ANALYSIS OF THE RISK OF BANKRUPTCY LLC "GROUP OF COMPANIES" RUSAGRO" BASED ON SOFTW ARE PACKAGE

DOI:10.24411/2588-0209-2018-10037

***A.A. Akimov*,**
E. M. Safin
Yu. S. Ermilova

Annotation. The paper presents the results of the development of a software package for assessing the risk of bankruptcy of an enterprise based on various methods of domestic and foreign authors. The article describes the capabilities of the developed program and its brief description. The testing of the developed program is shown on the example of the “Rusagro Group of Companies” company. All necessary coefficients for each method were calculated and the effect of these factors on bankruptcy analysis. Conclusions are made for each method used.

Keywords: bankruptcy, risk degree, analysis, model.

The process taken place in Russia economy over the latest decades prove conspicuously both economic and social stability of the society depends on financial stability of enterprises. The analysis of the most significant financial indices enables to evaluate of enterprise financial activities a stable scientifically proven economic processes control, providing for attainment of strategic goals set as well as to bring out the ability of an enterprise to move towards the stable functioning and growth under variable conditions of both external and internal ambiance. With the financial statement for the fiscal year or over several previously years on hand the shareholders of a company may estimate efficiency of application of the means invested by them profitability of organization assets financial solvency and prospects of development. In future as of now a good numbers of procedures has been developed to estimate prognostication of an enterprise bankruptcy, nevertheless each of procedures suffers from it’s own advantages and disadvantages.

A great contribution into the analysis of the enterprise activities as well as that into development of various procedures for rating for enterprise bankruptcy risk has been made by both

foreign and russian scientists such as E. Altman, W. Beaver, I. A. Blank, R. S. Saifullin, G. G. Kadykov, G. V. Savitskaya, and others.

However efficiency of every developed model for evaluating bankruptcy does not only depend on how specific is the national system of market relationship, on peculiarities of it's growth on the rules and standards as developed regulating inconsistency of economic subjects but also an a set of instruments, on possibility of revealing signs of bankruptcy at an early stage, on choice of most beneficial instruments out of their set.

In spite of availability of various models and procedures making it possible to predict the moment of the firms bankruptcy appearing round the corner with this or another degree of probability there is quite a good number of challenges of how to predict bankruptcy. Many procedures of bankruptcy prediction evoke various types of crisis, owing to which those estimates as obtained with the help can very drastically. Yet however any type of crisis may be conducive to winding the organization up.

Apart from classical models, the probability of an enterprise bankruptcy risk emergence can be evaluated using a fuzzy logic. Using a fuzzy logic to process nondetermine data linguistic variables can be operated which in the most natural way for human comprehension describe the elements of economic system.

Lately fuzzy simulation is one of most active in promising trends of applying research in the field of management and decision making.

In addition to the classical models, the probability of the risk of bankruptcy of the enterprise can be estimated using fuzzy logic. Using fuzzy logic to process non-deterministic data, it is possible to operate on linguistic variables that most naturally describe human elements of economic systems for human understanding. Recently, fuzzy modeling is one of the most active and promising areas of applied research in management research and decision making.

Today, the problem of the choice and use of methods for diagnosing bankruptcy of an enterprise is among the most popular paramount questions of economic theory and modern economic practice, however, due to the fact that in Russia this issue is not enough studied, it is necessary to use both Western models and Russian developments, that is, to apply the full range of methods for comprehensive and thorough analysis.

The relevance of this topic is that for an enterprise to function successfully, and for its work to bring profit, regular forecasting of its financial condition is necessary, since it is much easier to prevent a crisis than to rather overcome it.

In accordance with the foregoing, the purpose of writing an article is to create a specialized software package designed to assess the risk of bankruptcy of an enterprise.

To achieve this goal, the following tasks were set:

- to consider the theory of classical models and the theory of fuzzy sets, and their application for analyzing the degree of risk of bankruptcy;

- identify the relationship between the performance of the company and the magnitude of the risk of bankruptcy;

- to analyze the financial condition of the enterprise under study using various financial ratios;

- assess the likelihood of risk of bankruptcy in quantitative terms.

