

ASSESSMENT OF THE FINANCIAL POSITION OF A COMPANY: THEORETICAL ASPECT

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Abstract. *The article provides evidence on company's financial position and its perspectives depending on rational methods of analysis providing reliable and exact evaluations. It is stated that if the absolute and relative financial indicators are not provided, indicator standardization and the analysis of standardized values are not defined, and the complex indicator which shows the synthetic financial position of a company is not presented; without the analysis and assessment of structural changes of the indicator it would be difficult to ensure a company's successful position in the competitive environment. The article presents methods of analysis of the compound indicator structural changes.*

Key words: *financial position, methods of analysis, analysis of compound indicator structure*

Introduction

A country's enterprises face many external and internal factors. Their activity is influenced by political risks (changes in government and political life, new legal acts), criminological risk (the complicated criminological situation and corruption which are not solved by legal institutions), financial risk (scandals in financial markets) and commercial risk (changes in the rules of goods' import and export, an imperfect tax system, bad logistics, etc.). Therefore, a company's managers have to evaluate all these factors objectively in order to achieve the defined goals in the dynamic and competitive business conditions. A company's assessment is a very important issue in developing and improving its performance (Najmi, Kehoe, 2001); also, it is an active measure in the decision-making process while controlling and planning a company's activities (Chan, 2004). The comprehensive assessment of a company's activity helps to manage processes to increase the business value and ensure its long-term success. Most attention is paid to the most sensitive parts of a company's performance (Taticchi, Balachandran, 2008). The first part covers a company's financial position which can be analyzed applying different methods.

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The object of the investigation: analysis of a company's financial position compound index structure.

The aim of the investigation: to produce the method of analysis of a company's financial position index structural changes, which might be helpful for the company's managers and financial analysts in evaluating the compound index structural changes and producing a more rapid forecast of the changes.

The tasks of the investigation. The aim of the study covers the following tasks:

- to indicate the methods of analysis of a company's financial position, their application limits in order to achieve a deeper evaluation of its financial position;
- to offer the methodological background of a company's financial position compound index structural changes and the principles of their calculation.

The methods of the investigation: systematic analysis of the literature, synthesis, comparison, summary, statistical methods.

Company's financial position assessment practice

Investigations of Lithuanian authors' (Baležentis, Vijeikis, 2010; Gimžauskienė, Klovienė, 2010; Beržinskienė, Virbickaitė, 2006; Jasevičienė, Giniotienė, Stankevičienė, 2000; Bivainis, Garškaitė, 2010; Stundžienė, Boguslauskas, 2006; Rutkauskas, 2001, etc.) indicate that in order to have a qualitative picture of a company's financial position, there is a qualitative and relative method of analysis of its financial position. The company's management wants to have information about the enterprise's financial position: whether the company is solvent, has obligatory monetary means, what are its current and long-term liabilities, how effectively are current and fixed assets used, what is the value of its equity capital, its structure and profitability. On the basis of a true and fair view of the current financial position of the company, the management can make correct management decisions. A correct analysis of the financial position helps to define whether the management decisions made in the past were correct and current management decisions are reasonably grounded, whether there is any possibility of making management decisions in the future which would be logic and argumentative (Mackevičius, 2009). The analysis of the company's financial position allows to forecast the possible problems of its financial position, to disclose the company's management development reserves. Very frequently its material, labour, and financial reserves are disclosed. The analysis of the company's financial position often defines the trend where and in what company's production and service branches additional opportunities to improve the company's performance must be searched for and how to achieve its objectives in the market. The more rapidly such opportunities are disclosed, the bigger is the possibility to achieve better activity results.

The element of predicting a company's financial position is important, because a well-prepared forecast of financial results helps to define the future operating trends of a company in the market, to make correct analytical decisions, to evaluate alternative operating results more objectively.

In order to achieve these goals, many different methodologies of determining the financial position are applied. Practically, the methodologies of absolute and relative financial index analysis are used. They are described in many books written by both foreign (Brigham, Daves, 2004; Black, 2004; Palepu, Healy, Bernard, 2004) and Lithuanian authors (Bagdžiūnienė, 2008; Gronskas, 2006; Juozaitienė, 2007; Boguslauskas, Jagelevičius, 2002; Buškevičiūtė, Mačerinskienė, 2008; Mackevičius, 2007, 2009; Rutkauskas, Stankevičius, 2004). The above-mentioned authors indicate that the analysis of large-scale absolute indicators and their changes is very important, because these indicators make a great impact on the company's financial position and determine its activity prospects.

