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Methodological basis of firm financial risk management

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Abstract. The purpose of this article is to summarize the theoretical, methodological and methodological foundations of financial risk management in firms in modern conditions. **The methodological** basis of the research is the works of economists devoted to financial risk management. **Research novelty.** Various methods are presented in the economic literature for assessing financial risks. The introduction of modern methods of systematic and consistent analysis of the financial risk management of a firm is the main novelty of this study. **Conclusion.** Based on the current liquidity ratio of the company's financial condition and the assessment of borrowed funds in terms of liabilities, a two-factor model is investigated, and on the basis of working capital in terms of assets, return on assets (ratio of retained earnings to assets), profitability (ratio of operating income to assets), market value of shares by the ratio of liabilities and profitability of assets (profit by ratio to assets), a five-factor model is investigated. In the economic literature, it is considered appropriate to use the revised Altman model in developing countries.

Keywords. financial risks, firm solvency, liquidity, firm financial stability

Introduction. As you know, in a market economy, the activities of firms are at risk, they periodically face risk and fear of losses. Any sector of the economy, be it trade, services or manufacturing, is subject to its inherent risk.

The risks are associated with a lack of complete information, its asymmetry, as well as the presence of conflicting trends in the market.

Among the risks that firms face, the most important are financial risks. In economic relations, some firms are faced with insolvency and failure to meet their financial obligations on time.

The article shows methods for assessing financial risk and indicates the appropriate methodology for assessing financial risks for developing countries.

The purpose of this article is to summarize the theoretical, methodological and methodological foundations of financial risk management in firms in modern conditions.

The economic literature presents various methods for assessing the financial condition of a firm. One of these methods is based on the Savitskaya rating system, which is expressed in points. Banking methodology assesses the creditworthiness of firms and the solvency of borrowers, the main purpose of this methodology is to assess the risk of default of the firm. To diagnose bankruptcy, Beaver assesses the current liquidity ratio, economic profitability, financial leverage, and the ratio of own working capital to assets. Also, to assess the financial stability of the company, the two-factor and five-factor models of Edward Altman are used.

The systematic and consistent application of these modern methods to analyze financial risk management in firms is the main novelty of the research.

The methodological basis of the research is the works of economists devoted to financial risk management. The article uses analysis, synthesis, statistical comparison, modern economic and mathematical methods.

Main text

Considering that financial risks are one of the most important risks in the activities of any company, the sustainable functioning of a company involves complex financial risk management. A comprehensive analysis of financial risks at the enterprise includes the following stages:

- analysis of the external environment of the company;
- analysis of the internal environment of the company;
- identification of types of risk;
- Assessment of the quality of risks and creation of a system of the most important risks;
- Quantitative risk assessment.

An analysis of the external and internal environment of the firm can be carried out using a SWOT analysis, which analyzes the internal strengths and weaknesses of the firm, as well as external opportunities and threats. According to Rykhtikova, an important stage in the analysis of the internal environment is an express analysis, which consists of calculating the following indicators: [Rykhtikova, p. 72]:

- ratio of absolute liquidity;
- current liquidity ratio;
- debt ratio;
- coefficient of maneuverability;
- coefficient of autonomy;
- financial independence ratio.

However, it should be noted that the express analysis is not sufficiently informed and does not allow identifying financial risks and their causes. Therefore, the next step in assessing financial risks should be a comprehensive analysis of the solvency, liquidity and financial stability of the company.

As you know, one of the main indicators that qualitatively characterizes the financial condition of a company is its solvency. Solvency refers to the firm's ability to meet its obligations on time.

The solvency of firms has a positive impact on their activities and provides them with the necessary financial resources. Consequently, the firm's solvency plays an important role in providing the firm with financial resources. In addition, solvency strengthens the financial and accounting discipline of the firm and is important for the formation of an effective balance between the firm's equity and borrowed funds and its effective management.