In order to identify the most important parameters of the activities of enterprises, a software package for assessing the financial states has been developed, which includes:

1. analysis of the risk of bankruptcy on the basis of a comprehensive financial analysis proposed by A. O. Nedosekin;

2. analysis of the risk of bankruptcy of an enterprise on the basis of the domestic method proposed by Saifullin and Kadykov;

3. analysis of the risk of bankruptcy of an enterprise based on the models of foreign authors: Altman, Taffler and Tishou, Liss.

The software package is implemented in the Delphi programming language, it is quite simple, convenient and easy to use even for novice users. The program provides for calculating the risk of bankruptcy according to the financial statements of the company under investigation.

A convenient user interface allows you to easily add, delete and edit data. The program can work, as well as using the Delphi environment as well as an independent application [7].

The main task of the program is to promptly provide the most accurate indicators of the risk of bankruptcy of the enterprise. Via

This software product can successfully perform the following actions:

- Evaluate future spending and revenue projections;

- monitor the financial condition of the company at any time;

- perform financial and economic analysis of the enterprise;

- based on the results of the program to carry out the preparation of materials for meetings;

- determine the best ways for the effective development of the company, profit growth;

- to analyze the activities of the enterprise.

The convenient and simple interface of the software does not require additional time from the user to study and master the program.

Initially, when you start the software packages, all fields for entering values of financial statements are empty. For the users not have any questions about the classification of this or

another method to determine the bankruptcy risk degree, the software package includes all the necessary theory for each method that the user can use during the analysis. The interface of one of the methods when launching the program is shown in Figure 1.

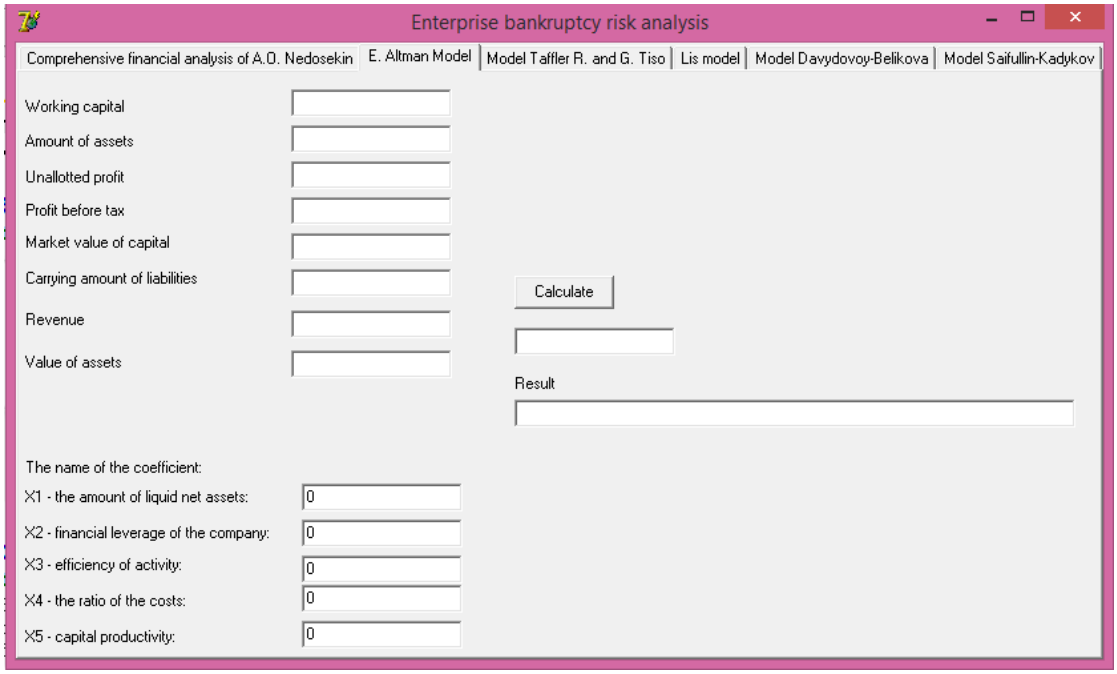


Fig. 1. Interface of the implemented method of E.Altman at program launch

The classical methods of bankruptcy risk assessment implemented in the program do not carry any serious complexity. The main task of such models is the calculation of all necessary coefficients and the calculation of the total value of the "Z-account" or rating number R.

