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Automation of the enterprise financial condition evaluation

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Abstract. This article is devoted to the topic of automating the process of analyzing the organization financial condition. The paper considers the nature and necessity of conducting a financial analysis of the enterprise as a whole for all organizations, and the tax service in particular, identifies factors affecting the financial and economic situation of the enterprise, and describes the methodology for conducting financial analysis of the enterprise. The study demonstrated the benefits of a comprehensive assessment of the enterprise financial condition. The article discusses the rating assessment features of the enterprise financial condition and describes in detail a system of indicators that gives the most accurate data. The paper reveals the importance for financial analysis of such parameters as profitability, liquidity, autonomy ratio, financial stability ratio and equity ratio. The article analyzes and selects software that meets the requirements of the customer, allowing you to automate business processes. The algorithm of the program for assessing the financial condition of organizations is described, and the input information necessary for the correct operation of the model is described, and the result of its work is described in detail. This article presents the results of testing the program on the data of an existing organization.

1. Introduction

In accordance with the Decree of the Russian Federation Government of 29.05.2004 N 257 "On ensuring the interests of the Russian Federation as a creditor in bankruptcy cases and bankruptcy proceedings", the federal tax authority is the body authorized to represent the Russian Federation interests as a creditor in bankruptcy cases and bankruptcy proceedings service of Russia [1]. The Federal Tax Service of Russia exercises its powers both directly and through territorial tax authorities, performing the functions of an authorized body on the basis of attorney powers issued in the established manner.

To determine whether a company is bankrupt, it is necessary to conduct a comprehensive assessment of the organization financial condition, since managers and owners of legal entities often use the enterprise liquidation through a simplified bankruptcy procedure to avoid paying off accumulated debts.

The following Russian scientists addressed the problem of assessing the organization bankruptcy risk in their works: S. G. Belyaev, M. G. Delyagin, O. V. Efimova, O. P. Zaitseva, G. P. Ivanov, V. N.



Kazakov, V V. Kovalev, V. I. Koshkin, T. Yu. Morozova, V. F. Paly, PC Sayfullin, G. K. Tal, E. A. Utkin, M. A. Fedotova, A. N. Khorin, A. D. Sheremet and others.

The purpose of this article is to automate the business process of assessing the enterprise financial condition. To achieve this goal, you must complete the following tasks:

- Analysis of business processes occurring in the bankruptcy support department.
- Analysis of software to automate the business process.
- Implementation of a model for assessing the enterprise financial condition.

2. Theoretical basis of the methodology for assessing the enterprise financial condition

The enterprise financial condition (EFC) is a complex economic category that reflects the state of capital in the process of its circulation and the ability of a business entity to self-develop at a fixed point in time. In the process of supply, production, marketing and financial activities, there is a continuous process of capital circulation, the structure of the means and its formation sources, the availability and need for financial resources, and, as a result, the enterprise financial condition, whose external manifestation is solvency, change [2]. Financial activity covers the processes of formation, movement and ensuring the safety of the enterprise property, control over its use.

The enterprise financial condition shows the degree of enterprise provision with financial resources, as well as the feasibility of investing financial resources in activities and the effectiveness of their use. The financial condition can be judged on solvency, liquidity, financial stability of the enterprise. It is on the basis of these data that the enterprise's work strategy is developed, work evaluations are made, and decisions are made on the further work of the campaign [3].

Our work presents a comprehensive assessment of the enterprise financial condition, which is the final, most important element of the its financial condition analysis, compiled using the rating. A comprehensive assessment of the enterprise financial condition involves the determination of its economic potential, which makes it possible to identify its place in the economic environment. Assessment of the property and financial and economic condition of the enterprise creates the necessary information base for making management and financial decisions regarding problematic issues and attracting or making investments. Also, a comprehensive analysis makes it possible to identify problematic aspects of the enterprise and find out the reasons that caused them, but on its basis, it is very difficult to draw detailed conclusions about the enterprise financial condition as a whole. [4]

A rating assessment of the financial condition of an enterprise is an instrument of on-farm, but to a greater extent, inter-farm comparative analysis, and assessment of its investment attractiveness. A rating is understood as a generalized quantitative characteristic of an enterprise that determines its place in the market. The rating of the enterprise can be considered a measure of assessment by referring to any class, group, depending on the quantitative and qualitative characteristics of its activities. The main users of the rating results are banks, insurance companies, the stock market, and investors.

