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The Application The Quantitative Assessment Model The Probability Of Bankruptcy To Assess The Financial Condition Of Subjects Agro-Industrial Complex.

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ABSTRACT

In the conditions of market transformation and possible financial risks, the issue of preventing the situations of the insolvency of organizations is actualized. The paper presents a theoretical review of existing methods for analyzing potential bankruptcies of business entities, provides an overview of models for quantifying the probability of bankruptcy. The practical implementation of the presented models was carried out on the basis of the financial indicators of a large agricultural association, the results of which can be used to prevent insolvency risks of various organizations of the studied region. A project to increase crop yields has been proposed, the implementation of which will increase the financial result of the economic entities of the agro-industrial complex.

Keywords: model, bankruptcy, agricultural production, project.

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INTRODUCTION

In a market economy, economic ups and downs are an integral part of the functioning of each economic entity. When raising the economy, it is important not to allow it to "overheat", and in the event of a recession, companies need to stay on the market, that is, to prevent the bankruptcy of organizations. Based on this, there is a need to conduct measures to stabilize and regulate this or that process, in order to prevent adverse consequences for the organization. During the period of financial instability, business entities require special efforts to improve the efficiency of production activities and to improve their competitive positions in regional and global commodity markets. This can be achieved by ensuring a stable financial condition and timely modeling of the situation for the medium term. Predicting the financial viability of the subjects is an urgent task to maintain sustainable economic growth and reduce the likelihood of bankruptcy of the economic entity.

MATERIALS AND METHODS

In modern science, there are a large number of both domestic and foreign methods, with which you can assess the risk of bankruptcy of the organization.

Researchers to determine and justify the assessment of the probability of bankruptcy offer two economic approaches: qualitative and quantitative.

The quantitative approach is based on the methods of statistical information processing and is based on the analysis of financial indicators. This approach includes scoring models, multidimensional rating analysis, multiplicative discriminant analysis.

The qualitative approach is a comparative analysis of indicators of the probability of bankruptcy of the organization under study and indicators of bankrupt organizations. For this approach are characterized by an extensive system of criteria and characteristics, a limited range of indicators.

To assess the risks of bankruptcy, factor models of well-known Western economists E. Altman, R. Lisa, R. Taffler-Tishou and others, as well as the Sanitskaya model, which was developed by a group of scientists, were analyzed in the course of analyzing the state of agricultural organizations in Belarus. Table 1 describes each of the models.

Table 1: Models for quantifying the probability of bankruptcy, developed using multivariate discriminant analysis

Modelname	Characteristics of the model	Formula calculation	Interpretation of results
E. Altman	Altman was used by 66 American companies from 1946-1965 to obtain a quantitative estimate. 33 companies went bankrupt during this period, while 33 remained financially stable. Also, out of a set of 22 financial indicators, I chose five of the most fully reflecting the financial viability of the subjects. Based on the tool of multiple discriminant analysis determined the weight values in the integrated model. There sult of the work was a statistical classification model for determining the class of an enterprise (bankrupt / non-bankrupt / zone of uncertainty).	Z= 0,716 x1 + 0,846 x2 + 3,106x3 + 0,42 x4 + 0,995 x5	Z = 2,71-2,99 - the probability of bankruptcy
R. Fox	The Fox model was developed in 1972, for organizations in the UK	Z = 0,063x1 + 0,092 x2 + 0,057 x3 + 0,001 x4	possible;
R. Taffler	The model was first introduced in 1977 by the British scientist Richard Taffler. Hedeveloped a regression	0,53x1 + 0,13x2 + 0,18x3 +	Z> 3.0 – probability of

	model with four financial ratios for analyzing the finance alviability of UK companies. The study object included 46 companies that suffered a collapse and the same number of financially sustainable companies from 1969 to 1975. The developed model takes into account the current market condition sand the impact of scientific and technological progress on the structure of financial indicators.	0,16x4:	bankruptcy
G. Sanitskaya	The continuation of the work of E. Altman appeared model G.V. Savitskaya, based on discriminant analysis, which was aimed a tassess in gand predicting the likelihood of bankruptcy of organizations.	Z= 0,111X1 + 13,239X2+ 1,676X3+ 0,515X4 + 3,80X5	Low

RESULTS AND DISCUSSION

At present, in the conditions of the financial and economic crisis, the economic activity of many organizations is undergoing a significant recession, the consequence of which could be the bankruptcy of the organization. In 2017, according to the average statistics, the frequency of bankruptcies increased to 1000-1050 cases per month, which still exceeds the level of the pre-crisis 2013 by 20%. In this regard, the development of effective indicators that will allow assessing the state of an organization under certain conditions is relevant today. One of the most reliable indicators is a financial analysis of a potential bankruptcy of an organization.