It should be noted that the method proposed by A. O. Nedosekin is rather difficult for unprepared users to understand its essence and requires complicated calculations. In this regard, the natural condition for the convenience of users is the automation of this method. Also, an additional advantage of this method is the ease of use of the graphic interface, using which the user can select the membership function of interest.

The interface of the method implemented by A. O. Nedosekin in the program is presented in Figure 2.

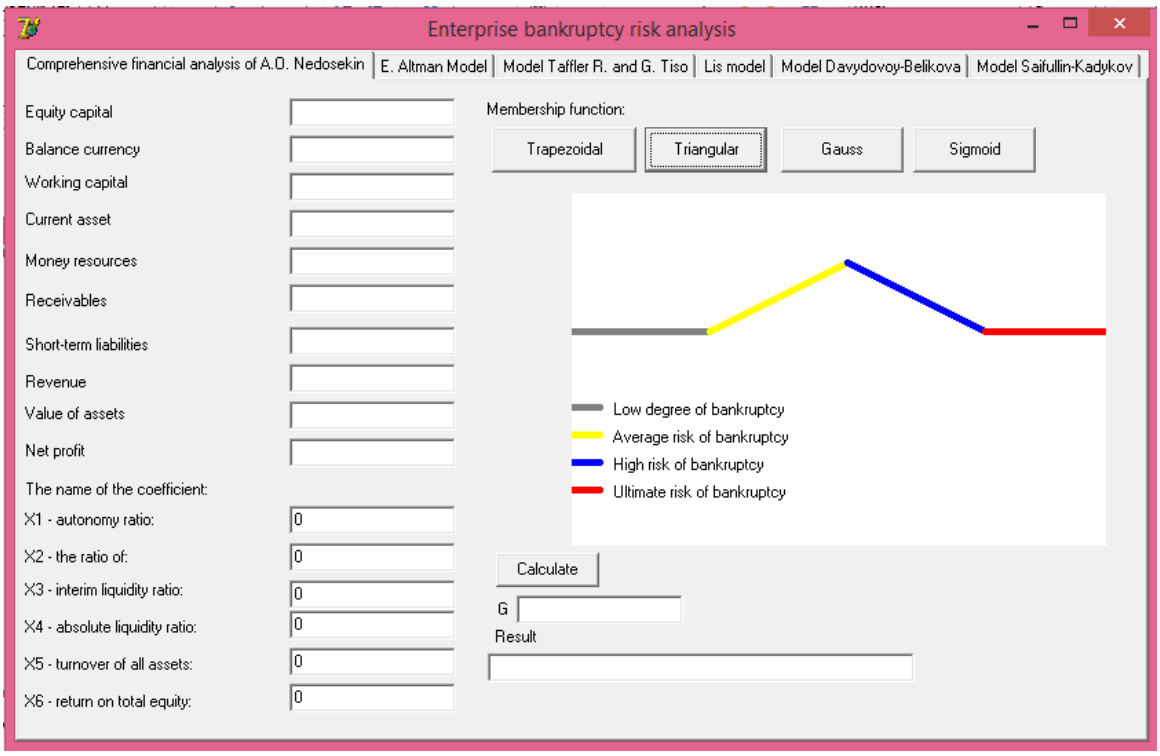


Fig. 1. Interface of the implemented method of A.O. Nedosekin at program launch

Analysis of bankruptcy by the method A.O. Nedosekin provides software package of the following functions:

- formation of linguistic variables that describe the degree of risk of bankruptcy;
- construction of the membership functions of terms of linguistic variables;
- input of clear values of input variables;
- classification of the partition of indicators into subsets based on preliminary expert analysis;
- calculation by the algorithm of fuzzy logical deductive output of the values of output variables.

