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THE MATRIX MODEL FOR ASSESSING THE INVESTMENT ATTRACTIVENESS OF AGRICULTURAL ENTERPRISES

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Abstract. The *purpose* of the paper is concerned with the relevant problem of regional development – the development of methodological instruments for assessing the investment attractiveness of agricultural enterprises. The article discusses the concept of "investment attractiveness" and justifies the author's position of its content. It has been established that the enterprise is an open system, so its appeal includes both internal and external environment, so the analysis of investment attractiveness of the enterprise is proposed to be carried out in stages, revealing its real and potential opportunities and threats at every economic level. *Methodology*. The analysis of existing domestic and foreign approaches to assessing the investment attractiveness of agricultural enterprises was carried out and the use of an integrated approach in conducting this investigation was argued. The algorithm of forming an integral indicator for assessing the investment attractiveness of an agricultural enterprise is substantiated. *Results*. The authors have proposed a methodical approach, the peculiarity of which is the construction of a matrix model for assessing the investment attractiveness of agricultural enterprises on the basis of a generalized indicator of quantitative and qualitative criteria for evaluating their production and financial position and investment potential. Methodical research instruments include mathematical methods of statistical data processing and expert evaluation using the weighing coefficient theory. *Practical implications*. Approbation of the methodological instruments was carried out on the example of agricultural enterprises of the Dnipropetrovsk region, as a result of which the most acceptable forms of attracting investment capital were proposed. Those companies can expect investments that have high investment attractiveness, which is 10.5% of the investigated producers. Enterprises of the first group are the most preferred for all types of investors: the largest land and labour potential, high results of economic activity. Agricultural enterprises of the second group have significant resource potential and provide 48.6% of gross output; they can be attributed to "strong middle peasants." Agricultural enterprises with low investment attractiveness can also count on investment funds. We believe that the most acceptable form of their attraction is the creation basis of unprofitable farms of enterprises with the participation of domestic and foreign capital.

Key words: economic efficiency, investments, investment attractiveness, matrix model, research methods, agricultural enterprises.

JEL Classification: E22, Q14

1. Introduction

The investment process is one of the generalized characteristics of the socioeconomic situation in the country. Stabilization and development of production are of great importance for its economy, and hereon an increase in the volume of investments in economically attractive branches. One of the problems of investment policy is the determination of the most effective and priority sectors of investment. At the present stage of development of the national economy, investments should be directed to those sectors and branches in which the market infrastructure is established and functions and the main prerequisite for attracting investments is economic and legal stability in the regions, the size of local markets. For Ukraine, agricultural production should be a priority for investment. As the latter provides more than a third of the gross domestic product, the employment of almost a third of the working population, the production of about 75% of consumer goods, and contains 17 million people of the rural population (Meselj-Veseljak, 2016). Due to the prolonged economic crisis, the material and resource potential of the agricultural sector of the economy

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has significantly decreased, the number of tractors, combine harvesters, other agricultural machines and implements has almost halved, which led to a sharp decline in the production of agricultural products and a decrease in its efficiency (Rossokha, 2017). For the country's economy, the relevant problem is the choice for investing in agricultural enterprises that have the best prospects for economic development and will be able to ensure high efficiency of invested capital, that is, they are investment-attractive. In order to solve this problem, it is necessary to develop an objective model for assessing the investment attractiveness of individual enterprises – potential investment objects.

2. Interpretation of the concept of "investment attractiveness"

Agriculture is an investment-attractive industry for domestic and foreign investors but they do not risk investing significant means due to low profitability and high risks in the industry. However, in recent years, the country's agriculture industry has shown a tendency to increase the volume of investments in farms of all forms of ownership, but their volume and level of efficiency are insufficient (State Statistics Committee of Ukraine, 2018). The problem of the development of the investment process is currently assuming great importance for agriculture industry surmounting the crisis and the provision of competitive food production. The debt capacity of agricultural production requires the active attraction of borrowed funds, in particular, loans from commercial banks, joint-stock and industrial capital. The use of loans is typical for agricultural enterprises that do not have sufficient amounts of their own financial resources to implement investment projects. One of the main tasks facing the investor is the choice of enterprises that have the best development prospects and can ensure the highest efficiency of investments. The basis of this choice is the assessment of their investment attractiveness (Blank, 2001; Gitman, 1997; Vinichenko, 2010, 2000; Pravyk, 2007).

