



Improving the Analysis of Financial Condition of Business Entities

Yusuf Usmonovich Sunnatov

Head of the Department, Bukhara State University, Uzbekistan

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Abstract

In the article, based on the generalized conditional reference balance, a rating methodology was developed that assesses the quality of the accounting balance of companies. Based on the quality of the accounting balance of companies, 4 quality gradations were established to divide them into groups. Also, in order to know the position of the companies in the top power, the financial size of the companies, which is a new economic term, was introduced and its calculation methodology was given. Based on the financial size of the companies, the financial size was divided into 9 steps to determine their overall comparative value. In order to determine the position of the companies included in each level in the financial top strength, a methodology for determining the financial rating within the ranking level was developed.

Keywords: *Companies; Generalized Conditional Reference Balance; Quality Gradation; Ranking Step; Financial Rating*

Introduction

Under the influence of market competition, company owners and management factors, positive and/or negative situations arising in the company's financial and economic activities are directly or indirectly reflected in its management and financial accounting documents (including reports). Such situations always demand the relevance and necessity of economic and financial analysis on the basis of accounting documents and reports that officially reflect the results of financial and economic activity of any company of any organizational and legal form and type of activity. Because, on the one hand, the owners and potential investors of the company, and on the other hand, its management (executive body) and contractual business partners are interested in such an analysis, which allows making management and investment decisions. Based on the assessment of the quality of management activity, it is determined by the analysis of the indicators of the accounting balance, the signs of positive or negative situations arising in its financial and economic activity under the influence of market competition, company owners and hired management factors.

The activities of the owners and management of the company are aimed at effective management of long-term assets (LTA(a)), current (short-term) assets (CA(b)), liabilities (L(c)) and own (private) capital (OC(d)). In this case, the ability to determine the quality of management and accounting activity

using the parameters of the accounting balance requires the analysis of its financial and economic activity. After all, based on the analysis of financial and economic activities of companies, including the quality of management and accounting, it is possible to balance and optimize the parameters of the balance structure and analytically determine the signs of imbalances in the company's balance sheet. In the context of what has been said, the following conclusion is appropriate: financial analysis is still relevant in the life of companies, its possibilities are expanding and developing more and more.

To be convinced of this conclusion, it is enough to look analytically at the development history and trends of the world experience of financial analysis and management. Based on their analysis, the following conclusion can be drawn: the methodology of financial analysis includes various methods, methods and techniques, as well as a large number (more than 50) of indicators (coefficients), which are used to make management and investment decisions based on specific goals, as well as management and financial allows you to keep accounts and reports. The large number of existing financial analysis indicators, the fact that most of them are similar in content, and the use of complex mathematical equipment (modern mathematical methods and models) in the quantitative determination of their interdependence and influence remains weak, on the one hand, it limits the quality and possibilities of making targeted decisions based on their analysis, on the other on the other hand, the quality of management and financial accounts and reports of the company is decreasing. As a result, under the influence of various factors, it is difficult to make a clear and reliable assessment of the quality of the company's management and financial accounts and reports, as well as the quality of the company's management and decisions made by it. But since the issues related to finance, accounting and analysis of the modern company tend to change and develop continuously, it is natural for their methodological base to improve with the passage of time.

Literature Review

The problems related to the research topic, as well as its urgency have been studied in the research papers of such scholars as Birman G., Schmidt S., Van Horn D.K., Bernstein L.A., Stone D, Hatching K., Bocharov V.V., Alekseev P.D., Balabanov I.T., Kolass B., Sheremet A.D., S.I. Krilov, Bank V.R., Kostirko R.O., Shokhazamiy Sh.Sh., Alimov B.B. and others. In their research papers they have analyzed current methods and technique of determining rating assessment of financial condition of non-financial companies. Moreover, they have expressed their views on the rating assessment. Herewith, foreign scholars have used classical methods in financial analysis. For example, Kostirko R.O has noted that the lack of a single standard method for determining the rating of non-financial companies makes it very complicated to determine the rating assessment of non-financial companies.