Thus, a bankruptcy assessment method based on the use of the theory of fuzzy logic does not require users to have knowledge of fuzzy methods and allows for analysis, hiding complex calculations from users.

Testing of the program was carried out on the basis of the accounting statements of Rusagro Group of Companies LLC (ROS AGRO PLC) for 2017. Data was taken from the site of this company: https://www.rusagrogroup.ru/en/]

We show the calculations of the risk of company failure of the Rusagro Group of Companies LLC by the method of E. Altman using the developed software package. To do this,

it is necessary to enter into the program all the necessary initial data of the firm accounting statements (figure 3).

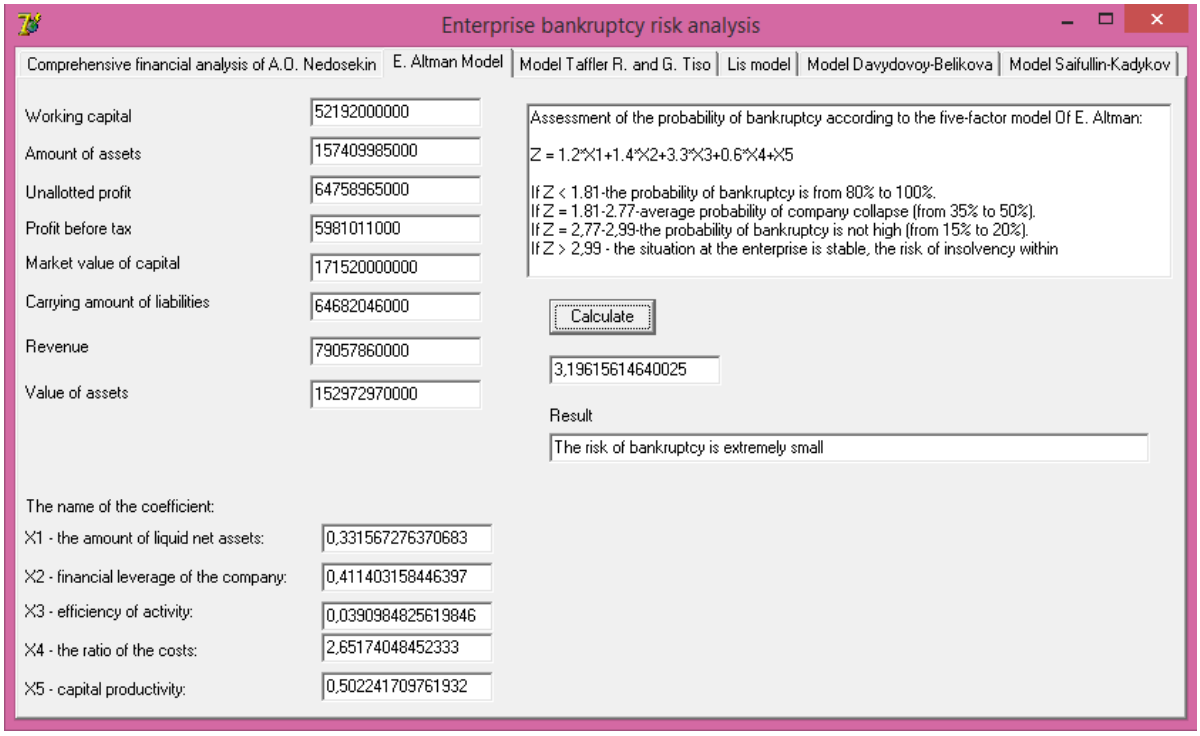


Fig. 3. Analysis of bankruptcy by Altman method

Having calculated the risk of bankruptcy of Rusagro Group of Companies LLC based on the developed program, they obtained very positive results. The calculations obtained by the program indicate an insignificant probability of a company failing.

Next, we will conduct a bank bankruptcy risk assessment using the R. Taffler and G. Tishou model (Figure 4).