Most of the existing definitions of the concept of "investment attractiveness" of enterprises consider it as the final stage of studying the investment market (Bocharov, 2002; Myljnyk, 2002; Pravyk, 2007; Khobta, 2005). In modern literature, the definitions of this concept are interpreted insufficiently clearly, or very narrowly, focusing only on certain essential aspects. For example, it is considered an important feature of the attractiveness of the enterprise: the quantity and quality of its economic resources, which attract investors (Tatarenko, 2000). Some authors propose to use the ratio analysis to assess the investment attractiveness of the enterprise: solvency ratio, business solvency, business activity, earning power (Jastremsjka, 2006). Other authors propose to conduct a phased analysis of the investment attractiveness of the enterprise: first of all, identifying the stages of the enterprise lifecycle, then analysing the performance of the enterprise in the dynamics, the last step in determining the attractiveness of the enterprise is to conduct a detailed financial analysis of the enterprise (Ghajducjkyj, 2004; Krylov, 2001).

3. Analysis and assessment of the investment attractiveness of the enterprise

We believe that an enterprise is an open system, therefore, its attractiveness covers both the internal and external environment, thus, we suggest analysing the investment attractiveness of the enterprise in stages, identifying its real and potential opportunities and threats at each economic level. At the first stage of the analysis of the investment attractiveness of the enterprise, SWOT analysis of the external environment

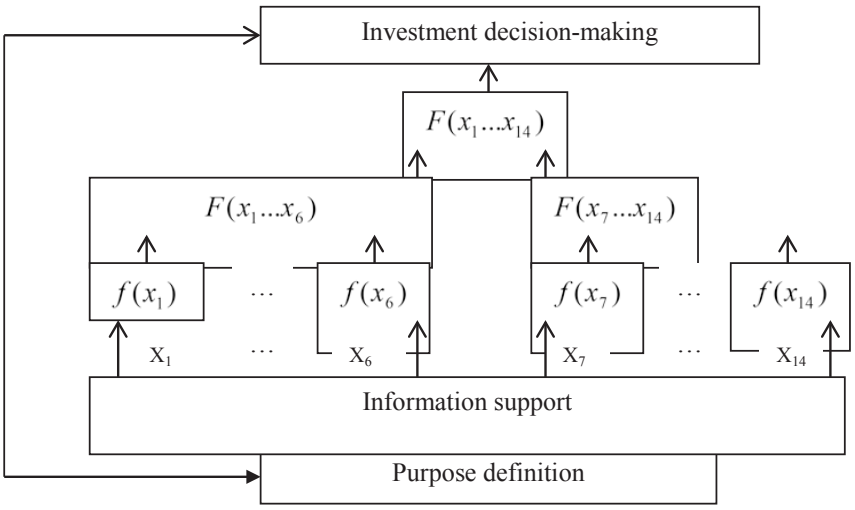

Figure 1. Algorithm of forming an integral indicator for assessing the investment attractiveness of agricultural enterprises

is carried out in order to identify the opportunities and threats of the enterprise at macro and microeconomic taxonomic levels. At the second stage, when analysing the internal environment, we suggest using a multi-level process of forming an integral indicator of a quantitative assessment of the economic and financial activities of agricultural enterprises (Figure 1).

According to the figure, the purpose of the investment challenge and the content of its solution are determined at the initial level. At the second level, information support is provided, which is necessary for solving the investment challenge. For this purpose, the open information of the financial and statistical reporting of the enterprise is used. At the third level, a set of criteria is formed, which allow assessing the investment attractiveness of the enterprise. Such a set of criteria provides for the analysis of indicators of the production and financial position of the enterprise $F_1(x_1 \ldots x_6)$ and its investment potential $F_2(x_7 \ldots x_{14})$, which will help to carry out the assessment process in a comprehensive manner. So, the components of the indicator $F_1(x_1 \ldots x_6)$ are:

$f(x_1)$ – an indicator determining the security of the enterprise with production assets;

$f(x_2)$ – an indicator which is used to determine the liquidity of the enterprise assets;

$f(x_3)$ – an indicator determining the business solvency of the enterprise;

$f(x_4)$ – an indicator that allows analysing asset turnover of the enterprise;

$f(x_5)$ – an indicator, which is used to determine the effectiveness of the economic activity of the enterprise;

$f(x_6)$ – an indicator that determines the profitability of assets used.