The main purpose of the financial analysis of the solvency of the organization and the possibility of its bankruptcy is the full and timely identification of potential hazards and the development of methods to combat it until the situation has reached a peak of criticality.

We will diagnose bankruptcy, based on a multiplicative discriminant analysis, using the above models (table 2).

Table 2: Assessment of the Potential Bankruptcy Organization

Indicator	2015	2016	2017	The recommended value of the indicator	Deviation (+, -) 2017 from	
					2015	2016
Coefficient E. Altman	3,322	2,988	3,856	>1,230	-0,318	0,016
Tuffler coefficient	0,064	0,068	0,078	> 0,300	0,049	0,002
Coefficient R. Fox	0,080	0,080	0,082	>0,037	0,002	0,002
Savitskaya coefficient	8,532	7,956	8,958	>8,00	0,426	1,002

The object of the research is the agricultural organization of the company AAA of the Krasnodar Region, whose main activity is the production of crop and livestock products and its sale.

On the basis of the obtained results, it can be concluded that for the reporting 2017 period, JSC “AAA” was characterized by a steady state with a positive dynamics of growth of the main indicators studied. According to the results of calculations using the Altman model, the probability level of bankruptcy is 3.856, which indicates a low probability of bankruptcy. The calculated values for the Fox model also confirmed the stability of the company's financial condition, having reached a figure of 0.078. The result on the model of Taffler showed a steady growth of financial indicators for the long term. In the five-factor model, the state of the economic entity can be characterized as satisfactory.

In general, the conducted research allowed to obtain the following conclusions.

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Table 3: SWOT-analysis in AO firm "AAA"

Strengths	Opportunities	Weak sides	Threats
High quality of products as a result of use in the production of complete feed	Entering new markets or market segments: Krasnodar territory	High cost of feed	The emergence of new competitors
Long-term contracts with suppliers	Enterprise in come growth	Out dated production equipment	Adversed emographic changes
Experienced and qualified personnel of the enterprise	Increasing state support (subsidies, compensation)	High production cost	Increase in tax burden (cancellation of benefits for agricultural producers)
Timely payment	The emergence of new technologies (artificial insemination, construction of a modern slaughterhouse)		A sharp increase in costs due to increased resource costs
High material interest of employees in labor results	Wage growth		The emergence of new legal restrictions (a ban on the implementation of individual consumers, the tightening of requirements for standardization and certification of products)
Availability of innovative capabilities and opportunities for their implementation	The possibility of obtaining savings from increased production volumes		Toughening requirements of suppliers (prepayment, transportation)

The organization should always strive to improve the solvency and financial stability of the organization and look for ways to reduce the cost of production. The latter can be achieved by increasing yields. In connection, we propose the cultivation of a new type of product, in particular - Bulgarian pepper. This is a fairly profitable direction of the production activities of the agricultural organization. Prerequisites for the implementation of the project are the following conditions: first, steady demand for vegetables, regardless of the time of year; secondly, the presence of permanent markets for products.

Bulgarian pepper can be grown in the open field and in the greenhouse. The first type is subject to strong weather conditions.

Growing products in the greenhouse conditions of this deficiency are deprived because the greenhouse creates its own microclimate for the rapid construction of culture. The result is - the production of high-quality products. The main consumers will be residents of the Krasnodar Region and the surrounding areas. Preliminary calculations showed that for the implementation of the proposed project it is necessary to attract additional sources of funding in the amount of 2.5 million rubles. According to the developed business plan, the investment will pay off within a year. It is planned that this production will create 5 new jobs.

Table 4: Investment costs for the acquisition of a technological line for year-round production of Bulgarian pepper

Indicators	Thousand rub.
Equipment complex	1500
Commissioning works	350
Communications	300
Fare	200
Other expenses	150
Total	2500

Considering the structure of investments, we see that a significant share in them is the purchase of necessary equipment, its share is 60%, and a larger share is commissioning 14%. The share of communication expenses is 12%. The smallest share of transport costs are 8% and other expenses 6%.

The calculation of the calculation of direct costs is made on the number of manufactured products, taking into account losses on the marriage.