However, more and exact information is obtained upon estimating and evaluating different relative financial indicators. More than 100 important relative indicators can be calculated from financial statements, but to evaluate a company's financial position the calculation of 10 to 15 indicators related to the company's assets, capital, and liabilities is enough.

The financial analysts, taking into account the financial accounting principles of the Republic of Lithuania, suggest four main groups of indicators (Lazauskas, 2005):

- profitability (12 indicators),
- current and long-term solvency (18 indicators),
- operational efficiency (36 indicators),
- capital market (15 indicators).

However, to apply and use all the indicators to evaluate a company's financial position is a very complicated and very often inappropriate task. Some other methods are possible. One of them is the compound index search method. The company's financial position or bankruptcy possibility, which is defined by a compound indicator or the search system abroad, started in the third decade of the 20th century and is still in use. From the methodological point of view, the research made by W. Beaver (1966) is very important because it was based on a comparative analysis of profitable and bankrupt companies' financial indicator trends; other scientists (Karlof, 2007) later used the method of discriminant analysis. Although the above-mentioned models are simple, they cannot be considered the models that globally and comprehensively define companies' financial, economic manufacturing and investment position, because these models do not directly evaluate the tendency of changes.

M. Jėčiuvienė (2006), who investigates the problems of crisis, stresses that the crisis is an integral part of a company's financial activity. Therefore, it is very important to clarify the factors of crisis, to evaluate and to manage them.

The failure of financial management is most important to the company, because the majority of financial crises are, in their essence, liquidity crises which can lead to a company's bankruptcy. The majority of crises, which happen for many reasons, very often become financial crises. Some factors may be defined, which lead to a financial crisis:

- poor credit decisions,
- credits the amount of which is too big,
- the loss of the biggest credit grantor,
- the partners' refusal to grant a credit,
- the lack of financial control,
- poor financial policy of a company.

Statistics Lithuania in 2011 carried out an investigation of barriers to small and medium-sized businesses, which are as follows: the lack of circulating capital, poor purchasing power, the order and interest rate of credits. Speaking about external factors, some trends can be mentioned, such as the lack of capital, the lack of circulating capital, big taxes, protectionism, etc., but the main reason, which is unwillingly identified by managers, is the poor management policy of a company (Rutkauskas, 2000). Practice shows that bankruptcies often happen in companies which have no or a very weak internal control system and in which no financial analysis is produced. Every manager of the company must have "analytical thinking" or, in other words, must understand the concepts of profitability, solvency, capital structure, cash flows, and other financial indicators. If a company experiences losses, this means that the company might become insolvent. Because of losses the company fails to expand production, to buy new equipment and new technologies. Therefore, in the author's opinion, it is important for companies' managers to monitor its capital structure and cash flows to guarantee the company's stability.

The traditional model of the diagnosis of crisis is based on the statistical calculation of threats and risks. The simplest risk estimation R is presented as follows (Kėdaitis, 2003):

$$R = \frac{K \times P \times T}{V \times A},$$

where: K – criticality,
 P – vulnerability,
 T – probability,
 V – event value coefficient,
 A – the level of restoration.

If the risk calculation ratio R is in the interval of 0–19, the risk is considered to be insignificant, and between 20–100 the risk has to be minimized, but it does not produce any danger; if it is 101–200, the risk has to be paid attention to because the situation is rather serious, and if 201–500 – the situation is very serious, and decisions have to be taken.

Today, from the author's working practice, analysts use different statistical methods to define the financial position. One of them is the discriminant analysis. It is a statistical method the essence of which is to evaluate a company's position from different points, applying relative indicators from which the generalizing special indicator Z is deduced. This indicator in scientific literature (Haugen, Senbet, 1978) is named as the Altman or zeta model. This index is calculated applying the method of discriminant analysis in which the parameters of the linear correlation function are set. Therefore, when applying this method, all the companies are divided into two groups: unreliable companies, which can undergo bankruptcy, and reliable companies, i.e. the ones that can avoid bankruptcy (Mackevičius, 2007). Such division has two characteristics – short-term solvency and financial stability which is stated by the liabilities divided by the asset ratio. Therefore, there is a threat for a company to go bankrupt if the losses become bigger, if the liabilities increase, and short-term solvency deteriorates. To avoid bankruptcy, it is necessary to find the level of the discriminant limit which might divide the possible indicators into two groups:

- those depicting the possibilities of a company going bankrupt,
- those depicting a positive performance prognosis.

