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Analysis Of The Financial Condition Of Economic Entities Using Quantitative Methods

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Abstract: The article presents the theoretical foundations of the financial situation of enterprises and describes the views of various scientists. Also, Examination of economic reality requires a broad spectrum of methods for the analysis of economic operators situation. Economic entities operating in the financial sector such as other economic sectors have distinct individual-specialized methods of "market recognition". Striving for the globalization and internationalization trends requires from the enterprises to undertake continuous processes, analysis and situation control, which mostly affects the financial and innovative sphere. The steps taken in this direction by the management staff, must have a basis in real performance results, which is achieved through all kinds of analysis. Quantitative methods, regardless of business sector, relatively enable to determine precisely the company condition and estimate their expected outcome. Additionally the use of non-standard economic methods for financial data, allow you to look at the situation with new "fresh" angle. The author in the article presents some mixed methods under which the managers will be able to interpret financial data based on the use of mathematical and statistical methods.

Keywords: Analysis, finance, economics, quantitative methods, financial condition, financial analysis, economic analysis, financial stability, solvency, liquidity, profitability, business activity, bankruptcy.

Introduction: The study of the economic reality requires business entities to use a wide range of methods for the analysis of its situation. Entities operating in the financial sector like other separate economic sectors possess individual – specialized methods to recognize the market. [1] Following the trends of globalization and internationalization requires enterprises to undertake continuous processes, analyses and control of the situation which most frequently concern the financial and innovative sphere. [2] The steps in this area undertaken by the management staff must have the basis in the actual results which are achieved through all types of analyses. Quantitative methods, irrespective of the business sector, relatively precisely allow to determine the condition of the company and assess their expected result. Additionally, the use of non-standard economic methods for the financial data allows to look at its situation from a new 'fresh' perspective. In the paper, the authors present a few methods on the basis of which the management staff will be able to interpret the financial data based on the use of mathematical-statistical methods. The analysis of the financial condition of the enterprise takes place in the current economic situation, caused by the increased influence of various risk factors, which can weaken the financial position of the enterprise. Efficient and effective management of the activity of the enterprise requires the involvement of numerous specialists from many different fields. In economic terms, companies are required to indicate the opportunity for development, therefore, generally – innovation. Very little emphasis, particularly with reference to the development of enterprises from the SME sector, is put on the performance of analyses which can reveal the mistakes made by the management staff. Medium and smaller entrepreneurs, in most cases, are oriented towards a single analysis which will allow to answer the question concerning how much they can earn due to specific activity/investment in the nearest future. Obviously, all large effectively managed businesses know that it takes time to see the effects of the investment and the costs, according to forecasts, will be reimbursed in a specific

percentage Thus, analysis of the financial condition of an enterprise is the most important area of the enterprise's activity, as it allows timely adoption of certain management decisions aimed at strengthening it.

Analysis of literature

To be competitive on the market the enterprise must have certain financial resources to engage in investment activities. The funds taking part in the activities of the enterprise may come from own sources or external ones. Each form of financing is dependent on the financial and legal situation of the company as well as on its policy of financial management. "Financial condition– this is one of the most important characteristics of the activities of economic entities, which reflects the availability of financial resources, the appropriateness and efficiency of their placement and use, solvency and financial stability" . [3]

"Financial condition- the state of the enterprise is one of the main economic categories. This qualitative characteristic determines the following aspects of the company's functioning: competitiveness; prospects for partnership; degree of confidence in achieving the set goals. The financial condition as a whole is a category of an ambiguous nature. The system of indicators that form the content of the concept of "financial condition" reports on the availability of financial resources at the enterprise, sources of their receipt, the ability to repay debts on loans and credits in a timely manner". [4]

Under the financial condition of an enterprise is understood as the characteristics of the composition and placement of funds, the structure of their sources, the rate of capital turnover, the ability of the enterprise to repay its obligations on time, as well as other factors. [5] One of the methods widely discussed in the literature in the field of financial mathematics is the investment portfolio. Its construction should include such securities which will maximally reduce the risk taken and will not reduce rates of return. [6] The relationship of rates of returns of some securities with others constitutes an important problem. The solution is the use of the correlation coefficient of rates of return, which is the measure of this relationship. The rate of return is the amount of the investor's benefits to be achieved in a given period from the invested capital.