Definition of a rating can be based on a system of absolute and relative indicators or on a combination of both. In determining the rating, the objectivity and accuracy of the choice of the system of indicators underlying the rating calculation, the methods of their calculation, the quality of the information calculation base and the algorithms for determining the rating itself as a quantitative assessment that allows ranking enterprises are of fundamental importance [5].

As indicators used to calculate the rating, the most significant in terms of enterprise assessing various aspects are selected. At the same time, the indicators selected for rating assessment should not be functionally dependent, should not duplicate each other, and should not contradict each other, i.e. they must be consistent with each other.

We have selected ten indicators that assess the enterprise financial condition from different angles, namely: return on sales by net profit, return on assets, financial autonomy, current liquidity, sales growth (without VAT), profitability of sales on profit from sales, growth in own capital, quick liquidity, current assets provision ratio, own financial stability ratio.

Return on sales of net profit is calculated by the formula:

$$R = \frac{Profit}{Gain} * 100\%, \quad (1)$$

where R – profitability;

$Profit$ – net profit of the organization;

$Gain$ – revenue.

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This indicator allows you to roughly determine how much profitability will increase with an increase in sales by 1 ruble. The value of the indicator indicates how much net profit the company received for each ruble of sold services or goods. A negative value indicates the need to find reserves to reduce costs. A high value of the indicator may indicate a high value of the product or service for the consumer, a strong competitive position and a high level of management professionalism.

Return on assets can be represented in the form of a formula:

$$ROA = \frac{Profit}{A}, \quad (2)$$

where ROA - return on assets;

$Profit$ - organization net profit;

A - organization assets.

Return on assets reflects the ratio of net profit to the value of an organization property certain type. The indicator is considered as one of the main indicators of the quality of investment investments made by the company. This indicator, which does not take into account the influence of borrowed funds, characterizes the organization effectiveness, the quality of top and middle management and is used when comparing campaigns of one industry.

The autonomy coefficient is calculated by the formula:

$$CA = \frac{CE}{A}, \quad (3)$$

where CA - coefficient of autonomy;

CE - equity;

A - assets.

The ratio shows how independent the organization is from creditors. The lower the ratio, the more the organization is dependent on borrowed sources of financing, the less stable its financial situation. In world practice, the debt ratio, the opposite in meaning of the autonomy coefficient, but also characterizing the ratio of own and borrowed capital, is more common.

Current ratio is calculated by the formula:

$$CR = \frac{CA}{CL}, \quad (4)$$

where CR – current ratio;

CA – current assets;

CL – short-term liabilities.

The coefficient reflects the campaign's ability to repay current (short-term) obligations using only current assets. The larger the indicator, the better the solvency of the enterprise. Current liquidity is a key indicator of the financial condition of any enterprises, it must be constantly monitored. The growth of the ratio makes the company more attractive for investors and lenders, which gives it a greater amount of additional leverage and monetary resources with an increase in market value, including profitability.

Sales growth can be represented as a formula:

$$Gain = \frac{G_{cy} - G_{ty}}{SG} * 100\%, \quad (5)$$

where SG - salesgrowth;

G_{cy} - revenue for the current year;

G_{ly} - previous year revenue.

Profitability of sales on profit from sales is calculated according to the formula:

$$ROS = \frac{Profit}{Gain} * 100\%, \quad (6)$$

where ROS - return on sales.

Obviously, the higher the operating margin, the better the campaign. As a rule, enterprises that show a trend towards an increase in operating profit margin also show an increase in the efficiency of managing general expenses [6].

The increase in equity is calculated by the formula:

$$Cap_{gain} = \frac{CE_{cy} - CE_{ly}}{CE_{ly}} * 100\%, \quad (7)$$

where Cap_{gain} - equity gain;

CE_{cy} - equity for the current year;

CE_{ly} - previous year equity.

Quick liquidity can be represented as a formula:

$$QR = \frac{CA - Inv}{CL}, \quad (8)$$

where QR - quick liquidity;

CA - current assets;

Inv - stocks;

CL - Short-term liabilities.

Quick liquidity ratio characterizes the organization's ability to repay its short-term liabilities through the sale of liquid assets. In this case, liquid assets in this case include both cash and short-term financial investments, and short-term receivables (according to another version - all current assets, except for the least liquid part of them - stocks). The quick ratio is widespread in Russian and world practice along with the current ratio.