$F_2(x_7 \ldots x_{14})$ – an indicator characterizing the qualitative characteristics of the assessment of the investment attractiveness of the enterprise. Its components are indicators $f(x_7)$, $f(x_8)$, $f(x_9)$, $f(x_{10})$, $f(x_{11})$, $f(x_{12})$ and $f(x_{14})$.

It should be noted that $f(x_7)$ is a branch affiliation of the enterprise, and the main indicator of the investment attractiveness of branches of the agricultural enterprise can be the level of profitability of using assets;

$f(x_8)$ – regional investment attractiveness;

$f(x_9)$ – stage of the enterprise lifecycle;

$f(x_{10})$ – ecological condition of the enterprise;

$f(x_{11})$ – calculations of the enterprise for loans according to the balance of the enterprise;

$f(x_{12})$ – the enterprise settlements with personnel;

$f(x_{13})$ – information about the professional skills of the management;

$f(x_{14})$ – information about the good faith of the enterprise's head as a partner.

In order to form a generalized indicator $F_1(x_1 \ldots x_{14})$, it is necessary to prioritize and streamline decision options in a certain methodological sequence. In order to reflect this indicator, a matrix form is used, which provides convenience in interpreting the results. According to Figure 1, in order to make a decision on the investment attractiveness of the enterprise, it is necessary to form a generalized indicator $F_1(x_1 \ldots x_{14})$ that takes into account the indicators of investment attractiveness, and with its help makes the appropriate decision. This indicator should be quantitative and adequately reflect the production and financial position of the enterprise.

Accounting for indicators of production and financial position is proposed to be carried out by drawing up a final matrix $E(n \times m)$, the number of lines of which is determined by the number of quantitative indicators evaluating the production and financial position of the enterprise (for our case n = 6), and the number of matrix columns – by the number of components that ensure the correct determination of the corresponding quantitative indicators (for our case m = 3). Thus, the matrix E has the form:

$$E = \begin{pmatrix} e_{11}e_{12}e_{13} \\ e_{21}e_{22}e_{23} \\ e_{31}e_{32}e_{33} \\ e_{41}e_{42}e_{43} \\ e_{51}e_{52}e_{53} \\ e_{61}e_{62}e_{63} \end{pmatrix} \quad (1)$$

We define the methodological rules for the formation of elements of the matrix. The elements of the first line (e_{1i}) $(i = 1, 3)$ of the matrix (1) characterize the security of the enterprise with production assets (x_{11}, x_{12}, x_{13}). In particular, the power equipment x_{11} should have a tendency to increase, if this condition is met, $e_{11} = 1$, if not – $e_{11} = 0$. The degree of depreciation of fixed assets x_{12} should have a tendency to decrease. If this condition is met, $e_{12} = 1$, if not – $e_{12} = 0$. The capital-labour ratio x_{13} should have a tendency to increase. If this condition is met, $e_{13} = 1$, if not – $e_{13} = 0$. Therefore, if:

$$\begin{aligned} &x_{11} \Rightarrow \text{increase} \Rightarrow e_{11} = 1, \\ &x_{12} \Rightarrow \text{decrease} \Rightarrow e_{12} = 1, \\ &x_{13} \Rightarrow \text{increase} \Rightarrow e_{13} = 1. \end{aligned} \quad (2)$$

The elements of the second line are determined using liquidity indicators (x_{21}, x_{22}, x_{23}), where x_{21} is the absolute liquidity ratio (the recommended value for this indicator is $x_{21} > 0.2$). If this condition is met, we assume that $e_{21} = 1$, if not, we assume that $e_{21} = 0$. The element of the matrix e_{22} is calculated using the value x_{22} – the liquid solvency ratio (coverage ratio, the recommended value of the indicator is $x_{22} > 1$). If this condition is met, we assume that $e_{22} = 1$; if not, we assume that $e_{22} = 0$. The element e_{23} of the matrix (1) is calculated using the quick assessment ratio (the recommended value of this indicator is $x_{23} > 0.7$-0.8). If this condition is met, we assume that $e_{23} = 1$, if not, we assume that $e_{23} = 0$. Therefore, if:

$$\begin{aligned} &x_{21} \supset 0,2 \Rightarrow e_{21} = 1, \\ &x_{22} \supset 1 \Rightarrow e_{22} = 1, \\ &x_{23} \supseteq 0,7 - 0,8 \Rightarrow e_{23} = 1. \end{aligned} \quad (3)$$