Sheremet A.D. emphasizes that one of the non-financial companies, which differs from various other industries and possesses efficient performance can be studied as a reference standard. This does not impose any restrictions on the use of the evaluation method because the financial performance of different business entities is studied in terms of comparison.

Data and Methodology

At the same time, scientific studies on comprehensive analysis and rating assessment of companies' financial situation are being carried out in global practice. However, the issues of comparative assessment of quality levels based on the methodology of rating and ranking by means of coefficients in correct and inverse proportions based on the summary indicators of the accounting balance, which represent the financial status of economic entities in a complex manner, have not been effectively solved on the basis of specific mathematical methods and criteria. In this context, due to the increasing digitization of the activities of national and international rating evaluation systems, the theoretical and

methodological basis related to these issues is not sufficiently developed, the urgency and necessity of achieving their effective solution is emerging.

A Proposed Mathematical Approach

The methodological approach based on the rules given above includes a set of methods (methodologies) given below:

The first method: 6 are correct $\left(\frac{LTA}{OC}, \frac{LTA}{CA}, \frac{L}{CA}, \frac{LTA}{L}, \frac{L}{OC}, \frac{OC}{CA}\right)$ and 6 reversed $\left(\frac{OC}{LTA}, \frac{CA}{LTA}, \frac{CA}{L}, \frac{L}{LTA}, \frac{L}{OC}, \frac{OC}{CA}\right)$ determining the minimum and maximum limit values of a total of 12 relative coefficients;

The second method: Determination of the optimal limit for the minimum and maximum limit values of 6 positive and 6 inverse ratio coefficients;

The third method: Determination of reference quantities lying within the interval of minimum and maximum limit values of 12 relative coefficients;

The fourth method: Determination of ratings of companies according to 4 financial quality conditions using a generalized criterion (its modular form);

The fifth method: Based on the company's normalized financial size and rating on a logarithmic scale, its ranking position in financial top–strength was determined.

We reveal the content of the methodological approach in the sequence of the methods included in it.

The first method: One of the main goals of company owners is to increase the mobility of balance sheet items. During this movement, the value of a total of 12 relative coefficients changes in a certain interval by means of the coefficients of the balance sheet items of the company with a stable financial position. If one of these relative coefficients does not change in a certain interval, this will affect the other relative coefficients. As a result, it leads to a violation of the balance sheet items.

In order to determine the balance sheet quality assessment (rating) of a non–financial company, with the aim of simplifying to apply the 12 coefficients, we define them accordingly as follows:

$$\frac{LTA}{CA} = x_1, \frac{CA}{LTA} = x_2, \frac{PE}{TL} = x_3, \frac{TL}{PE} = x_4, \frac{LTA}{PE} = x_5, \frac{PE}{LTA} = x_6,$$

$$\frac{CA}{TL} = x_7, \frac{TL}{CA} = x_8, \frac{LTA}{TL} = x_9, \frac{TL}{LTA} = x_{10}, \frac{CA}{PE} = x_{11}, \frac{PE}{CA} = x_{12}$$

(here LTA – long–term assets, CA – current assets, PE – private equity, TL – total liabilities).

The values of the defined minimum and maximum limits of these coefficients were as follows:

$$0,1 \leq x_1 \leq 1, \quad 1 \leq x_2 \leq 10, \quad 1 \leq x_3 \leq 4, \quad 0,25 \leq x_4 \leq 1, \quad 0,5 \leq x_5 \leq 0,8,$$

$$1,25 \leq x_6 \leq 2, \quad 1 \leq x_7 \leq 2, \quad 0,5 \leq x_8 \leq 1, \quad 0,1 \leq x_9 \leq 2, \quad 0,5 \leq x_{10} \leq 10,$$

$$0,5 \leq x_{11} \leq 8, \quad 0,13 \leq x_{12} \leq 2.$$

The second method (determining the optimal dividing limit for the minimum and maximum limit values of 6 correct and 6 reverse relative coefficients).

