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Financial Risks Assessment and Control of the Bankruptcy Probability of a Company

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Abstract—**The purpose of this study is to develop analytical tools to assess and predict the likelihood of bankruptcy, as well as the possibility of its use in financial and consulting technology Due Diligence. The proposed methodology for assessing and forecasting the risks of financial insolvency of a company includes four stages: assessment of financial results; solvency assessment; identification and calculation of financial risks and verification of comparability of results with similar estimates using well-known forecast models; development of a calculator for forecasting and evaluating financial indicators for positioning changes in the level of bankruptcy risk. Recommended areas of application of this technique: audit and consulting activities, improvement of the practice of using tools for implementing international audit standards for self-regulatory organizations of auditors and audit companies; development of the Due Diligence technology to justify the choice of companies - borrowers, companies participating in tenders and exchanges, as well as in systems of internal audit, internal control, financial control of business processes.**

Keywords—audit; risks; business continuity; bankruptcy; analytical tools; Due Diligence; financial security

I. INTRODUCTION

Currently, there is no technique and methodology used in international and national standards for applying analytical procedures to assess and predict financial risks and the likelihood of bankruptcy. Consulting companies usual use their own methods based on various indicator framework, information base and analytical methods. The accuracy of the results largely depends on the experience of the analyst, the specifics of the company, the information base and its reliability, as well as on the software and technology resource. The results of this study consist in the applied tools' development and justification for assessing financial risks and controlling the likelihood of bankruptcy, taking into account the possibility of customizing it to the specifics of the company and the goals of various users, as well as using it in a computer environment.

This study consists of developing an original methodology for assessing financial risks and monitoring the probability of companies' bankruptcy as a comprehensive analytical toolkit for consulting companies. The initial information for applying the methodology is annual financial statements and forecasted statements of the company and also public statistical information in industry terms.

The conceptual approaches of ISO 31000: 2018 "Risk Management" were used as a methodological tool.

The result of the study is a financial calculator for forecasting and assessing the financial risks, which is a mathematical tool for diagnosing the impact of changes in factors on financial risks of the company, tuned to the specifics of its activities.

II. THE RELEVANCE AND SCIENTIFIC DEVELOPMENT OF THE RESEARCH TOPIC

Financial risks, their assessment, forecasting the probability of bankruptcy were the subject of research by such scientists as, I.T. Balabanova, I.A. Blanca, I.V. Maces, V.V. Vakhitova, A.E. Velichko, V.M. Granaturova, N.V. Grineva, G.G. Kadykova, R.M. Kachalova, J. M. Keynes, G.B. Kleiner, V.V. Kovaleva, M.N. Kreinina, I.Ya. Lukasevich, A. Marshall, J. Mill, O. Morginshtern, J. Von Neumann, A. Pigou, R.S. Sayfulina, N.U. Seniora E.S. Stoyanova, E.A. Fedorova, N.V. Khokhlova, B. B. Khrustaleva, A.D. Sheremet, I. Schumpeter and others [1, 2].

The study showed that there are a lot of methods for identify financial and bankruptcy risks, including as a result of fraudulent actions or intentional misrepresentation of financial information. The most famous methods are Altman, Tuffler and Beaver models, which have a number of advantages and make their use possible in assessing financial risks and predicting the probability of bankruptcy: the ability to determine the risk zone; the optimal composition of indicators calculated according to the financial statements [3].

In addition, the Due Diligence financial technology is interest for the purposes of our study, because it is using to assess the investment attractiveness of companies for potential investors.

The Due Diligence technology involves analyzing the current and future financial condition of the organization, assessing the sustainability of revenues based on a study of the main risks and financial indicators according to the financial statements, in order to assess "whether it is reasonable to expect continued operations and understand how changing circumstances and trends can affect the future of the company".

The Due Diligence technology is open, does not contain a unified list of stages, financial ratios and does not contain specific recommendations for use in various industries and for specific purposes of assessing the financial solvency of an organization [4].