In order to assess the investment attractiveness of agricultural enterprises, an important indicator is the

indicator of business solvency of the enterprise, which is proposed to be identified using the elements of the third line of the matrix (1). The elements of this line are determined using the solvency factors of the financial position of the company (x_{31}, x_{32}, x_{33}), where x_{31} is the coefficient of financial autonomy, which shows to what extent the enterprise uses the assets formed at the expense of its own capital. So, the recommended value of the indicator $x_{31} > 0.5$, if this condition is met, then $e_{31} = 1$, if not, then $e_{31} = 0$. X_{32} is the current assets to equity ratio. The recommended value of $x_{32} > 0.5$, if this condition is met, then $e_{32} = 1$, if not, $e_{32} = 0$. X_{33} is the debt ratio. The recommended value is $x_{33} < 1$, if this condition is met, $e_{33} = 1$, if not – $e_{33} = 0$. Therefore, if:

$$\begin{aligned} &x_{31} \supseteq 0,5 \Rightarrow e_{31} = 1, \\ &x_{32} \supseteq 0,5 \Rightarrow e_{32} = 1, \\ &x_{33} \subseteq 1 \Rightarrow e_{33} = 1. \end{aligned} \quad (4)$$

The elements of the fourth line of the matrix (1) characterize the turnover of assets of the enterprise, they are calculated using three ratio. In particular, the asset turnover ratio x_{41} should tend to increase, if this condition is met, $e_{41} = 1$, if not – $e_{41} = 0$. The ratio x_{42} is the duration of the turnover of all assets, should tend to decrease. If this condition is met, $e_{42} = 1$, if not – $e_{42} = 0$. The ratio x_{43} characterizes the turnover of current assets and should have a tendency to increase. If this condition is met, $e_{43} = 1$, if not – $e_{43} = 0$. Therefore, if:

$$\begin{aligned} &x_{41} \Rightarrow \text{increase} \Rightarrow e_{41} = 1, \\ &x_{42} \Rightarrow \text{decrease} \Rightarrow e_{42} = 1, \\ &x_{43} \Rightarrow \text{increase} \Rightarrow e_{43} = 1. \end{aligned} \quad (5)$$

The elements of the fifth line include the most important indicators for assessing the production activities of agricultural enterprises (x_{51}, x_{52}, x_{53}). In particular, capital productivity ratio x_{51} should tend to increase, if this condition is met, $e_{51} = 1$, if not – $e_{51} = 0$. Annual labour productivity x_{52} should tend to increase. If this condition is met, $e_{52} = 1$, if not – $e_{52} = 0$. The level of profitability x_{53} should also tend to increase. If this condition is met, $e_{53} = 1$, if not – $e_{53} = 0$. Therefore, if:

$$\begin{aligned} &x_{51} \Rightarrow \text{increase} \Rightarrow e_{51} = 1, \\ &x_{52} \Rightarrow \text{decrease} \Rightarrow e_{52} = 1, \\ &x_{53} \Rightarrow \text{increase} \Rightarrow e_{53} = 1. \end{aligned} \quad (6)$$

The elements of the sixth line of the matrix E (1) estimate the profitability of investment capital; they are determined using indicators (x_{61}, x_{62}, x_{63}). X_{61} is the amount of investment per 1 production unit, UAH. The value of this indicator should tend to increase. If this condition is met, $e_{61} = 1$, if not – $e_{61} = 0$. X_{62} is the level of profitability of innovations. It characterizes the level of return on investment capital, which is invested in the enterprise. The recommended value of this indicator should tend to increase. If this condition is ensured, $e_{62} = 1$, if not – $e_{62} = 0$. X_{63} is a productive investment ratio. It should tend to increase. If this condition is met, $e_{63} = 1$, otherwise $e_{63} = 0$. Therefore, if:

$$\begin{aligned} &x_{61} \Rightarrow \text{increase} \Rightarrow e_{61} = 1, \\ &x_{62} \Rightarrow \text{increase} \Rightarrow e_{62} = 1, \\ &x_{63} \Rightarrow \text{increase} \Rightarrow e_{63} = 1. \end{aligned} \quad (7)$$