Using the defined limits of the six correct $\left(\frac{LTA}{OC}, \frac{LTA}{CA}, \frac{L}{CA}, \frac{LTA}{L}, \frac{L}{OC}, \frac{OC}{CA}\right)$ and 6 reversed $\left(\frac{OC}{LTA}, \frac{CA}{LTA}, \frac{CA}{L}, \frac{L}{LTA}, \frac{OC}{L}, \frac{CA}{OC}\right)$ coefficients presented in the first methodology, the optimal minimum and maximum amount for them is determined as follows:

- Using the minimum and maximum amounts determined for these correct proportions, their optimal minimum and maximum amounts are determined as follows:

$$\begin{aligned} \frac{LTA}{OC} \cap \frac{LTA}{CA} \cap \frac{L}{CA} \cap \frac{LTA}{L} \cap \frac{L}{OC} \cap \frac{OC}{CA} \\ = [0,5; 0,8] \cap [0,1; 1] \cap [0,5; 1] \cap [0,1; 2] \cap [0,25; 1] \cap [0,125; 2] \\ = [0,5; 0,8] \end{aligned}$$

- Using the minimum and maximum amounts determined for these inverse ratios, their optimal minimum and maximum amounts are determined as follows:

$$\begin{aligned} \frac{CA}{LTA} \cap \frac{OC}{L} \cap \frac{OC}{LTA} \cap \frac{CA}{L} \cap \frac{L}{LTA} \cap \frac{CA}{OC} = [1; 10] \cap [1; 4] \cap [1,25; 2] \cap [1; 2] \cap \\ [0,5; 10] \cap [0,5; 8] = [1,25; 2] \end{aligned}$$

The third method (determining standard quantities lying within the interval of minimum and maximum limit values of 12 relative coefficients).

The generalized conditional reference balance was as follows:

Generalized conditional reference balance	
LTA (a) = 57y	PE (c) = 92y
CA (b) = 97y	TL (d) = 62y

The quantities of the x_3 standard determined on this conditional reference balance are as follows:

$$x_{3(1)} = 0,59, x_{3(2)} = 1,7, x_{3(3)} = 1,5, x_{3(4)} = 0,67, x_{3(5)} = 0,62, x_{3(6)} = 1,61,$$

$$x_{3(7)} = 1,56, x_{3(8)} = 0,64, x_{3(9)} = 0,92, x_{3(10)} = 1,09, x_{3(11)} = 1,05, x_{3(12)} = 0,95$$

The fourth method: Determination of ratings of companies according to 4 financial quality conditions using a generalized criterion (its modular form);

Using the reference values and the minimum and maximum limits of all 12 coefficients determined above, the summarized criterion adopted in the following form is considered to be relevant:

$$F = \sum_{i=1}^{12} |x_{3(i)} - x_i|$$

Using the proposed summarized criterion, it is possible to assess the rating of any non-financial company, which reflects the quality of the financial position of any organizational and legal form and type of business. For said purpose, in order to divide the amount of the criterion F into qualitative gradations, using the standard values and minimum and maximum limits of all 12 coefficients determined above, we calculate its minimum ($minF$) and maximum ($maxF$) values as follows:

$$\begin{aligned} \min F &= |0,59 - 1| + |1,7 - 1| + |1,5 - 1| + |0,67 - 1| + |0,62 - 0,5| \\ &\quad + |1,61 - 1,25| + |1,56 - 2| + |0,64 - 0,5| + |0,92 - 0,1| \\ &\quad + |1,09 - 0,5| + |1,05 - 0,5| + |0,95 - 0,13| \\ &= 5,04 \end{aligned}$$

$$\begin{aligned} \max F &= |0,59 - 0,1| + |1,7 - 10| + |1,5 - 4| + |0,67 - 0,25| + |0,62 - 0,8| + \\ &\quad |1,61 - 2| + |1,56 - 1| + |0,64 - 1| + |0,92 - 2| + |1,09 - 10| + |1,05 - 8| + \\ &\quad |0,95 - 2| = 31,19 \end{aligned}$$

We divide the range of the calculated $\min F$ and $\max F$ values into four qualitative gradations as described above, i.e.:

- (0; 5,04] – excellent quality;
- (5,04; 15,595] – good quality;
- (15,595; 31,19] – satisfactory quality;
- (31,19; ∞) – poor quality.