III. METHODOLOGY

Our proposed approach to the development of a methodology for assessing financial risks and predicting the likelihood of a bankruptcy of a company consists of four stages: assessment of financial results; solvency assessment; identification and calculation of financial risks and verification of the relevance of the results on the basis of comparability with similar assessments with recognized methods commonly used in practice; development of a calculator for forecasting and evaluating financial indicators for positioning changes in the level of financial risk and the probability of bankruptcy of a company (Fig. 1).
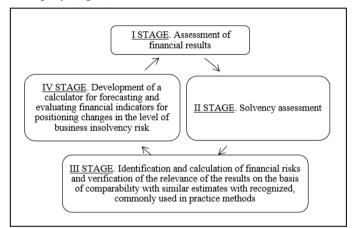

Fig. 1. Methods for assessing and forecasting financial risk and the probability of bankruptcy of a company (compiled by the authors)

Based on the results of the analysis of the company's activities, the first two stages of the methodology provide a qualitative analysis and selection of the most significant risk factors that may lead to the emergence of a business insolvency [5]. The selection of representative indicators in each group is based on principles such as the relevance of the assessment for the characteristics of the company, the availability of an information base and the ability to calculate selected indicators, ensuring comparability of the dynamics of indicators, and the preference for using dynamic indicators [6–10].

The procedure for evaluating indicators is based on a three-point scale, where 0 points – minimum risk, 1 point – acceptable (average) risk; 2 points – critical risk. To select each risk group, threshold values are determined for each risk zone, and also taking into account the possibility of using criteria values (for example, for the current liquidity ratio), or based on the inflation level (for example, for the growth rate of sales profit). A dynamic approach based on the use of the rate of change of the corresponding indicator is recommended in the absence of a similar indicator in official statistical databases. The following correlations are offered for risk zones: the zone of minimal risk – the rate of change of the indicator is greater than 1, the zone of acceptable (medium) risk – the rate of change of the indicator 1, the zone of critical risk – the rate of change of the indicator is less than 1. Regulatory approach based on the use of average values of the indicator (for the industry, the region, national or global economy, depending on the specifics of the company), it is recommended if there is a similar indicator in the official statistical databases [11].

Calculation of the total number of points and determination of the risk level of financial insolvency of a business is carried out on the basis of the following scale (up to 8 points – low risk, 9–16 points – medium, 17–24 points – high). The result obtained is compared with the calculation result according to known forecast models corresponding to the industry specifics of the audited company. The most significant risk factors identified in the previous stages are included in the calculator for forecasting and evaluating financial indicators to position the change in the level of risk of business insolvency. It is designed to diagnose the impact of changing factors on the risks of financial insolvency of the business of the audited company.

IV. RESULTS AND DISCUSSION

The methodology for assessing financial risks and forecasting the probability of bankruptcy was tested at the Russian company "Stroykompleks-NS", which implements projects in the field of civil engineering, transport and sports infrastructure.

Based on the results of the first and second stages of the methodology, the following conclusions were made. Dynamics of financial indicators for the period 2015–2017 indicates that in 2017 there was an increase in revenue compared to the previous year by 6.52 billion rubles. (by 34%), cost growth amounted to 4.82 billion rubles. (or 27%), and the share of cost in revenue is the lowest for the last three years - 88.7%. However, this is a rather high level of cost for the construction industry, which is associated with the high cost of raw materials. In 2017, profit amounted to 0.64 billion rubles.

For the construction industry in the Russian Federation, the industry average value of sales profitability is at least 7%. In 2017, the indicator almost reaches the industry average. Based on the analysis of solvency, it was revealed that the company's balance sheet is not liquid, however, the current liquidity conditions are met. As a result, the most significant factors on which the level of financial risks and the likelihood of future bankruptcy depend in the medium and long term are identified: the risks of late settlement of obligations and the risks of lost profit.

The results of the financial risk assessment of the company "Stroykompleks-NS" are presented in Table 1.