Some authors (Haugen, Senbet, 1978, Mackevičius, 2007, Girdzijauskas, 1997, Gronskas 2006) tried to solve the problem. The first bankruptcy prognosis studies were globally popular in the 20th century at the end of the 7th decade (Haugen, 1978); however, the biggest contribution to bankruptcy prognosis was done by E. Altman (Haugen, Senbet, 1978) who modified the Z model presented by other economists:

$$Z = C_0 + C_1X_1 + C_2X_2,$$

where: Z – the indicator of classified function,

C_0 – stable parameter,

C_1, C_2 – coefficients, indicating the changes and magnitude of indicators,

X_1, X_2 – coefficients chosen to indicate the bankruptcy prognosis.

In companies where Z is equal to zero, the possibility of bankruptcy is 50%. If Z is less than 1, then the possibility of bankruptcy is less than 50%; furthermore, if the index goes down, the possibility of going bankrupt goes down, too. If Z is bigger than zero, then the possibility of bankruptcy increases. E. Altman, while applying the Z model, used the company's indicators and suggested the following formula of calculation:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5,$$

where: X_1 – net working capital relative weight to the amount of total assets,
 X_2 – the ratio of retained earnings to total assets,
 X_3 – asset profitability before taxes and interest,
 X_4 – the ratio of equity (market value) to borrowed capital,
 X_5 – asset turnover.

Every indicator in some aspect defines the company's risk: X_1 – short-term solvency risk; X_2 – asset profitability, which uses retained earnings in the calculation; X_3 – current profitability; X_4 – long-term solvency risk; X_5 – the company's asset ability to promote sales.

Using this equation, E. Altman, by defining the Z ratio, forecasted bankruptcy. For example, if the coefficient ratio is up to 1.8, the probability of a company to go bankrupt is high, from 1.81 to 2.7 – very high, from 2.8 to 2.9 – possible, more than 3.0 – a very low bankruptcy probability. In the author's opinion, applying five-factor equations, it is possible to forecast bankruptcy probability to within 96% if the economic recession happens within one year.

When the company will go bankrupt and what the threats are can be seen analyzing the data of financial statements (Mackevičius 2005), the dynamics of indicators, the absolute changes of financial results, applying financial indicators for analysis. So, it is possible to state that a company's bankruptcy diagnosis is a company's financial activity factors' assessment system, with the help of which, critical factors of the company's activity which lead to its bankruptcy, are determined. According to Rutkauskas (2000), Haugen R., Senbet L. (1978), Juozaitienė (2007), Ginevičius (2004) and other authors, nine financial coefficients are very important for determining as company's financial position, the sum of which produces the company's insolvency assessment regression:

$$Z = 0.762 + 0.003X_1 - 1.424X_2 - 0.06X_3 + 0.22X_4 - 0.774X_5 - (-0.189)X_6 + 6.842X_7 - 12.262X_8 - 5.257.22X_9,$$

where: Z – assessment regression,
 X_1 – general liquidity coefficient,
 X_2 – ratio of net circulating capital to assets,
 X_3 – coefficient of financial liabilities,
 X_4 – equity to the coefficient of financial liabilities,
 X_5 – financial expenses (interest) coefficient,
 X_6 – coefficient of performance profitability,
 X_7 – return on assets coefficient,
 X_8 – net circulating capital turnover,
 X_9 – asset turnover.

Upon receiving the values of Z probability, the Pr dependence ($X_1 - X_9$) model is as follows:

$$Pr(1) = \frac{e^{-0.762+0.003X_1-0.424X_2-0.06X_3+0.22X_4-0.774X_5-0.189X_6+6.842X_7-12.262X_8-5.257X_9}}{1+e^{-0.762+0.003X_1-0.424X_2-0.06X_3+0.22X_4-0.774X_5-0.189X_6+6.842X_7-12.262X_8-5.257X_9}};$$

$$Pr(0) = \frac{1}{1+e^{-0.762+0.003X_1-0.424X_2-0.06X_3+0.22X_4-0.774X_5-0.189X_6+6.842X_7-12.262X_8-5.257X_9}}.$$

If $Pr(Z) = 1$, or the receivables (likely) event probability is close to 1, it may be said that the company will go bankrupt. If $Pr(Z) = 0$ or the receivables (likely) event probability is close to 0, it may be said that the company will not go bankrupt.