Indicators (2) – (7) allow algorithmizing the process of finding the values of the elements of the matrix E (1), which is used for the overall assessment of quantitative indicators to assess the investment attractiveness of agricultural enterprises. In accordance with it, it is necessary to consider an investment attractive enterprise with a stable financial position, that is, if the matrix E looks like:

$$\begin{pmatrix} 111 \\ 111 \\ 111 \\ 111 \\ 111 \\ 110 \end{pmatrix}, or \begin{pmatrix} 111 \\ 111 \\ 111 \\ 110 \\ 110 \\ 100 \end{pmatrix}, \quad (8)$$

that is, the sum of the elements of all six lines of the matrix E must be 17 or 14. If the sum of the elements of the matrix E is less than 14, we can conclude that the enterprise is not as attractive as an investment object. The critical position is given by the matrix E of the following form:

$$E = \begin{pmatrix} 111 \\ 111 \\ 110 \\ 110 \\ 110 \\ 100 \end{pmatrix}. \quad (9)$$

The crisis position of enterprises is characterized by the majority of zero elements of the matrix E. Considering (1) we will form a general indicator characterizing all indicators of the production and financial position of the enterprise. For this purpose, we calculate the sum of all elements of the matrix E. We denote such a sum K_n as an indicator of the production and financial characteristics of the investment attractiveness of agricultural enterprises. It is necessary to take into account all possible options and the fact that a prerequisite for determining the financial position is the presence in the matrix (1) 17 or at least 14 units. If we consider all the options, we will be able to determine the financial position of agricultural enterprises as investment objects. Table 1 shows the weighting coefficients of the financial position of the enterprise

Table 1

Determination of the financial position of the agricultural enterprise

Crisis financial position	Financial uncertainty	Stable financial position
if $K_n \subseteq 2$, then $P_{11} = 0$	if $K_n \subseteq 13$, then $P_{12} = 0$	if $14 \subseteq K_n \subseteq 17$, then $P_{13} = 0$

Table 2

Weighting coefficients of qualitative indicators for assessing the investment attractiveness of agricultural enterprises

Indicator name	Indicator	Variation interval of weighting coefficients
1. Branch affiliation	$f(x_7)$	$0 \subset k_7 \subseteq 0,05$
2. Regional affiliation	$f(x_8)$	$0 \subset k_8 \subseteq 0,05$
3. Stage of the enterprise lifecycle	$f(x_9)$	$0 \subset k_9 \subseteq 0,2$
4. Ecological condition of the enterprise	$f(x_{10})$	$0 \subset k_9 \subseteq 0,2$
5. The enterprise's settlements with personnel	$f(x_{11})$	$0 \subset k_{10} \subseteq 0,15$
6. The enterprise's settlements with creditors	$f(x_{12})$	$0 \subset k_{11} \subseteq 0,2$
7. Professional skills of the management	$f(x_{13})$	$0 \subset k_{12} \subseteq 0,1$
8. The good faith of the enterprise as a partner	$f(x_{14})$	$0 \subset k_{13} \subseteq 0,05$

Table 3

The level of professional skills in the management of agricultural enterprises

Levels	Low level	Average level	High level
Variation interval of weighting coefficients	$0 \subset k_{prof} \subseteq 0,4$	$0,4 \subset k_{prof} \subseteq 0,6$	$0,6 \subset k_{prof} \subseteq 1$
Corresponding weighting coefficient	$K_{15} = 0$	$K_{25} = 0,1$	$K_{35} = 0,2$

P, which have the appropriate values, depending on the stability of the financial position.

It is proposed to carry out the determination of the investment potential of F_2 ($x_5 \ldots x_{11}$) by conducting a detailed analytical work by an expert method, using the weighting coefficient theory. We will provide each of the corresponding quality indicators with weighting coefficients – k_i (i = 5.11) (Table 2).

The list of basic professional skills of the management and the corresponding weighting coefficients ki prof (i = 1.5) are set as follows: the level of special knowledge and education $k_{1\ prof} = 0.25$; competence – $k_{2\ prof} = 0.25$; analytical thinking – $k_{3\ prof} = 0.2$; efficiency – $k_{4\ prof} = 0.2$; sociability – $k_{5\ prof} = 0.1$. If we use the proposed list of professional skills of the management of enterprises by weighting coefficients, then we can determine the appropriate level of professional skills of the management (Table 3).