To prevent bankruptcy, a firm must effectively manage its financial resources. This, in turn, involves the management of the structure and sources of the authorized capital, the composition of the borrowed capital. The main purpose of the analysis of the firm's solvency in a market economy is to identify and eliminate shortcomings in the financial performance of the firm and to create financial reserves to increase its solvency. To achieve this goal, it is necessary to complete the following tasks [Savitskaya]:

- assessment and analysis of the use of financial resources in the firm;
- creation of a system of indicators characterizing the level of the company's solvency;
- existing financial resources of the firm and their assessment;
- identification of internal resources to improve the financial position of the company;

- development of specific proposals for the efficient use of financial resources;
- Implementation of proposals for the efficient use of financial resources.

An analysis of the firm's solvency suggests a distinction between internal and external types. An internal analysis of the firm's solvency is performed by the firm, and the results of this analysis are used in planning, forecasting and monitoring. The main purpose of internal analysis is to ensure the planned flow of cash and financial resources of the firm, which, in turn, allows the firm to maximize profits or reduce losses and risk of bankruptcy by ensuring the efficient operation of the firm.

Analysis of the firm's solvency is performed by its investors, suppliers of materials and raw materials, banks and other financial institutions that provide the firm with financial resources. The main purpose of the external analysis of solvency is to create conditions for the efficient allocation of funds, thereby increasing profits or reducing losses.

The main source of information for analyzing the company's solvency is the company's balance sheet. Data from the appendix to the balance sheet is also used to analyze the solvency of enterprises [Tanriverdiyev p. 151-152].

The analysis of the firm's solvency can be carried out according to the following indicators [Turmanidze, p. 279]:

- critical liquidity ratio;
- current assets;
- ratio of fixed assets;
- ratio of current assets provision with own funds;
- the ratio of current assets to non-current (long-term) assets.

Along with the solvency of the company, the analysis of the balance sheet liquidity is also important. A balance is considered liquid if it meets the following 4 conditions:

- the most liquid assets cover short-term liabilities;
- liquid assets cover short-term loans and borrowings;
- low-liquid assets cover long-term liabilities;
- Low liquid assets are formed only at the expense of equity capital.

The economic literature presents various methods for assessing the financial condition of a firm. One of these methods is based on the rating of the system of indicators proposed by Savitskaya (table 1) According to this indicator, the company can be attributed to one of the following classes:

1. the firm's financial strength is highly valued and is able to repay debts and loans on time;
2. the firm may face certain difficulties in repaying debt and credit, but nevertheless the financial stability of the firm is highly valued;
3. the firm is considered problematic. Even if the firm is able to repay most of its debts and loans, it may find it difficult to pay interest;
4. the risk of bankruptcy of the company is highly valued, despite the implementation of measures for the financial recovery of the company;
5. This includes firms showing signs of bankruptcy;
6. companies with a very high risk of bankruptcy.

Table 2. Biver's system of indicators [Dontsova, p. 122]

	Group 1 (successful firms)	Group 2 (bankruptcy is expected within 5 years)	Group 3 (bankruptcy is expected within 1 year)
Beaver coefficient	0,4-0,45	0,17	-0,15
Current liquidity ratio	2-3,2	1-2	≤1
Economic profitability	6-8%	4-6%	-22%
Financial leverage	< 37%	40-50%	≥80%
The ratio of own working capital and assets	0,4	0,4-0,3%	0,06

1. Model by Edward Altman

Also, when assessing the financial stability of firms, it is advisable to use two-factor and five-factor models of Edward Altman. The two-factor model determines the influence of the current liquidity ratio and the share of borrowed funds in liabilities. The two-factor formula for Altman's model is as follows:

$$Z = -0.3877 - 1.0736 * CLR + 0.579 * REL$$

Here:

CLR - current liquidity ratio, the ratio of current assets to short-term liabilities;

REL - the ratio of equity to liabilities;

-0.3877; - 1.0736; 0.579 is the current odds.

If Z is higher than 0, then the state of the analyzed firm is critical, with a high risk of bankruptcy.

It should be noted that the two-factor model does not provide a comprehensive assessment of the financial condition of the company. Therefore, instead of a two-factor model, it is desirable to use a five-factor model.