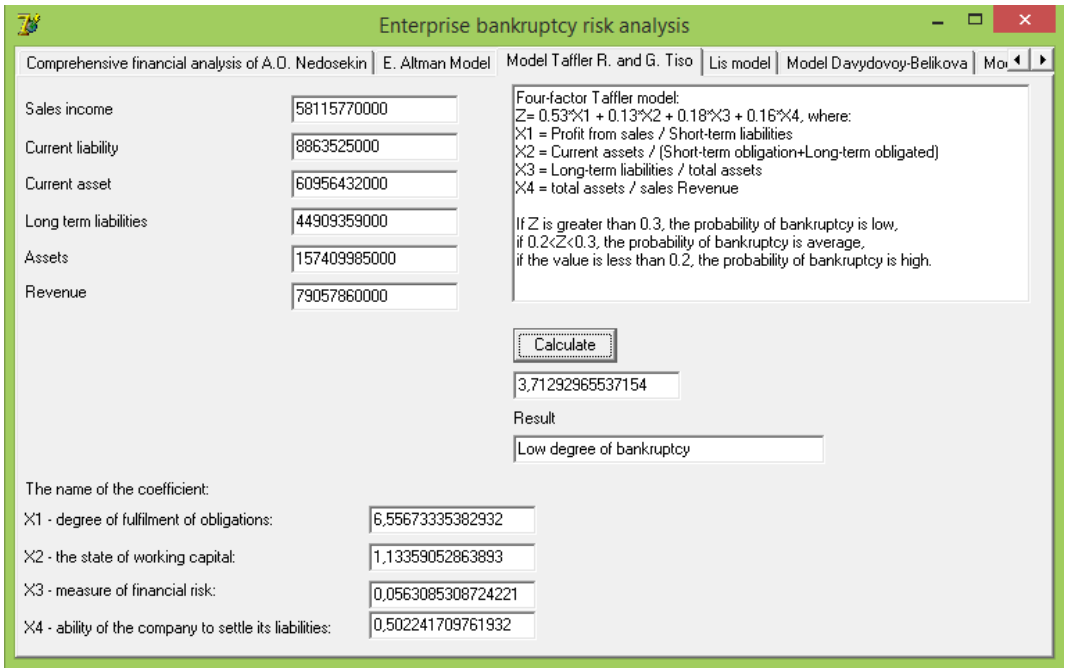


Fig. 4. Analysis of bankruptcy by the method of Taffler and Tishou

The developed program showed the result Z = 3.713, which confirms that Rusagro Group of Companies LLC has a low probability of bankruptcy.

The financial condition of the Rusagro Group of Companies LLC can be considered stable.

Let us proceed to assessing the risk of bankruptcy of Rusagro Group of Companies LLC using the Lis method (Figure 5).