To calculate the weighting coefficient of the index f (x_{10}) according to the data of Table 3, the following ratios are used:

$$K_{prof} = \sum_{i=1}^{5} {}_{iprof} \qquad (10)$$

When calculating the indicator F_2 (x_7 ... x_{14}), we take into account the weighting coefficients of only those quality indicators that can most significantly characterize the investment attractiveness of enterprises. Such qualitative indicators as the stage of the enterprise lifecycle, the calculations of the enterprise for loans and the ecological condition of the enterprise must be taken into account, therefore, they have the highest weighting coefficients. Based on the calculations, we can compile a table of the rating of the enterprise as an investment object. Its basis is a set of corresponding coefficients, which receive an assessment in points and depend on the value of this coefficient as an assessment criterion and the corresponding weight value. The sum of points for all coefficients gives the basis to refer the enterprise to one level or another. In order to solve this challenge, we will compile the corresponding tables of rating levels for n = 2 (Table 4 and Table 5) and for a larger number of ranking economic indicators (coefficients).

Table 4

Rating levels (n = 2)

Combination of ranks criteria	Total points	Rating level
3,5	0,5	High
3,6	0,45	High
3,4	0,4	Average
4,5	0,4	Average
4,6	0,35	Low
1,6	0,25	Low

Table 5

Rating levels (n > 2)

Combination of ranks criteria	Total points	Rating level
3,5,6	0,7	High
3,4,5	0,65	High
3,4,6	0,6	Average
2,3,5	0,55	Average
2,3,6	0,5	Average
1,2,3	0,35	Low
2,3,7	0,35	Low

After analysing the obtained rating levels for n = 2 and n > 2, we obtain a general table for optional n (Table 6).

Table 6
General table for optional *n*

Low level of quality indicators	Average level of quality indicators	High level of quality indicators
$0,3 \subseteq k \subseteq 0,5$	$0,5 \subset k \subseteq 0,6$	$0,6 \subset k \subseteq 1$
K_{min}	K_{adi}	K_{max}

Then, if we analyse the data in Tables 3 and 6, we can suggest a ratio that will allow to estimate the total allowable rating level of investment attractiveness of the agricultural enterprise (in our Figure 1 is presented as a generalized indicator $F(x_1 \ldots x_{14})$), and which should be carried out in the fourth model level.

$$K_{25} + k_{adi}(x_1 \ldots x_{14}) \subseteq K_{35} + k_{max} \quad (11)$$

where $K_{25} + k_{adi} = 0,1 + 0,5 = 0,6$ (12)

This sum is denoted by $F_{2min}(x_7 \ldots x_{14})$.

$$K_{35} + k_{max} = 0,2 + 1 = 1,2, \quad (13)$$

which is denoted by $F_{2max}(x_7 \ldots x_{14})$.

Taking into account expressions (11) – (13), we get:

$$F_{2min}(x_7 \ldots x_{14}) \subset F(x_7 \ldots x_{14}) \subseteq F_{2max}(x_7 \ldots x_{14}) \quad (14)$$

The formation of a generalized indicator for assessing the investment attractiveness of agricultural enterprises is carried out by summing up its components.

Taking into account (14), as well as the value of P_{12} and P_{13} from Table 1, we obtain an expression for estimating the allowable level of investment attractiveness of agricultural enterprises:

$$F_{min}(x_7 \ldots x_{14}) + P_{12} \subset F(x_1 \ldots x_{14}) \subseteq F_{max}(x_7 \ldots x_{14}) + P_{13} \quad (15)$$

Therefore, enterprises will be investment attractive if:

$$1,1 \subset F(x_1 \ldots x_{14}) \subseteq 2,2 \quad (16)$$

According to the proposed methodology, the method of standardization is used for ranking and dividing into investment attractiveness groups, the methodological basis of which is to reduce various types of indicators to comparability. Based on the calculated indicators of the economic and financial activities of agricultural enterprises of Dnipropetrovsk region $f(x_1) - f(x_{14})$ a standard enterprise is formed with the best indicators of the current year. Then, the rating of the proximity of the entire set of indicators of a particular enterprise with the standard indicators is determined. Comprehensive comparative rating assessment is used to determine the location of the farm among agricultural enterprises of the region, and their distribution into groups.