Assessment of a company's financial position applying a combined indicator

While analyzing a company's financial position where the model of calculating the absolute and relative indicators is used, some other methods such as indicator standardization and a standardized methodology for assessing the indicator value could be applied. The procedure of applying indicator standardization allows to reveal the commercial economic activities of a company, the improvement of which helps to achieve the optimal financial position.

The method of data standardization helps to take into account the indicators meaning a variation (Mackevičius, Valkauskas, 2010). The absolute and relative financial indicators which identify a company's financial position are different in their content and the role they play in the company's assessment. It is a list which can be unified. This unification, applying the method of data standardization, can be illustrated in the following way:

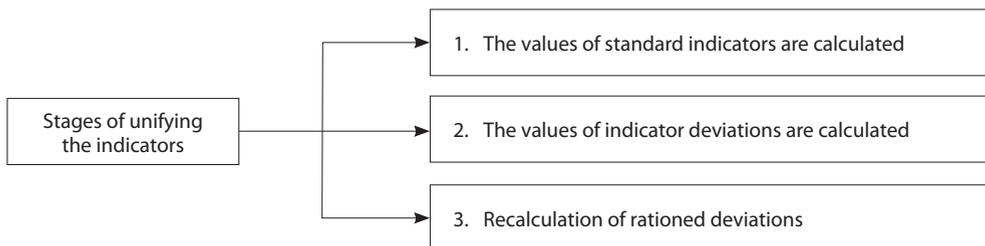


FIG. 1. Unification trends of a company's financial position indicators

Unifying the data on a company's financial position, applying the method of standardization according to Fig. 1 which presents the consistency of calculation, the calculation of deviation average is the last stage in the recalculation of indicators. These averages make a time series which can be investigated more deeply. The main characteristics

of combining these indicators are that there is a possibility to delimitate the indicators from the content and to compare them differently.

On the other hand, the application of the data standardization method is a calculation variant which states that while choosing one of the data combining methods, the rate of indicators in the assessment of a company's financial position is high, but of great importance are also the methods and means how the ratios are uniformed and standardized. However, the rational analysis method is the one that uses the indicator and meaning standardization, i.e. the calculation of standardized indicators and score, which identifies the "normal position" of a company, the calculation of ratio-related deviations, the "actual position" score, and the calculation of "normal position" deviation.

The suggested method of calculation deepens the analytical assessment of a company's financial position and helps to reveal its "weak points" (Mackevičius, Valkauskas, 2010). To have a more objective view of a company's financial position (bearing in mind the above-mentioned absolute relative and standardized indicator methods of analysis), it is preferable to use the compound indicator method of analysis. The literature on financial analysis does not mention it, and in assessing a company's financial position this method is not applied.

The company's financial position can be estimated applying the evaluation system which comprises partial, integral, and compound indicators. Such system of indicators, which is formed by the hierarchical principle, allows to get a true and fair view of a company's financial position.

Applying this method of analysis, which describes a company's financial position, the most difficult task is to produce indicator compounds. The absolute financial indicators which describe a company's financial position, and the relative financial indicators are different in their content and role they play. In Fig. 2, the formation of compound indicators on the basis of absolute financial indicators is presented:

- calculation of indicator value deviations. At this stage, the empirical absolute financial indicator values are replaced by relative deviations;
- calculation of the indicator group deviation average. At this calculation stage, for each absolute financial indicator group the aggregate characteristics of the group – the average deviations – are calculated. This average is calculated using the arithmetical average system;
- calculation of the indicator group deviation sum. At this stage, the average of the absolute financial indicator group is adjusted to the characteristics of group weight, and the adjusted deviation average values are added. The calculation result is the absolute compound indicator.