Considering the structure of current expenditures, we see that for the first year of production, the total costs of sales will amount to 2,600.0 thousand rubles, then they will increase due to price indexation taking into account the projected inflation of 8.4% per year. The largest share is wages, which accounts for 34.62% of total costs. In second place is raw materials, which is 25%, and in third place are transportation costs and marketing costs, 7.69%. The lowest share is the cost of sewage and packaging, which account for only 3.85%.

Table 5: Current costs for the planned volume of production and sales of Bulgarian pepper, in thousand rubles

Expenditures	2019	2020	2021	2022	2023
Raw material	650,00	704,60	763,79	827,94	897,49
Electricity	150,00	162,60	176,26	191,06	207,11
Fare	200,00	216,80	235,01	254,75	276,15
Water costs	150,00	162,60	176,26	191,06	207,11
Wage	900,00	975,60	1057,55	1146,38	1242,68
Tara	100,00	108,40	117,51	127,38	138,08
Sewage	100,00	108,40	117,51	127,38	138,08
Marketingcosts	200,00	216,80	235,01	254,75	276,15
Othercosts	150,00	162,60	176,26	191,06	207,11
Total	2600,00	2818,40	3055,15	3311,78	3589,97

Price indexation will be based on an inflation forecast of 8.4%.

Price for 1 c. Cucumber is established by the cost method, where the minimum price is dictated by the total cost, and the maximization by the potential opportunity of buyers.

Stable sales channel - the key to the success of any enterprise.

It is supposed to take a loan for a period of 5 years, the payment and accrual of interest on the loan start from the first year of product sales. Since the organization, LLC "Voskhod" has its own capital, but it is directed for other purposes, for the implementation of our project it is necessary to take a loan in the amount of 2.5 million rubles.

The calculation of the effectiveness of the investment project for the year-round production of Bulgarian pepper is presented in Table 6.

Table 6: Calculation of the effectiveness of the investment project for the year-round production of Bulgarian pepper

Indicators	2019(0)	2019(1)	2020(2)	2021(3)	2022(4)	2023(5)
Investments, thousand rubles	-2500,0	-	-	-	-	-
Revenue, thousand rubles	-	15390,0	16682,8	18084,1	19603,2	21249,8
Total costs, thousand rubles	-	2600,0	2818,4	3055,1	3311,8	3590,0
Loan fee, thousand rubles	-	850,0	780,0	710,0	640,0	570,0
Tax of 20%, thousand rubles.	-	2388,0	2616,9	2863,8	3130,3	3418,0
Cashinflow, thousand rubles	-	15390,0	16682,8	18084,1	19603,2	21249,8
Cashoutflow, thousand rubles	-	5838,0	6215,3	6628,9	7082,1	7395,6
Netcash flow	-2500,0	9552,0	10467,5	11455,2	12521,1	13854,2

Net cash flow with cumulative total, rub. thousand	-2500,0	7052,0	17519,5	28974,7	41495,8	55350,0
Discount factor (r = 9%)	1,00	0,92	0,84	0,77	0,71	0,65
Net discounted flow, thousand rubles	-2500,0	8787,8	8792,7	8820,5	8890,0	9005,3
Net discounted flow with cumulative total, rub. thousand	-2500,0	6287,8	15080,5	23901,0	32791,0	41796,3
Internal rate of return,%	446,46					
Discounted payback period, months	3,41					
Profitability index,%	17,72					

Thus, on the basis of the presented investment project, the following conclusion should be drawn. This production will pay off faster without risk, this is evidenced by the table presented above. It states that the discounted payback period will be about 4 months. With regard to the calculation of the effectiveness of the investment project with regard to risk, there is an increase in payback period by 10.9%.

CONCLUSION

Considering the results of calculating the effectiveness of an investment project with regard to risk, we see that it is financially sustainable, since the internal rate of return is 445.21%, and the profitability index is 13.34%. As for the payback period, it is slightly different and will be 3.78 months.

Thus, on the basis of the presented investment project, it is possible to increase the financial stability of the organization. This production will pay off faster without risk, this is evidenced by the table presented above. It states that the discounted payback period will be about 4 months. With regard to the calculation of the effectiveness of the investment project with regard to risk, there is an increase in payback period by 10.9%. And the profitability index for the year-round production of Bulgarian pepper, taking into account the risk, will decrease by 4.38% and amount to 13.34%.

To eliminate them, you must: be one of the leaders in the market, follow the innovations in the legislation and enter into long-term contracts with suppliers.

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