The Ratio of security of current assets with own funds is calculated by the formula:

$$Equity Ratio = \frac{Total Equity}{Total Assets}, \quad (9)$$

By means of this coefficient, the ability of a campaign to finance current activities is determined only at the expense of its own working capital. The Ratio of own working capital is used in order to timely identify signs of insolvency of enterprises.

The financial stability ratio is calculated by the formula:

$$FSI = \frac{(CE + Long-term loans)}{Currency}, \quad (10)$$

The financial stability ratio shows which part of the asset is financed from sustainable sources, that is, the share of those sources of financing that the organization has been using in its activities for more than a year. [7]

Thanks to these indicators, we conducted a comprehensive assessment of the enterprise financial condition.

Each indicator was assigned a score in the amount from -1 to 1, but for each, depending on its norm. As a result, we get the overall coefficient of the enterprise state within the calculated range shown in the table 1.

Table 1. Gradation result.

Score	Condition
-------	-----------

From (inclusive)	To	
1	0.8	Great
0.8	0.6	Very good
0.6	0.4	Good
0.4	0.2	Positive
0.2	0	Normal
0	-0.2	Satisfactory
-0.2	-0.4	Unsatisfactory
-0.4	-0.6	Bad
-0.6	-0.8	Critical
-0.8	-1	Potential bankrupt

3. Development and testing of a rating assessment of the enterprise's financial condition

Using of computer technology improves the effectiveness of financial analysis. This is achieved by reducing the time of its holding, the possibility of using a large amount of information about financial and economic activities, reducing errors in calculations, using modeling and optimization methods that are practically not possible by hand and traditional methods.

Financial analysis in a computer environment has become an integral profession part of economist, accountant, financier. Currently, there are such programs with which you can not only constantly inform the campaign management about its work. But, despite this, they are not suitable for inspection because of the organization specifics, since this institution is a budget institution and has the right to install software from the approved list. For our purpose, only licensed Microsoft Office Excel is suitable from this list.

Automation of the assessment of the financial condition of enterprises using Microsoft Excel will lead to an increase in the productivity of employees, easier access to information for making management decisions, improvement of executive discipline, and, therefore, to an overall increase in the quality of management.

The input information for the program is the balance sheet - the most important form of financial statements, which can be used to judge the enterprise financial condition, what property it has and how much debt it has. The balance sheet contains data as of a certain date (usually the end of the year or quarter) in this case for the last two years. [8]

The enterprise provides the initial data, and a specialist in the bankruptcy procedure department checks their accuracy using information from other departments and data from external sources.

Thus, as a result of filling out the base, the bankruptcy procedure department has enough information to analyze this enterprise and assess its financial condition.

The output information is the conclusion about the state of the enterprise and the schedule for the development of the enterprise for the selected period, formed by this system.

The algorithm of the program is presented in figure 1.

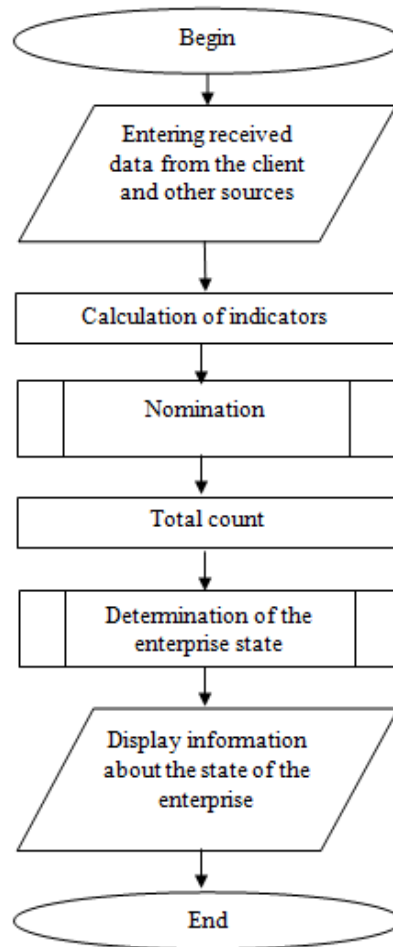


Figure 1. Program operation algorithm.

For the convenience of using the program, we created an interface in the programming language Visual Basic (figure 2).

