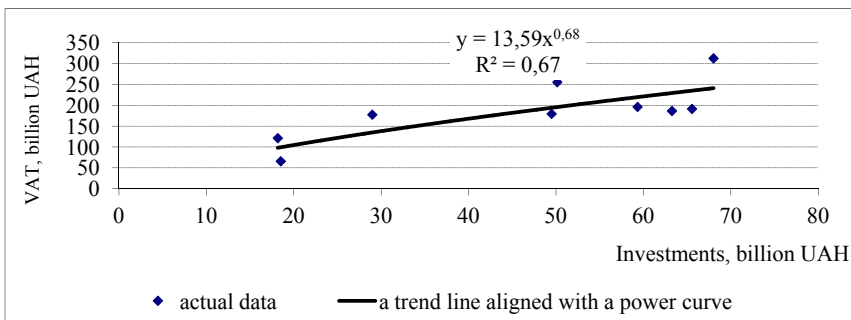| Resultant sign	Functional equation	Coefficient of approximation
Gross value added	$Y=13{,}59X^{0{,}68}$	$R^2 = 0{,}67$
Release of products	$Y=25{,}50X^{0{,}77}$	$R^2 = 0{,}84$
Financial results	$Y=0{,}61X^{1{,}25}$	$R^2 = 0{,}65$
Export of agro-food products	$Y=10{,}16X^{0{,}98}$	$R^2 = 0{,}87$

Source: author's own development

Fig. 3. The influence of the volume of capital investments on the economic growth of agricultural enterprises, 2013–2021.

Source: author's own development

The model of the dependence of the volume of production by agricultural enterprises on the volume of capital investments has the form:

$$Y = 25{,}50 \, X^{0,77},$$

where Y – volume of production of agricultural enterprises, billion UAH;

X – capital investments, UAH billion.

Coefficient of approximation R^2 in the model is 0,84. That is, we can state the fact that the volume of output of agricultural enterprises depends on the volume of capital investments by 84%, and the remaining 16% is evidence of the influence of factors that were not taken into account in this model. The analysis of the power equation shows that an increase in the volume of capital investments by 1 hryvnia causes an increase in the volume of production by 0.77 UAH (Fig. 4).

The results of the assessment of the impact of the volume of capital investments on the financial results of agricultural enterprises are quite significant. Yes, the studied model has the form:
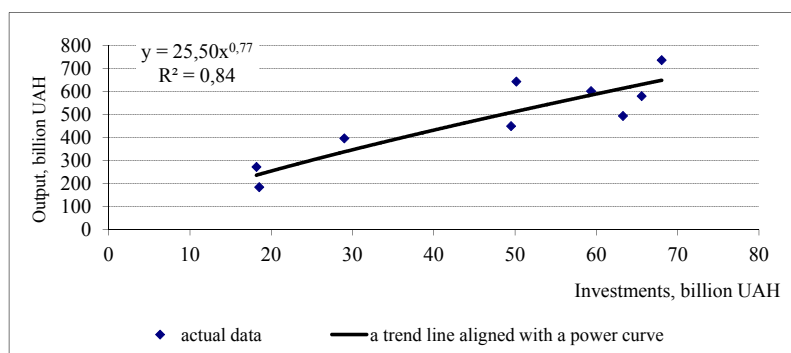

Fig. 4. The influence of the volume of capital investments on the volume of output of agricultural enterprises, 2013–2021.
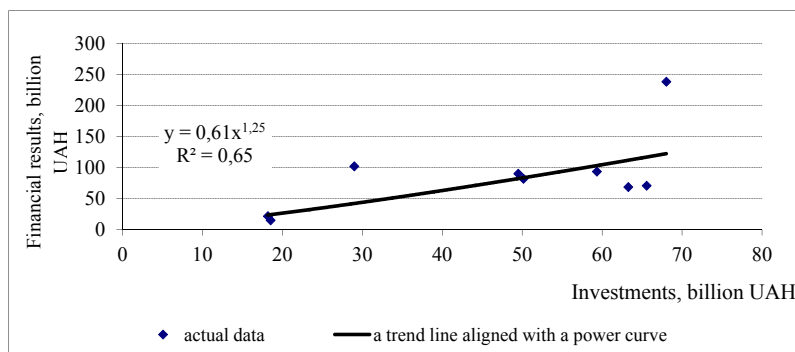
Source: author's own development

Fig. 5. The influence of the volume of capital investments on the financial results of agricultural enterprises, 2013–2021.

Source: author's own development

$$Y = 0,61 \ X^{1,25} \ ,$$

where Y – financial results of enterprises, UAH billion;

X – capital investments, UAH billion.