4. Approbation of results for agricultural enterprises of the Dnipropetrovsk region

In 2017, according to the results of the assessment, four groups of agricultural enterprises were distinguished by the level of investment attractiveness of Dnipropetrovsk region (Table 7).

The first group includes enterprises that are developing dynamically, have high production indicators, the most stable financial position and low risk of debt repayment. The second group includes enterprises with relatively good production indicators, a stable financial position, and a relatively low level of risk of debt repayment. The third group includes enterprises of the region with finance uncertainty with production indicators below average and a relatively high level of risk of debt repayment. And the fourth group includes enterprises with critical financial position, low production rates, and a very high risk of debt repayment.

Certainly, the enterprises of the first group are most preferable for all types of investors, but most of all for large ones. They are characterized by the greatest land and labour potential, high results of economic activities. At other enterprises, it is necessary to take measures to improve it. Enterprises that have the highest investment attractiveness can count on the flow of financial resources; this is only 10.5% of all the studied producers. Agricultural enterprises that form the second group can be classified as "strong average producers." They have significant resource potential and provide 48.6% of gross output. Agricultural enterprises with low investment attractiveness can also rely on investment funds. We believe that the most acceptable form of their attraction is the creation on the basis of unprofitable farms of enterprises with the participation of domestic and foreign capital.

5. Conclusion

Thus, the proposed method of constructing a matrix model for assessing the investment attractiveness of agricultural enterprises based on a generalized indicator makes it possible to take into account quantitative and qualitative criteria for assessing their production and financial position, allows for the integration of various economic indicators, and making an appropriate investment decision that significantly reduces the risk of an investor. And:

1. Analysis of investment attractiveness should be carried out, covering both the internal and external environment, identifying its real and potential opportunities and threats.
2. In order to assess the investment attractiveness of agricultural enterprises, the main indicator is their financial stability.
3. Indicators of investment attractiveness must be calculated taking into account weighting coefficients.
4. Agricultural enterprises can count on investment funds as a generalized coefficient of investment attractiveness, which is higher than 1.

Table 7

Production characteristics of groups on the investment attractiveness of agricultural enterprises of the Dnipropetrovsk region

Indicators	Groups of enterprises on investment attractiveness level			
	1	2	3	4
Number of enterprises	109	190	258	122
Area of agricultural land, ths. ha	544,2	564,1	767,5	336,2
Yield of cereals and legumes, c	23,9	22,2	20,3	20,2
Sunflower yield, c	7,5	7,4	6,2	6,1
Vegetable yield, c	6,1	6,0	5,1	4,2
Milk production per 1 ha of agriculture lands, c	0,7	0,6	0,3	0,3
Production of increase in live weight of animals per 1 ha of agricultural lands, c	0,5	0,2	0,2	0,1
Gross output, ths. UAH for: 1 ha of agriculture lands	2,0	1,8	1,7	1,5
Power equipment of the enterprise, hp	129,8	105,4	88,3	94,0
Degree of depreciation of fixed assets, %	33,6	49,8	54,3	87,6
Capital-labour ratio, ths. UAH	345,0	311,4	218,0	105,5
Absolute liquidity ratio	0,23	0,19	0,11	0,09
Liquid solvency ratio	1,09	1,07	0,94	0,54
Quick assessment ration	0,81	0,79	0,34	0,23
Financial autonomy ratio	0,67	0,61	0,24	0,36
Current assets to equity ratio	0,54	0,48	0,29	0,12
Debt ratio	0,67	1,04	1,21	1,43
Assets turnover ratio	2,18	2,02	1,31	1,12
Duration of the turnover of all assets, days	167,4	180,7	278,6	325,9
Current assets turnover	3,74	2,96	1,47	1,32
Capital productivity ratio	1,04	0,97	0,81	0,62
Annual labour productivity, ths. UAH	98,9	71,1	57,8	53,7
Level of profitability of production, %	55,7	43,8	53,4	8,1
Volume of investment into 1 UAH of manufactured products, UAH	0,87	0,81	0,4	0,27
Level of profitability of innovation, %	10,0	7,5	4,6	1,36
Investment ratio	0,89	0, 83	54,7	0,45
Generalized coefficient of investment attractiveness	**2,13**	**1,14**	**0,89**	0,67

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