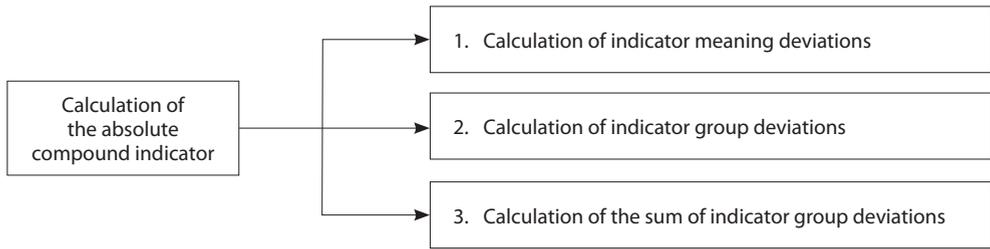


FIG. 2. Trends of calculating the absolute compound indicator of a company's financial position

The situation becomes more complicated if the indicators undergo a qualitative assessment. Such assessment is closely related with the relative financial indicators.

While producing a compound indicator, the company's relative financial indicators' qualitative estimation scale as well as the scale position quantitative equivalent must be produced. This procedure is the first step in getting a compound indicator on the base of relative financial indicators.

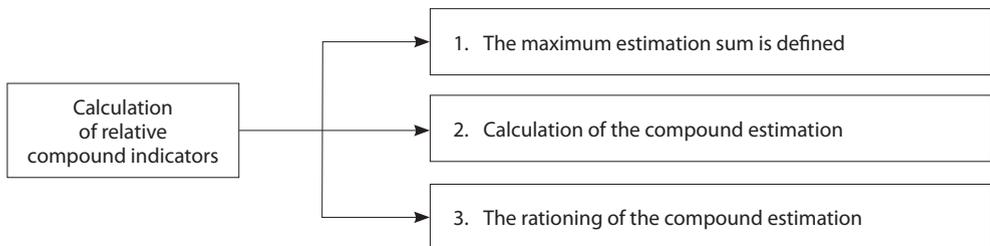


FIG. 3. Trends of calculating the relative compound indicator of a company's financial position

Figure 3 presents stages of the compound index which is formed on the basis of relative financial indices:

- the calculation of compound estimation. This compound is calculated by summing up the factual evaluation scores of each relative financial indicator. This sum can also be calculated considering the importance (materiality) of a relative financial indicator;
- the rationing of compound assessment. This rationing evaluates the number of relative financial indicators and is produced applying the method of arithmetical average.

The method of analysis related with the company's financial position allows calculating both the absolute and relative compound indicators and gives a possibility to apply the hierarchical principle of both absolute and relative indicators.

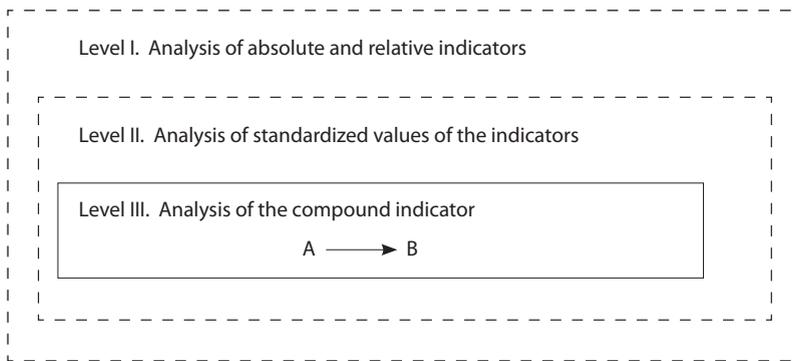


FIG. 4. The position of methods of analysis in the system of analysis of company's financial position

Figure 4 describes the relation among the discussed analytical methods of a company's financial position and its place in the company's financial position system of analysis. The following assessment directions are identified:

- A) actual compound assessment and maximum estimation is the score sum deviation (absolute and relative) assessment and the compound indicator (both absolute and relative) dynamics estimation whether the comparative base is stable or fluctuating;
- B) analysis of the compounds' indicator structure (both absolute and relative).

Methodological analysis of the compound indicator structure of a company's financial position

The concept of structural changes is dynamic. It explains the "internal" structural change of a company's financial position compound indicator X_1 with time. Many authors (Спаская, 2006; Schlittgen, 1993; Čekanavičius, Murauskas, 2000; Levine et al., 2005; Martišius, Kėdaitis, 2010, and others), propose to calculate structural changes, using absolute and relative statistics. In general, structural changes can be described by two types of statistical indicators:

- absolute indicators, which indicate the difference in the magnitude of two relative structures;
- relative indicators, which indicate the same value of two different relative magnitude ratios in different periods of time.