TABLE I. THE RESULTS OF THE FINANCIAL RISK ASSESSMENT OF "STROYKOMPLEKS-NS" BUSINESS CONTINUITY (CALCULATED BY THE AUTHORS)

Risk factors	Risk assessment indicators	Values for the period		Indicators change for the period	Risk trend	Risk degree
		2016	*2017*			
Risks of untimely settlement of obligations	Autonomy ratio	0.10	0.12	0.02	↓	2
	Financial leverage ratio	13.58	10.99	-2.60	↓	2
	Ratio of accounts receivable and accounts payable	0.69	0.88	0.19	↑	1

	Accounts payable turnover	0.69	1.09	0.40	↓	1
	Accounts receivable turnover	1.03	0.89	-0.14	↑	1
	Current liquidity ratio	1.20	1.29	0.09	↓	1
Risks of lost profits	Revenue dynamics, billion rubles	19.23	25.75	6.52	↓	1
	Cost dynamics, billion rubles	18.03	22.85	4.82	↓	1
	Net profit dynamics, billion rubles	0.33	0.64	0.31	↓	0
	Return on sales, %	-1.67	6.12	7.79	↓	1
	Return on equity, %	8.76	20.20	11.44	↓	0
	Return on investment, %	5.86	9.13	3.27	↓	2
Final risk assessment						13

The final risk score was 13 points, which, according to the established scale, corresponds to the average level of financial risk of the "Stroykompleks-NS" business continuity.

Checking the comparability of the assessment results with the results obtained using the forecast models of Altman, Tuffler and Beaver showed their identity: according to the Altman model, the value of the bankruptcy probability integral indicator was 1.94; according to the Tuffler model - 0.63; according to Beaver's model, the bankruptcy probability is up to 5 years, which corresponds to the average level of financial risk of the company's business continuity.

At the final stage of the implementation of the authors' methodology, a developed calculator for forecasting and evaluating financial indicators is used to position the change in the level of business insolvency risk (Table 2).

TABLE II.   TABULAR PRESENTATION THE RESULTS OF THE CALCULATOR WORK TO POSITION THE CHANGE IN THE LEVEL OF CONTINUITY RISK ON THE DATA OF THE COMPANY "STROYKOMPLEKS-NS" (CALCULATED BY THE AUTHORS)

Financial indicators	Forecast	2017	2016	Comparison of 2017 with 2016		Comparison 2017 with the forecast	
				Abs.	*%*	*Abs.*	*%*
Return on sales, %	7.24	6.12	-1.67	7.79	-466.47	1.12	18.30
Financial leverage ratio,%	6.46	10.99	13.58	-2.59	-19.07	-4.53	-41.22
Current liquidity ratio, %	1.54	1.29	1.20	0.09	7.50	0.25	19.38
Ratio of payables and receivables, %	1.48	1.65	1.55	0.10	6.45	-0.17	-10.30

The calculator uses the reporting (actual) and planned data involved in the calculation and assessment of key financial risk factors – untimely settlements on liabilities and lost profits in their relationship with financial results.

Based on the planned revenue growth of "Stroykompleks-NS" by 7%, the financial indicators are calculated and defined as the most significant in assessing risk factors. In the forecast period, profit from sales will grow by 25%, the industry average level of profitability (7.24%) will be achieved. At the same time, the financial leverage indicator will decrease by 41.22%, but still remain quite high, i. e., the company remains at high risk of losing financial independence and financial stability. The forecast current liquidity ratio is 1.54, which indicates possible difficulties in repaying current liabilities and requires additional analysis of cash flows from operating activities. The ratio of forecast payables and receivables is 1.48, which, on the one hand, is an indicator of unbalanced and unsettled settlements with debtors and creditors, and on the other hand, is associated with the specifics of the construction industry. At the same time, a positive factor should be noted - a decrease in the imbalance of settlements by 10.30%, which indicates an improvement in the financial planning system at "Stroykompleks-NS".

V.   CONCLUSION

The results of testing the presented methodology allow us to identify the most significant risk factors for a particular company, which determine the level of financial solvency of the business, the balance of its financial calculations; evaluate the impact of changes in financial indicators on the risks of insolvency of the company. The developed analytical toolkit for assessing financial risks and forecasting business insolvency risks can be recommended for use as an analytical tool to determine the level and risk factors of companies; in financial consulting, including valuation management, Due Diligence techniques to justify the choice of counterparty companies, as well as in the system of internal audit and internal control in companies of various sectors of the economy.

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