The fifth method: Based on the company's normalized financial size and rating on a logarithmic scale, its ranking position in financial top–strength was determined.

Thus, the quality of the financial position of a non–financial company is assessed by a rating using the summarized criterion F. This rating is determined in four gradation intervals.

In the schematic model of the above non–financial company's balance sheet indicators, which depends on the same unknown, it serves as a necessary indicator in determining the financial amount of the non–financial company. In this case financial amount will be equal to $k = \log_{10} y$.

In a competitive market environment, it is much more complicated for non–financial companies to operate according to the above schematic model. In such circumstances, the financial amount of the balance sheet items varies. That is, the above model shall look like this.

Generalized conditional reference balance	
LTA (a) = 57y ₁	PE (c) = 92y ₃
CA (b) = 97y ₂	TL (d) = 62y ₄

According to the above schematic model, the financial amount of a non–financial company is determined as follows.

$$k = \log_{10} \frac{y_1 + y_2 + y_3 + y_4}{4}$$

In reliance upon the financial amount of non–financial companies, we divide the financial amount into several levels to determine their comparable total cost. These levels are as follows:

- Level 1 is called “A”. This level includes all non–financial companies with a financial amount more than 8 (i.e. $k > 8$);
- Level 2 is called “B”. This level includes all non–financial companies with a financial amount more than 7 and less than 8 (i.e. $7 < k \leq 8$);

Level 3 is called “C”. This level includes all non-financial companies with a financial amount more than 6 and less than 7 (i.e. $6 < k \leq 7$);

Level 4 is called “D”. This level includes all non-financial companies with a financial amount more than 5 and less than 6 (i.e. $5 < k \leq 6$);

Level 5 is called “E”. This level includes all non-financial companies with a financial amount more than 4 and less than 5 (i.e. $4 < k \leq 5$);

Level 6 is called “F”. This level includes all non-financial companies with a financial amount more than 3 and less than 4 (i.e. $3 < k \leq 4$);

Level 7 is called “G”. This level includes all non-financial companies with a financial amount more than 2 and less than 3 (i.e. $2 < k \leq 3$);

Level 8 is called “H”. This level includes all non-financial companies with a financial amount more than 1 and less than 2 (i.e. $1 < k \leq 2$);

Level 9 is called “I”. This level includes all non-financial companies with a financial amount more than 0 and less than 1 (i.e. $0 < k \leq 1$).

Creating a ranking for non-financial companies by dividing them into intermediate gradations of one unit length makes it easier for us to draw conclusions for these non-financial companies. However, since there are unlimited numbers in a single unit range, it is very unlikely that the financial amount of two or more non-financial companies will be equal to the same number. We use an overall estimate to determine robust position of non-financial companies that belong to each of these levels. This assessment is determined as follows:

$$n = \frac{\textit{the normalized financial size of the company}}{\textit{the company's financial rating}}$$

The higher this overall assessment, the more stable the company's financial position, as well as the higher its position in the top-strength.

Financial statements of each company, which role in financial strength is comparable, should be brought to the same financial amount (thousand, million or billion UZS or in the currency, such as the USD or the Euro).

Practical application of the results, specified above, can be seen in the example of non-financial companies in the F, G and H levels of the United States.

Results and Discussion

Based on the new method proposed above, in determining the overall rating of companies, it was seen that it is important to give a quantitative assessment of the rating of the financial condition of companies compared to the generalized conditional reference balance sheet. Due to the large number of objects that are studied when determining the financial status rating of companies, we divide them into groups such as companies from America, Europe and Asia.

The performance of American companies with a normalized financial size (3;4) from 2016 to 2020 was analyzed based on the mathematical approach of financial analysis. The results of the analysis are presented in Table 1.