ANALYSIS AND RESULTS

The study of the relationship resulting from the calculation of the correlation should be considered in the short-term perspective in spite of the calculations based on historical data. [7] In long periods, the overwhelming number of macroeconomic phenomena is characterized by slow, continuous growth. In turn, short-term volatility frequently hinders this process. The components of the economic macroenvironment are very often created by the (long-term) trend, (short-term) fluctuations and random deviations. The elements of the environment tend to return to the state of long-run equilibrium every time after the occurrence of any changes which are associated with the functioning of external forces.

The state of long-run equilibrium determines the situation which the system strives for after prior being thrown off equilibrium and which will be achieved after finite time under the circumstances in which it is not subjected to external forces.

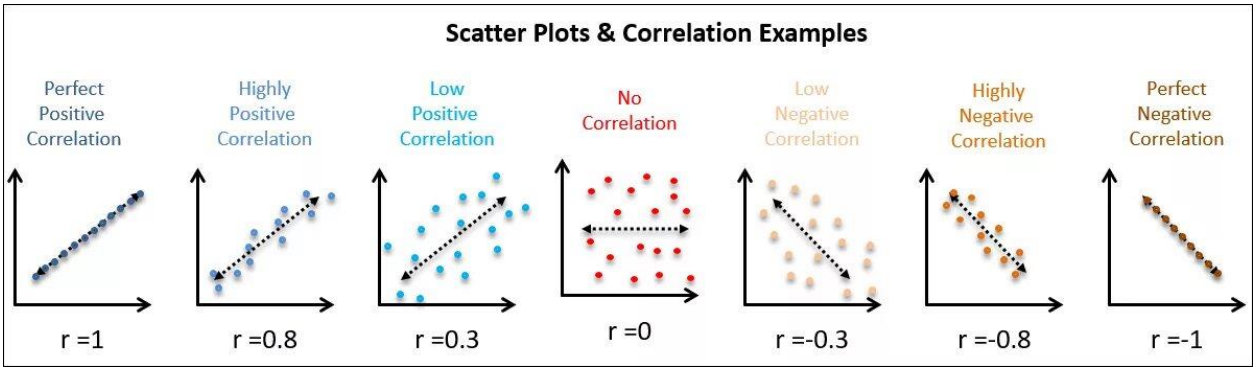
Testing the relationships, first of all, consists in eliminating the occurrence of so called spurious regression. The validity of its verification is based on the assumption that nonstationary variables, which are not related to each other in the cause and effect context, on the basis of high value of the correlation coefficient, very often indicate statistical significance of their relationship. On that basis, there is built the model which in fact does not meet the assumed expectations. The causative agent of the occurrence of spurious regression is taking into account nonstationary variables in the model, which are not linked by cointegrating relationships. The foundation of the assumptions of the occurrence of the phenomenon of spurious regression is the existence of the relationship defined as "the rule of the thumb" (the calculated value of the correlation coefficient is higher than the calculated value of the empirical statistics applied for the study of the autocorrelation with the Durbin-Watson test). The data analysis allows to assess the regression function and to obtain information on their variability.

Additionally, there can be applied ECM (Error-Correction Model), which is the model for increments of variables, enriched with error-correction parameter. ECMs provide an opportunity to distinguish long-term and short-term relationships. As a result, it is possible to draw conclusions on the basis of the models characterized by spurious regression with reduced probability of their occurrence. The theory in the field of cointegration was tested on the basis of the same data which were used to create the investment portfolio. The study of the relationships, based on the expected rate of return, allowed to determine regression, where the intercept α 0 amounted to 0.9% – therefore, such a mean value is taken by the endogenous variable of the expected rate of return on Shares of the bank (A), when the explanatory variable of the expected rate of return on Shares of the bank (B) assumes zero value. An increase in the value of the expected rate of return on Shares of the bank (B) by 1%