The analysis of the mentioned influence shows that the approximation coefficient is 0,65, which indicates a moderate closeness of the relationship, after examining the obtained equation, it can be concluded that with a 1% increase in investments, an increase in the financial results of agricultural enterprises by 1,25% can be expected. Which indisputably indicates the significant impact of capital investments on the financial security of agricultural enterprises.

The study of the influence of the amount of capital investment on the export of agro-food products is described by the following equation:

$$Y = 10,16 \ X^{0,98} \ ,$$

where Y – export of agro-food products, UAH billion;

X – capital investments, UAH billion.

The analysis of Figure 6 shows the significant influence of the volume of capital investments affecting agricultural enterprises on the volume of their exports, since the approximation coefficient is 0,87. The analysis of the power function shows that if the volume of capital investments increases by 1%, the volume of export of agricultural products will increase by 0,98%.

Conclusions.

The conducted studies show that during the period under study, the growth of the volume of investments involved in the economy of Ukraine, in relation to agriculture, is observed, so it is worth noting a slight increase in the volume of investments. In order to analyze the dependence of economic growth and the level of financial security of agricultural enterprises on the volume of capital investments, a factor analysis was conducted. It was established that there is a close relationship between the studied factors. Therefore, in order to increase the level of financial security of agricultural enterprises, it is advisable to attract additional investment resources.

During the research, the impact of activity results on investment volumes was also determined. That is, it has been proven that only the level of profitability of enterprises and the amount of own
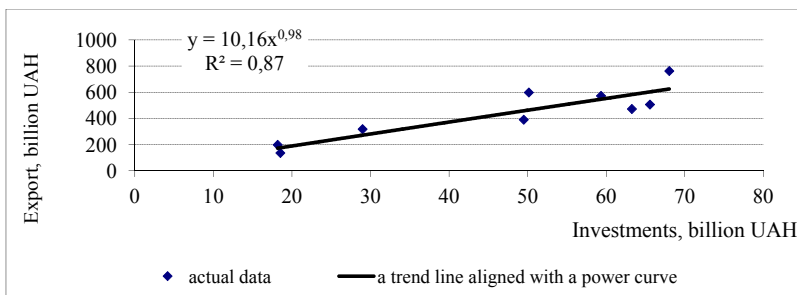

Fig. 6. The influence of the volume of capital investments on the export of agro-food products, 2013–2021.

Source: author's own development

capital significantly affect the attraction of additional investment resources. In addition, a stable economic and political situation is important for investors, which will ensure the attractiveness of domestic agricultural enterprises for foreign investors.

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Анотація.*У статті розкрита сутність капітальних інвестицій та важливість даної категорії для розвитку аграрних підприємств. Доведено, що вони безпосередньо впливають на економічний розвиток досліджуваних підприємств та рівень їх фінансової безпеки. Проведений аналіз встановив, що протягом останніх п'яти років не має чіткої тенденції збільшення обсягу залучених інвестицій, що обумовило потребу у визначенні внутрішніх факторів що впливають на залучення інвестицій. За допомогою економіко-математичних методів було визначено вплив внутрішніх факторів, а саме доходу підприємств і розміру власного капіталу на обсяги залучення інвестицій. В процесі дослідження було визначено, що обсяги залучених інвестицій та фінансові результати діяльності підприємств мають тісний взаємозв'язок, що свідчить про їх вплив на рівень фінансової безпеки аграрних підприємств.*

У статті визначено також ряд інших факторів, що свідчать про економічний розвиток підприємств, вплив обсягу інвестицій на які є досить суттєвий. Метою статті є оцінка впливу і тіснота зв'язку між обсягами інвестицій та факторами, що свідчать про рівень фінансової безпеки аграрних підприємств. У процесі проведення дослідження використовувалися загально наукові та спеціальні методи дослідження. Зокрема, метод наукового пізнання, аналізу та синтезу, графічний метод, метод узагальнення, факторний аналіз, економіко-математичні методи дослідження.

В результаті проведення дослідження автором визначено основні фактори впливу на економічний розвиток підприємств та рівень їх фінансової безпеки. З метою визначення тісноти зв'язку, між досліджуваними категоріями побудовано економетричні моделі, які ґрунтуються на рівняннях степеневої функції. Доведено існування тісного зв'язку між інвестиціями та обсягом випуску продукції і експортом та помірного впливу на фінансові результати та валовою доданою вартістю. Автором проведена оцінка впливу внутрішніх факторів на інвестиційну привабливість сільськогосподарських підприємств та обґрунтована необхідність врахування зовнішніх факторів, що є перспективним для проведення подальших досліджень.

Ключові слова: *інвестиції, фінансові результати, фінансова безпека, аграрні підприємства, тіснота звязку.*