The method for calculating the Altman five-factor model is as follows:

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + X5,$$

Here:

X 1 - the share of current assets in assets;

X2 - return on assets (ratio of retained earnings to assets);

X3 - profitability (ratio of operating profit to assets);

X4 is the ratio of the market value of shares to liabilities;

X5 - return on assets (ratio of income to assets).

According to Altman's model, the financial condition of a firm is assessed as follows:

Here:

- $Z \leq 1.8$ - very high risk of bankruptcy;
- $1.8 < Z < 2.7$ - high risk of bankruptcy;
- $2.7 < Z < 2.9$ - there is a risk of bankruptcy;
- $Z > 2.9$ - very low risk of bankruptcy.

It should be noted that Altman's five-factor model is used for financial analysis of joint-stock companies whose shares are freely traded on the securities market.

For firms whose shares are not traded on the stock market, the following formula is used to assess the financial condition:

$$Z = 0.717X1 + 0.847X2 + 3.107X3 + 0.420X4 + 0.998X5$$

Here:

- X1 is the share of circulating assets in assets;
- X2 - return on assets (ratio of retained earnings to assets);
- X3 - profitability (ratio of operating profit to assets);
- X4 is the ratio of equity to liabilities;
- X5 - return on assets (ratio of income to assets).

As you can see, the coefficient (X4) here differs from the coefficient of the previous five-factor Altman model. The formula uses the firm's equity value instead of the market value of the shares. It should be noted that the accuracy of the modified five-factor Altman model in predicting bank bankruptcy within 1 year is 90.9%.

Using the modified Altman five-factor model, the financial stability of a firm is estimated as follows:

at:

- $Z > 2.9$ - zone of stable finance ("green" zone).
- $1.23 < Z < 2.9$ - unstable zone ("gray" zone).
- $Z < 1.23$ financial risk zone ("red" zone).

It is advisable to use the corrected Altman model for emerging markets with the addition of (+3.25). The formula looks like this:

$$Z = 3.25 + 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$$

This formula can be used for the economies of developing countries, including Azerbaijan. Here, the financial stability of a firm is assessed as follows:

at:

- $Z > 2.6$ - financial stability zone (green zone).
- $1.1 < Z < 2.6$ - zone of uncertainty ("gray" zone).
- $Z < 1.1$ - financial risk zone ("red" zone).

2. Altman-Sabato bankruptcy risk assessment model

For firms with debt or credit obligations, it is advisable to use the model proposed by Altman-Sabato. This model is based on logistic regression and looks like this:

$$P = 1 / (1 + e^{-y})$$

$$Y = 4.28 + 0.18X1 - 0.01X2 + 0.08X3 + 0.02X4 + 0.19X5$$

X1 is the ratio of profit before tax and interest to assets;

X2 is the ratio of current liabilities to capital;

X3 is the ratio of net profit to assets;

X4 is the ratio of cash to assets;

X5 is the ratio of profit before tax and interest to interest liabilities.

As a result of the calculation, an indicator (the probability of bankruptcy) is obtained from 0 to 1. For example, 0.4 means 40% of the probability of bankruptcy, and 0.9 - 90% of the probability of bankruptcy. If $P > 0.5$, then the firm can be classified as bankrupt, and if $P < 0.5$, then the financial position of the firm can be considered stable. It should be noted that this model does not have a gray area of uncertainty.

According to Altman's model, the assessment of a firm's financial strength is closely related to its credit rating. As you know, a credit rating is assigned by a rating agency, but this model is very convenient, because the assessment of the financial condition of a firm using Altman's model can be carried out by the firm itself.

Conclusion. Based on the current liquidity ratio of the company's financial condition and the assessment of borrowed funds in terms of liabilities, a two-factor model is investigated, and

on the basis of working capital in terms of assets, return on assets (ratio of retained earnings to assets), profitability (ratio of operating income to assets), market value of shares by the ratio of liabilities and profitability of assets (profit by ratio to assets), a five-factor model is investigated.

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