will bring about an increase in the expected rate of return on Shares of the bank (A) by 54.1%. The significance of the structural parameters indicates the appropriate selection of the explanatory variable – the expected rate of return on Shares of the bank (B). The mean value of R 2 coefficient R 2 = 0.536 indicates the appropriate adjustment of the model to the empirical data. The calculated relationship DW < R 2 indicates the lack of existence of spurious relationship between the expected rate of return on Shares of the bank (A) and Shares of the bank (B). The study of cointegration occurring between the expected value of rates of return on Shares of the bank (A) and Shares of the bank (B) taking into account their residuals, allowed to obtain the following orders of integration: • Variable (A t) representing the expected rate of return on Shares of the bank (A) is integrated of order zero At~I(0)

• Variable (B t) representing the expected rate of return on Shares of the bank (B) is integrated of order zero Bt~I(0)

• Variable et(residuals) is stationary i.e. integrated of order zero et~I(0)



Pictures 1.

The obtained results allow for the conclusion that there is no long-term relationship between the expected rates of return, however, the exclusion of spurious regression and relatively significant correlation coefficient allows to imply that there is a short-term relationship between the expected rates of return on shares.

Thus, the financial condition acts one of the key components in the activities of an enterprise, which requires high-quality analysis in order to develop various solutions to improve the efficiency of the enterprise, to increase the investment attractiveness of the enterprise, and to reduce the likelihood of bankruptcy of the enterprise.

"Assessment of the financial condition of an enterprise is part of financial analysis and can be carried out with varying degrees of detail, depending on the available information, the objectives of the analysis, etc. It is characterized by a certain group of indicators reflected in the balance sheet as of a certain date. The main target setting and content of financial analysis is to assess the financial condition and identify the possibility of ways to improve the efficiency of the economic entity with the help of rational financial policy.

Analysis of the financial condition shows that in what directions this work should be carried out, which makes it possible to identify the most important aspects and the weakest points in the financial condition of the organization. Based on this, the results of the analysis provide an answer to the question of what are the most important ways to improve the financial condition of the organization in a specific given period of its activity. But the main goal of the analysis is to promptly identify and eliminate shortcomings in financial activities, as well as find reserves for improving the financial condition of the organization and its solvency. [8]

In this regard, the methodological aspects of conducting an analysis of the financial condition of an enterprise will be discussed below.

To conduct the analysis and assessing the financial condition of an enterprise, there are many different methods and approaches that are described by researchers.

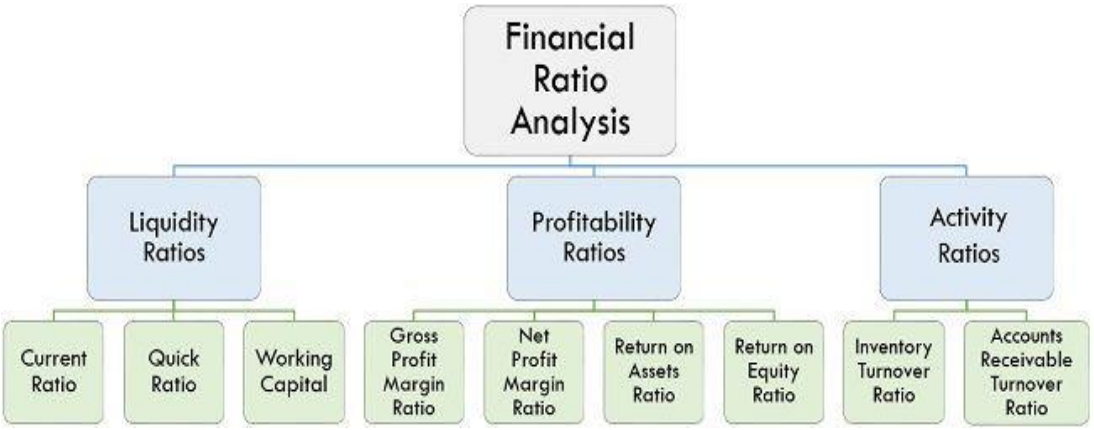
In general, approaches to conducting analysis and assessing the financial condition of an enterprise are partially used in parallel.