Table 1
Determining the position of the top-power American companies with a normalized financial size (3;4] in 2016-2020

Companies	Standardized financial size					Financial rating					The financial rating within the ranking stage					Top strength position				
	2016 year	2017 year	2018 year	2019 year	2020 year	2016 year	2017 year	2018 year	2019 year	2020 year	2016 year	2017 year	2018 year	2019 year	2020 year	2016 year	2017 year	2018 year	2019 year	2020 year
General motors	3,22	3,21	3,24	3,24	3,25	15,20	17,53	16,09	15,25	14,45	0,21	0,18	0,20	0,21	0,22	5	6	9	8	10
Alphabet	3,02	3,09	3,17	3,25	3,32	9,72	6,10	5,94	4,74	3,79	0,31	0,51	0,53	0,69	0,87	3	1	1	1	1
Microsoft	3,11	3,23	3,25	3,29	3,31	7,03	6,62	7,65	6,32	5,41	0,44	0,49	0,42	0,52	0,61	1	2	2	2	2
Exxonmobil	3,39	3,41	3,41	3,43	3,40	20,58	19,09	10,60	18,82	19,61	0,16	0,18	0,32	0,18	0,17	6	7	4	10	13
Apple	3,37	3,44	3,43	3,39	3,38	9,39	9,53	10,60	10,35	13,86	0,36	0,36	0,32	0,33	0,24	2	3	3	3	8
Walmart	3,17	3,18	3,21	3,25	3,27	10,73	10,77	11,49	12,55	9,24	0,30	0,30	0,28	0,26	0,35	4	4	6	5	3
Ford Motor	3,25	3,28	3,28	3,28	3,30	21,00	19,09	18,86	20,34	22,31	0,15	0,17	0,17	0,16	0,15	7	8	10	12	14
Verizon	3,30	3,31	3,32	3,35	3,39	38,44	28,94	25,20	18,14	16,20	0,09	0,11	0,13	0,18	0,21	9	10	12	9	11
Chevron	3,29	3,28	3,27	3,24	3,25	22,04	22,11	19,11	21,10	23,00	0,15	0,15	0,17	0,15	0,14	8	9	11	13	15
UnitedHealth Group	↓	3,02	3,06	3,12	3,17	↓	12,15	12,70	13,22	12,09	↓	0,25	0,24	0,24	0,26	↓	5	7	6	7
Amazon	↓	↓	3,07	3,21	3,37	↓	↓	10,50	10,50	10,08	↓	↓	0,29	0,31	0,33	↓	↓	8	4	5
CVS Health	↓	↓	3,17	3,23	3,24	↓	↓	14,72	15,11	13,96	↓	↓	0,22	0,21	0,23	↓	↓	5	7	9
Walt disney	↓	↓	↓	3,16	3,18	↓	↓	↓	18,55	16,28	↓	↓	↓	0,17	0,20	↓	↓	↓	11	12
Intel	↓	↓	↓	↓	3,04	↓	↓	↓	↓	9,01	↓	↓	↓	↓	0,34	↓	↓	↓	↓	4
Facebook	↓	↓	↓	↓	3,02	↓	↓	↓	↓	9,29	↓	↓	↓	↓	0,32	↓	↓	↓	↓	6
Exelon	↓	↓	↓	↓	3,01	↓	↓	↓	↓	28,92	↓	↓	↓	↓	0,10	↓	↓	↓	↓	16

↓ - During this period, the normalized financial size of the company was one step lower

Among the companies in this range in 2016, “Microsoft” ranked first has the highest internal financial rating of 0,44. “Apple” and “Alphabet” have an internal financial rating of 0,36 and 0,31, respectively, ranking second and third in 2016. Incoming “Ford Motor Company”, “Chevron” and “Verizon” occupy the bottom three positions, with intra–rank financial scores of 0,15 and 0,09, respectively. The reason for taking over is that the balance sheet quality of “Ford Motor” and “Chevron” companies is satisfactory, and the balance sheet quality of “Verizon” company is “poor”.