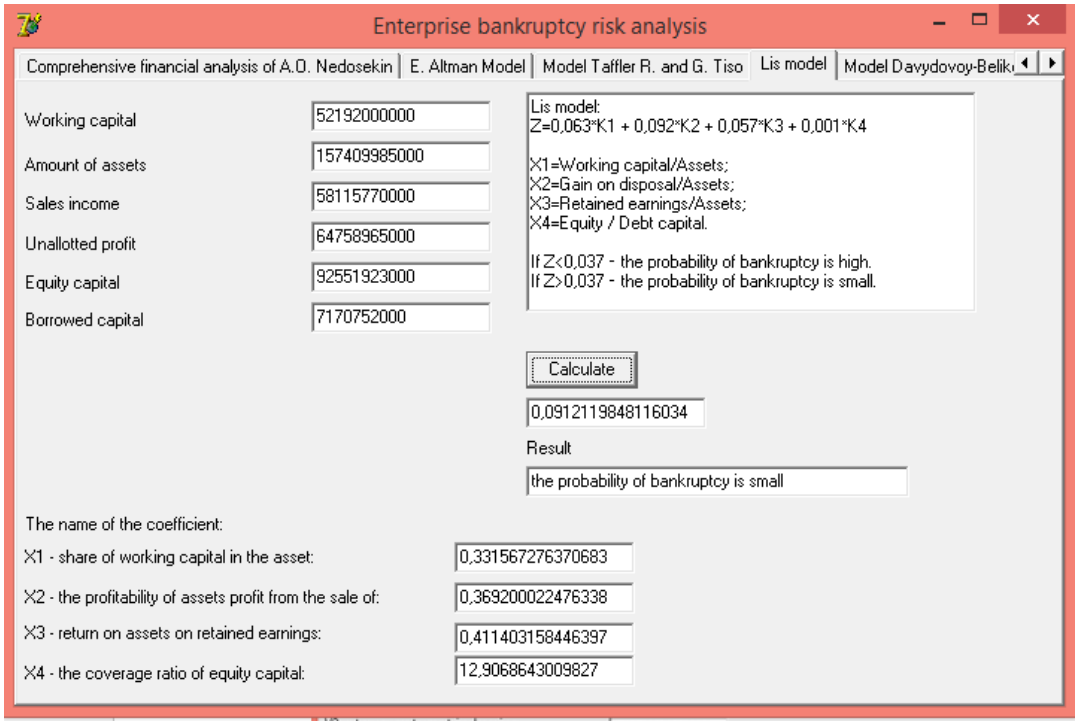


Fig. 5. Analysis of bankruptcy method Lis

When calculating the risk of bankruptcy by this method, it should be noted that X4 is high. This coefficient shows how many times equity exceeds loan capital. The obtained value of this indicator once again makes it possible to make sure of the solvency and credit worthiness of the enterprise. The final result of the "Z-account" indicates that the financial stability of the Rusagro Group of Companies LLC is not in doubt.

Finally, we turn to assessing the risk of enterprise failure by the R.S. Saifullin and GG Kadykova (Figure 6).

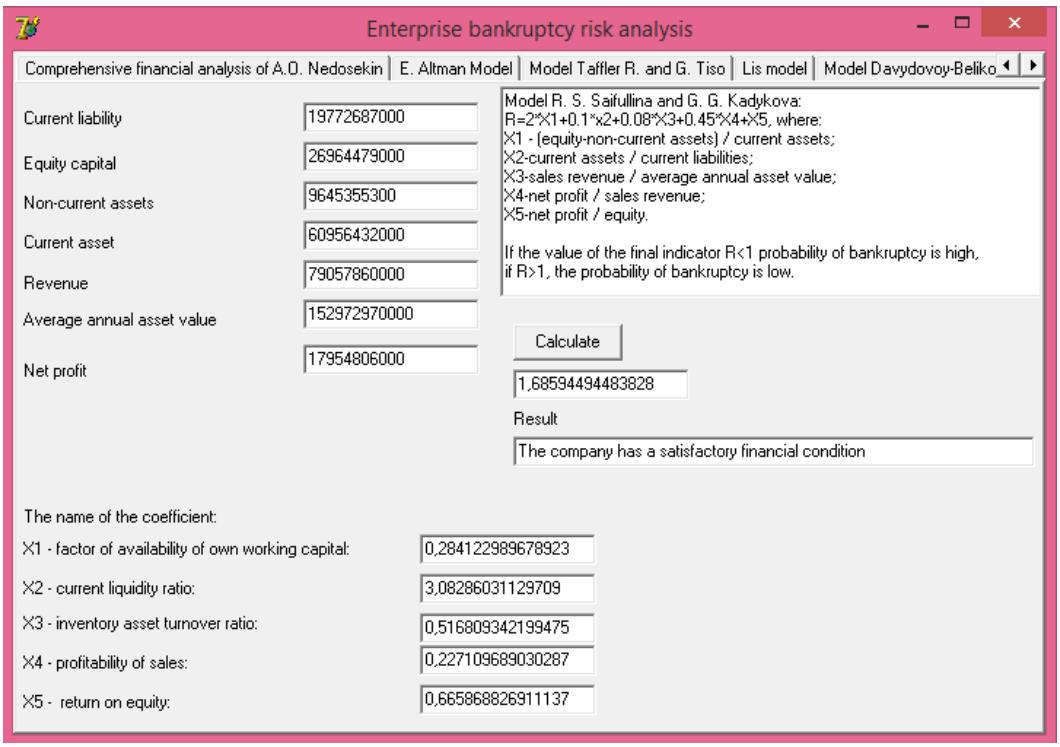


Fig. 6. Analysis of bankruptcy by the method of R. S. Saifullin and G. G. Kadykova