The absolute structural change indicators indicate the velocity of changes, i.e. they show how big or small the changes of the indicators were during the period. Relative structural change indicators show the change intensity of an indicator.

The structural changes of a company's financial position compound indicators can be revealed in the following way: we have a compound indicator formed of compound parts

x_i ($i = 1, 2, \dots, n$), i.e. index level is: $S_i = \sum x_i$. In this case, the specific gravity weight of the indicator's compound part is as follows: $f_i = \frac{x_i}{\sum x_i} 100$. This simple procedure means changing the value of initial data to a relative structure. We are aware of the actual and comparative base company's financial position compound, the indicator ratio (during the elapsed period of time, standard, etc.). We have to identify:

- the S_i characteristics of structural changes while comparing actual and comparative data;
- the extent of deviations of the actual indicator compound ratio as compared with the base situation;
- the ratio compound part value if the S_i change rate is equal to I_s .

Considering the structural changes characterized by indicator calculation methods and stating that $f_{i,t}$ is the company's financial position compound indicator, the actual specific gravity of the compound part 0, $f_{i,t-1}$ is the specific gravity of a component in the period $t-1$ and $f_{i,0}$ is the specific gravity of the compound part comparative base, it could be said that:

- the absolute structural changes are as follows:

$$\text{base: } \Delta_i = f_{i,t} - f_{i,0};$$

$$\text{chain: } \Delta_i = f_{i,t} - f_{i,t-1};$$

- the relative structural changes are:

$$\text{base: } i_i = \frac{f_{i,t}}{f_{i,0}};$$

$$\text{chain: } i_i = \frac{f_{i,t}}{f_{i,t-1}}.$$

These two indicators identify structural changes. It is the answer to the first issue. Later, we are going to evaluate a generalized case. The absolute and relative structural change indicators are rather important parts, but they do not provide general conclusions. These conclusions can be provided by a deviation produced by the average quadratic absolute structural change, which can be calculated as follows:

$$\text{base: } \sqrt{\frac{1}{n} \sum (f_{i,t} - f_{i,0})^2};$$

$$\text{chain: } \sqrt{\frac{1}{n} \sum (f_{i,t} - f_{i,t-1})^2}.$$

Thus, two generalizing indicator groups, base and chain, may be distinguished, which define a company's financial position. The chain structural change indicators help to solve the task of structural change intensity analysis, i.e. they help to fix the time interval

when structural changes were more significant and, on the other hand, not too big. The base structural change indicator reveals the cases when structural changes showed certain tendencies and underwent irregular fluctuations.

Let's say that $S_{i,t}$ is the actual company's financial position compound indicator ratio (value) and $S_{i,0}$ is a comparative base ratio (value). Hence, the change rate of the company's financial position compound indicator will be: $Is = \frac{S_{i,t}}{S_{i,0}}$. Suppose that $x_{i,0}$

is the rate of a comparative base of the constituent part of the company's financial position compound indicator. This ratio can be adjusted by the indicator change rate: $x_{i,0} \times Is = x_{i,k}$. The adjustment result implies the situation which "had to be". But the level of the compound part of the compound indicator of the company's financial position is $x_{i,t}$. Actual and deviation "from the situation which had to be", the company's financial position rationality is indicated by calculations by the formula: $\Delta x_{i,k} = x_{i,t} - x_{i,k}$. In these calculations, $\sum x_{i,t} = \sum x_{i,k}$.

The order of calculation is described bearing in mind the fact that the company's financial position compound indicator constituent part ratio deviation is identified by the formula

$$\Delta x_i = x_{i,t} - x_{i,0}.$$

Therefore, some other aspect may be seen in these calculations. Hence it follows that the company's financial position compound indicator may have a standard structure. Therefore, the aim of the final calculation is to evaluate the structure deviations of both formed and standard indicators.

Conclusions

One of the most important analyses of financial position is to use the above-described information. It is important for a company's management to know the general financial position of a company. The company's financial position allows defining whether the management decisions made in the past were right and the current management decisions are grounded, whether it is possible to make logical and argumentative management decisions. To achieve these goals, numerous methods of financial position analysis are applied.