This algorithm, in our opinion, it allows us to analyze the financial condition of the enterprise quite consistently. However, this algorithm does not present profitability indicators, and does not assess the probability of bankruptcy of the enterprise.

Below in the algorithm is presented, according to which the financial condition analysis will be conducted within the framework of this study. This algorithm systematizes the key approaches to conducting the analysis of the financial condition of the enterprise: 1 Analysis of the structure of assets and capital enterprises; 2 Analysis of the dynamics of assets and

capital enterprises;

3 Analysis of indicators of profitability, business activity (turnover), financial stability, solvency (liquidity); 4 Assessment of the probability of bankruptcy of the enterprise.



Pictures 2

First- analysis of the structure of assets and capital. It consists of determining the share of individual items of assets or capital in the structure

balance sheet currencies (ratio of item value to the balance sheet currency) or in the section structure (the ratio of the item value to the section value), as well as in determining the share of balance sheet sections in the balance sheet currency structure (the ratio of the section value to the balance sheet currency). The share is usually expressed as a percentage.

Second– analysis of the dynamics of assets and capital. It consists of determining the growth rates or growth rates of the value of individual items or sections over several periods (years). The growth rate or growth rate can be either chain (when the dynamics are determined in relation to the previous value) or base (when the dynamics are determined in relation to the base value). The growth rate is calculated as the ratio of the current value to the previous (or base), expressed as a percentage. That is, if the value is less than 100%, then there has been a decrease, if the value is more than 100%, then there has been growth. The growth rate is calculated as the ratio of the difference between the current value and the previous (base) value to the previous (base) value, expressed as a percentage. That is, if the value is negative, then there has been a decrease, if the value is positive, then there has been growth. If you subtract 100% from the growth rate, you get the growth rate.

Third- analysis of profitability indicators, business activity (turnover), financial stability, solvency (liquidity). In this case, absolute and relative indicators are calculated based on the data of the financial statements of the enterprise.

CONCLUSION

The conducted analyses for the expected rates of return in most cases are interpreted with reference to the level of investment risk. Additionally, the data used in the study come from the banks, which justifies the financial dimension of the analysis. The authors wish to draw attention to a different possibility of interpretation of the obtained information. The entities subjected to the studies, irrespective of the sector they operate in, can be treated as a manufacturing or service company whereas the expected rate of return, in spite of its 'stock' specificity, as a determinant of the condition of the entity. In such a situation, the analyzed data indicate the economically stable situation of the analyzed entities without a clear upward trend. The relationships between the entities are noticeable, however, it cannot be considered that e.g. an increased interest in products of one entity in the long term will translate into an increased interest in the other entity. Therefore, it can be concluded that the relationships between the discussed units result only from a similar nature of the conducted activity and they cannot be translated into the way of strategic management in the long term context. The advantages in favor of the necessity to conduct the analyses, even in small companies, include the fact that any information, even seemingly not bringing apparently positive/negative forecasts, is significant in the study of the economic reality. The economic essence of the concept of financial condition of the enterprise is revealed in the works of various researchers. Thus, the financial condition of an enterprise can be understood as the enterprise's ability to develop, as part of the economic potential of the enterprise, as indicators of financial statements, as the investment attractiveness of the enterprise. The financial condition is one of the key components in the activities of the enterprise, which requires high-quality analysis in order to develop various solutions to improve the efficiency of the enterprise, to increase the investment attractiveness of

the enterprise, and reduce the likelihood of bankruptcy of the enterprise. There are many different methods and approaches to analyze and assess the financial condition of an enterprise, including horizontal analysis (dynamics), vertical (structural) analysis, trend analysis, analysis of relative indicators (ratio analysis), comparative (spatial) analysis, factor analysis. The algorithm by which the financial condition will be analyzed within the framework of this study: analysis of the structure of assets and capital of the enterprise, analysis of the dynamics of assets and capital of the enterprise, analysis of profitability indicators, business activity (turnover), financial stability, solvency (liquidity), assessment of the probability of bankruptcy of the enterprise.

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