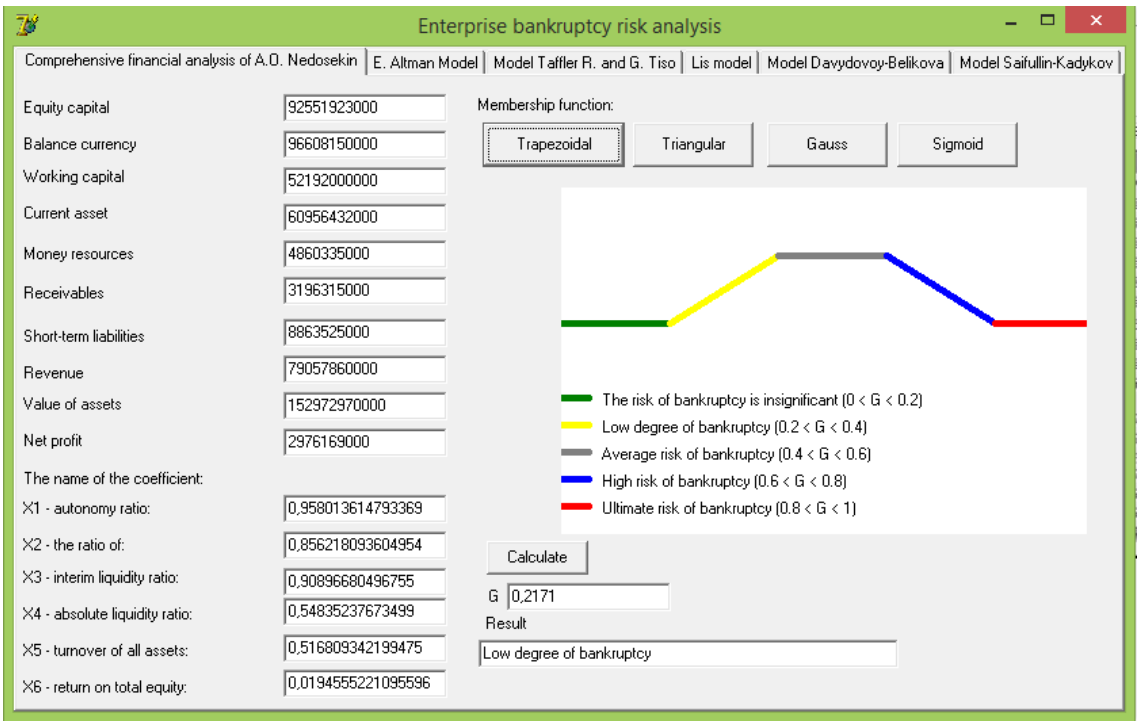
The implemented method of Saifullin Kadykov showed the value of R> 1, namely R = 1.6859, which once again confirms that the financial condition of the Rusagro Group of Companies LLC can be considered satisfactory.

After analyzing the risk of bankruptcy of Rusagro Group of Companies LLC using four classical methods, it is worth noting that each model showed a result of an insignificant degree of bankruptcy risk, which means that the enterprise is successfully operating and liable for its obligations.

It should also be noted differences in the models themselves, which basically comes down to the number of factors used, that is, the coefficients (baseline values).

Based on the results of the analysis of the bankruptcy of ROS AGRO PLC by classical methods, it can be concluded that bankruptcy is not threatened by this enterprise in the near future, and its financial condition is considered stable and stable.

Next, using the apparatus of the theory of fuzzy logic, we analyze the risk of bankruptcy of Rusagro Group of Companies LLC by the method of complex financial analysis. The result of calculating the risk of bankruptcy by the method of A. O. Nedosekin is shown in Figure 7.