In practice, more often methods of analysis comprising absolute and relative financial indicators are used. To assess a company's financial position, it is enough to calculate 10–15 indicators related with capital assets and liabilities, except absolute and relative indicators; the method of indicator standardization and standardized ratio estimation can be applied. To highlight more objectively the company's financial situation, the method of a compound indicator analysis is preferable. These methods are independent of each other, although some steps were made to integrate their separate constituents.

The company's financial position assessment systems are as follows: the initial financial company's position evaluation on the basis of absolute and relative indicators, which can be supplemented by indicator standardization and a standardized ratio analysis; parts of the system, which synthesize a company's financial position evaluations produced on the basis of a compound indicators of a company's financial position.

In the company's financial position, which is established on the basis of a compound indicator analysis, the following assessment trends can be distinguished:

- the actual compound assessment and the maximum assessment score sum deviation (absolute and relative) dynamics if the comparison base remains stable or fluctuates;
- structural analysis of the compound indicator (both absolute and relative).

The tasks of defining a company's financial position compound indicator structure deviation are as follows:

- analysis of structural deviation trends comparing the base of actual and comparative data;
- analysis of the actual constituent parts' ratio deviation scale as compared with the base situation;
- defining the compound indicator rate if the change rate of an indicator is known.

The analysis of a company's financial position compound indicator structural changes comprises the calculation of absolute and relative structural change indicators and the evaluation of the generalizing indicator.

REFERENCES

- Bagdžiūnienė, V. (2008). *Finansinių ataskaitų analizė: esmė ir verslo situacijos*. Vilnius: Conto Litera.
- Baležentis, A., Vijeikis, J. (2010). *Krizės valdymo veiksniai ir priemonės Lietuvos įmonėse*. Management theory and studies for reval business and infrastructure development, Vol. 23, issue 4, p. 1–10.
- Black, G. (2004). *Applied Financial Accounting and Reporting*. New York: Oxford University Press.
- Beržinskienė, D., Virbickaitė, R. (2006). *Dinaminės įmonių krizių vystymosi alternatyvos*. Ekonomika ir vadyba: aktualijos ir perspektyvos, t. 2, Nr. 7, p. 21–24.
- Buškevičiūtė, E., Mačerinskienė, I. (2008). *Finansų analizė*. Kaunas: Technologija.
- Bivainis, J., Garškaitė, K. (2010). *Įmonių bankroto grėsmės diagnostikos sistema*. Verslas: teorija ir praktika, 11(3), 204-212.
- Brigham, E. F., Daves, P. R. (2004). *Intermediate Financial Management*. Thomson, South Western.
- Boguslauskas, V., Jagelevičius, G. (2002). *Įmonių veiklos finansinis vertinimas*. Kaunas: Technologija.
- Damodar N. Gujarati. (2004). *Basic Econometrics*. Fourth edition. McGraw Hill.
- Edwards, D., Hamson, M. (1989). *Guide to Mathematical Modelling*. Boca Raton, Fla., CRC Press.
- Francis, A. (1993). *Business Mathematics and Statistics*. London: DP Publications.