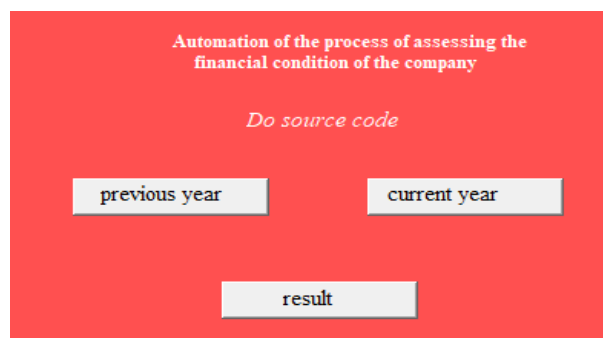


Figure 2. Interface in Visual Basic.

As a result, we received the result in a tabular form with detailed information for each indicator, as well as a conclusion on the enterprise financial condition in graphical form for clarity of results (figure 3).

AUTOMATION OF THE PROCESS OF ASSESSING THE FINANCIAL CONDITION OF THE COMPANY				
Index	2016		2017	
	Net Profit Margin	0.44142	0	1.15355
Return on assets	0.614833	0	2.61685	0
Financial autonomy	-0.00358	-1	0.019049	-1
Current ratio	18.22566	1	2.896459	1
Gain	504.1111	1	186.9965	1
Return On Sales	1.066765	0	1.371443	0
Capital gains	-59.5745	-1	-947.368	-1
Quick ratio	12.97788	1	2.540031	1
Equity Ratio	-0.29255	-1	-0.10166	-1
Financial stability	0.957399	1	0.692617	0
Total	1		0	
The company is in a state of	Normal		Satisfactory	

Figure 3. The result in a tabular form.

During testing, negative dynamics of the organization's development were revealed (taken as a control example). Currently, the organization is under reorganization under competitive management, as a result of which it is impossible to give its name. This example confirms the operability of the program and the correctness of the chosen methodology, however, it requires further deepening and the introduction of new indicators for determining bankruptcy using private models Altman [9] and Fulmer [10] (figure 4).

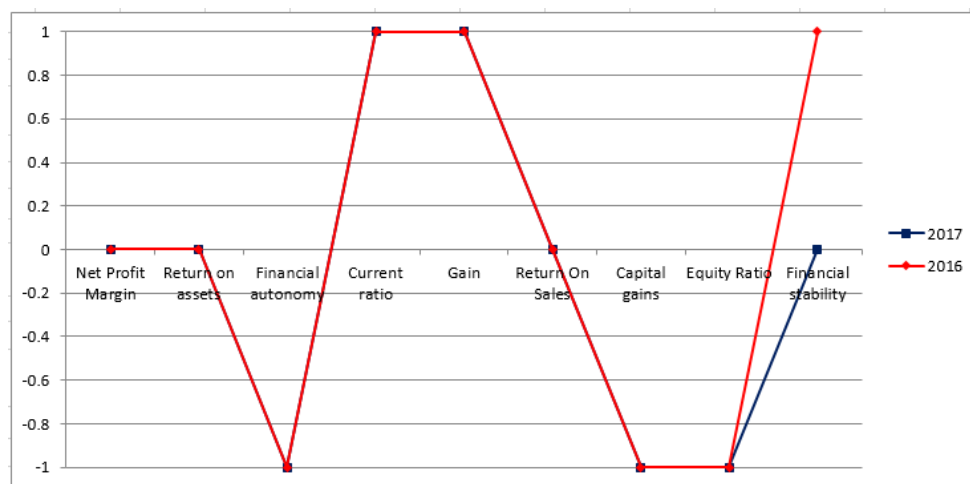


Figure 4. Negative dynamics of the organization's development.

4. Conclusion

As a result of this work, a model was created that helps to draw a conclusion about the state of the organization at the moment and a schedule for its development for the selected period, which clearly shows the state of the enterprise and its development prospects. The use of private bankruptcy models will improve the results of the program and increase the accuracy of calculations.

At the moment, the information subsystem is being tested at Interdistrict IFTS No. 24. The model for assessing the enterprise financial condition significantly facilitated the work of employees and increased their work efficiency. Moreover, the model we have presented for assessing the financial

condition of an enterprise can be used not only by the tax authority, but also by any organization that wants to assess its risks and development prospects.

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