The method proposed by A. O. Nedosekin is very different from the classical models, since it is based on the theory of fuzzy logic. The theory of fuzzy logic is the most mathematically adequate for solving the problem of enterprise risk assessment. The applying of fuzzy logic to calculate the risk of bankruptcy makes it possible to use non-standardized indicators for evaluation and to take into account the specifics of the financial and economic activities of the analyzed company. The proposed methodology for the integrated assessment of the financial condition of an enterprise, in fact, reproduces human thinking processes based on subjective judgments [9].

Based on the obtained results of the analysis performed using the method based on the theory of fuzzy logic, it can also be concluded that the financial condition of Rusagro Group of Companies LLC should be assessed as satisfactory.

Analysis of all data obtained indicates the presence of uniform conclusions. Evaluations of the threat of bankruptcy of Rusagro Group of Companies LLC, carried out according to foreign methods of E. Altman, R. Taffler and G. Tishou, Lisa, domestic methods: R. S. Saifullin and G. G. Kadykov, and also according to the model proposed by A. O. Nedosekin, based on the use of the theory of fuzzy logic, allow us to state that the enterprise has a stable financial condition and a high level of solvency.

The use of the finished product has greatly simplified the computational process, even an knowledgeable user can work in this program due to a fairly simple and simple interface.

Summing up, it can be noted that each enterprise can have its own level of acceptable risk, in accordance with which the planning and analysis of the enterprise's activity is carried out.

Bankruptcy is a widespread problem faced by individual entrepreneurs and legal entities. A large number of organizations each year are subject to bankruptcy in our country. In this regard, the timely identification of adverse trends is of paramount importance. Diagnosis of the probability of bankruptcy in the enterprise is a system of targeted financial analysis aimed at identifying possible trends and negative consequences of the crisis development of enterprises.

Based on the analysis, it can be judged that Rusagro Group of Companies LLC has an insignificant risk of bankruptcy, which indicates the financial stability and reliability of the bank.

1. Abryutina M. S. Analiz finansovo-ehkonomicheskoy deyatelnosti firmy. ucheb. –prakt. posobie // M. S. Abryutina, A. V. Grachev. M. Delo i servis. 2010. 256 s.

2. Baykina S. G. Uchet i analiz bankrotstva ucheb posobie// S. G. Baykina. M. Dashkov i Ko. 2012. 220 s.

3. Baranova M. A. Analiz riska bankrotstva predpriyatiya na osnove klassicheskih modeley // M. A. Baranova Integraciya mirovyh nauchnyh processov kak osnova obshchestvennogo progressa. 2015. S. 53-57.

4. Baranova M. A. Analiz deyatelnosti predpriyatiya v sisteme antikrizisnogo upravleniya// M. A. Baranova. Teoriya i praktika menedzhmenta. 2016. S. 239-240.

5. Baranova M. A. Analiz riska bankrotstva predpriyatiya OOO Himsnab s ispolzovaniem razlichnyh metodik// M. A. Baranova, E. A. Bochkareva, G. R. Galiaskarova. Ekonomika i predprinimatelstvo. 2015. 8. S. 494-499.

6. Vahrushina M. A. Kompleksnyy ehkonomicheskiy analiz hozyaystvennoy deyatelnosti. ucheb posobie// M. A. Vahrushina, M. Vuzovskiy. Uchebnik. 2008. 462 s.

7. Galiseev G. V. Programmirovanie v srede Delphi 7 .Samouchitel uchebnik. // G. V. Galiseev M. Izdatelskiy dom Vilyams. 2006. 288 s.

8. ZHurov V. A. Process razrabotki modeley dlya prognozirovaniya bankrotstva predpriyatiy // V. A. ZHurov. Finansovyy menedzhment. 2007. 1. S. 23-27.

9. Nedosekin A. O. Ocenka riska biznesa na osnove nechetkih dannyh // A. O. Nedosekin. Audit i finansovyy analiz. 2008. 4. S. 68 – 72.

10. Nedosekin A. O. Identifikaciya i analiz riskov biznesa s ispolzovaniem metodov teorii nechetkih mnozhestv // A. O. Nedosekin K. E., Pavlov L. A., Volkova Banki i Riski. 2006. 2. S. 44 – 50.