- Chan, Y. (2004). Performance measurement and adaption of balanced scorecards. A survey of municipal governments in the USA and Canada. *The International Journal of Public Sector Management*, Vol. 17, issue 3, p. 204–221.
- Čekanavičius, V., Murauskas, G. (2000). *Statistika ir jos taikymai. I dalis*. Vilnius: TEV.
- Girdzijauskas, S. (1997). *Finansiniai skaičiavimai*. Kaunas: Technologija.
- Ginevičius, R., Tvaronavičienė, M. (2004). Collection of business cases (finance). *Technika*, Vol. 1, p. 2–7.
- Gronskas, V. (2006). *Ekonominė analizė*. Kaunas: Technologija.
- Haugen, R., Senbet, L. (1978). The insignificance of bankruptcy costs to the theory of optimal capital structure. *Journal of Finance*, No. 70, p. 383–393.
- Gimžauskienė, V., Klovienė, L. (2010). Research of the performance measurement system: Environmental perspective. *Engineering economics [Inžinerinė ekonomika]*, Vol. 21, issue 2, p. 180–186.
- Jasevičienė, F., Giniotienė, R., Stankevičienė, V. (2000). *Bankų rizikos: sisteminis požiūris*. Vilnius: LBDFI.
- Jėčiuvienė, M. (2006). *Įmonių veiklos ekonominė analizė*. Vilnius: LKA.
- Juozaitienė, L. (2007). *Įmonės finansai: analizė ir valdymas*. Šiauliai: Šiaulių universiteto leidykla.
- Karlof, B., Lovingsson, F. (2007). *Vadybos koncepcijos ir modeliai nuo A iki Z*. Vilnius: Verslo žinios.
- Kėdaitis, V. (2009). *Koreliacinės ir regresinės analizės pagrindai*. Vilnius: Vilniaus universiteto leidykla.
- Lazauskas, J. (2005). *Įmonių ūkinės ir komercinės veiklos ekonominė analizė*. Vilnius: Technika.
- Levine, D., Stephan, D., Krehbiel, T., Berenson, M. (2005). *Statistics for Managers using Microsoft*. Pearson Education Inc., Upper Saddle River, New Jersey.
- Mackevičius, J. (2005). *Įmonių veiklos analizė. Informacijos rinkimas, sisteminimas ir vertinimas*. Monografija. Vilnius: TEV.
- Mackevičius, J. (2007). *Įmonių veiklos analizė. Informacijos rinkimas, sisteminimas ir vertinimas*. Vilnius: TEV.
- Mackevičius, J. (2009). *Finansinių ataskaitų auditas ir analizė. Procedūros, metodikos ir vertinimai*. Vilnius: TEV.
- Mackevičius, J., Poškaitė D. (2003). Finansinio svarto apskaičiavimas ir interpretavimas. *Ekonomika*, 2003, Nr. 61, p. 100–110.
- Mackevičius, J., Valkauskas, R. (2010). Integruota įmonės finansinės būklės ir veiklos rezultatų analizės metodika. *Verslas: teorija ir praktika*, t. 11(3), p. 213–221.
- Martišius, S., Kėdaitis, V. (2010). *Statistika. I dalis. Statistinės analizės teorija ir metodai*. Vilnius: Vilniaus universiteto leidykla.
- Najmi, M., Kehoe, D. (2001). The role of performance measurement systems in promoting greality development beyond ISO 9000. *International Journal of Operations a Production Management*, Vol. 21, issue 1–2, p. 159–172.
- Palepu, K., Healy, M., Bernard, L. (2004). *Business Analysis and Valuation. Using Financial Statements*. Thomson, South-Western.
- Parker, Ch. (2000). Performance measurement. *Work Study*, Vol. 49, issue 2, p. 63–66.
- Rutkauskas, A. (2000). *Finansų ir komercijos kiekybiniai modeliai*. Vilnius: Technika.
- Rutkauskas, V. (2001). *Finansinės veiklos valdymas*. Daktaro disertacija. Socialiniai mokslai, ekonomika. Vilnius, Vilniaus Gedimino technikos universitetas.
- Rutkauskas, A., Stankevičius, P. (2004). *Finansų analizė, valdymas ir prognozavimas*. Vilnius: Vilniaus pedagoginio universiteto leidykla.
- Schlittgen, R. (1993). *Einführung in die Statistik: Analyse und Modellierung von Daten*. München, Wien.
- Slatkevičienė, G., Vanagas, P. (2001). *Veiklos kompleksinio vertinimo sistema: sudarymo teorija ir metodai*. Monografija. Kaunas: Technologija.

Stundžienė, A., Boguslauskas, V. (2006). Valuation of bankruptcy risk for Lithuanian companies. *Engineering Economics [Inžinerinė ekonomika]*, Vol. 4, issue 49, p. 29–36.

Taticchi, P., Balachandran, K. (2008). Forward performance measurement and management of integrated frameworks. *International Journal of Accounting Information Management*, Vol. 16, issue 2, p. 104–154.

Valkauskas R., Zaicev S. (2007). Lietuvos bendrasis vidaus produktas: struktūra ir jos pokyčiai. *Lietuvos statistikos darbai*. Vilnius, Nr. 46, p. 88–99.

Спасская, О. (2006). Развитие методов макроэкономического анализа структурных изменений в экономике России. Автореферат диссертации. Москва.