During the next 4 years (2017, 2018, 2019 and 2020), the financial rating of “Alphabet” and “Microsoft” companies within the ranking increased as a result of the increase in their logarithmically normalized financial size and the improvement of the quality of the accounting balance. In 2017, 2018, 2019, the company “Apple” occupied 3 places. But over the years, we see that Apple’s logarithmically normalized financial size has shrunk instead of growing. At the same time, its financial rating has also deteriorated. As a result, in 2020, the Apple company took 8th place. This situation is definitely not positive. By 2020, the company “Walmart” occupies the 3rd place among the companies on this level. The reason for taking such a place is that its logarithmically normalized financial size has grown over the years and its balance sheet quality in 2020 is at a good level, and its financial rating within the ranking is equal to 0,35.

“Ford Motor”, “Chevron” and “Verizon” companies occupy the last three places in 2017 and 2018. If we pay attention to the result of the analysis of “Ford Motor” company based on the mathematical approach of the financial analysis method, we can see that its normalized financial size in 2017–2019 has not changed compared to the previous period. This is definitely a negative situation for the company. Because as long as the company operates, its normalized financial size should increase compared to the previous year. But despite the fact that 2020 will be a virus pandemic for Ford Motor Company, we can see that its normalized financial size has slightly increased compared to 2019. We can see that the quality of its balance sheet in 2018 has improved slightly compared to last year. As a result, the financial rating of the company in 2018 was equal to 18,86. As a result of the virus pandemic

affecting this company's financial rating, its 2020 financial rating slightly worsened from last year's to 22,31. As a result, his financial rating in the 2020 ranking has also deteriorated slightly, and he has taken the last place in the top power.

As Verizon's log-normalized financial size has grown over the years and its financials have improved, the company rose to the top spot in 2019. One of the last ranked companies in 2019 was Walt Disney Company, which was one place lower in previous periods. Over the years, as a result of the increase in the logarithmic scale of the normalized financial size of this company, by 2019 it was included in the ranks of the companies in the (3;4) rank. Also, its financial rating within the ranking rank was equal to 0,17. Exelon, which took one of the last places in 2020, also in previous periods, it was among the lowest companies. It also joined the ranks of companies in the (3;4) range by 2020 as a result of the increase in its logarithmic scale normalized financial size over the years according to, the top ranks last in strength.

The results of the analysis of American companies in the range (2;3) are presented in Table 2.

Table 2

Determining the position of the top-power American companies with a normalized financial size (2;3] in 2016-2020

Companies	Standardized financial size					Financial rating					The financial rating within the ranking stage					Top strength position				
	2016 year	2017 year	2018 year	2019 year	2020 year	2016 year	2017 year	2018 year	2019 year	2020 year	2016 year	2017 year	2018 year	2019 year	2020 year	2016 year	2017 year	2018 year	2019 year	2020 year
Occidental Petroleum corporation	2,50	2,49	2,51	2,92	2,8	14,31	14,30	12,66	21,46	27,41	0,17	0,17	0,20	0,14	0,10	11	11	7	11	12
Dell technologies INC	2,96	2,98	2,94	2,97	2,98	19,65	20,0	251,95	83,07	39,26	0,15	0,15	0,01	0,04	0,08	13	13	19	18	15
Intel	2,90	2,95	2,97	3,00	↑	8,43	11,48	12,01	11,93	↑	0,34	0,26	0,25	0,25	↑	3	6	6	5	↑
Tesla	2,24	2,3	2,36	2,41	2,56	14,08	17,94	16,67	13,98	4,87	0,16	0,13	0,14	0,17	0,52	12	16	12	9	2
Pepsi	2,75	2,78	2,77	2,79	2,86	18,58	19,78	16,99	18,57	21,46	0,15	0,14	0,16	0,15	0,13	14	14	11	10	11
Coca - cola	2,81	2,81	2,80	2,82	2,83	11,27	13,33	14,21	15,59	16,44	0,25	0,21	0,20	0,18	0,17	6	9	8	7	9
Facebook	2,61	2,72	2,79	2,94	↑	22,04	15,47	13,84	6,64	↑	0,12	0,18	0,20	0,44	↑	17	10	9	2	↑
AmerisourceBergen	2,38	2,40	2,43	2,44	2,50	36,47	39,33	29,54	31,71	119,58	0,07	0,06	0,08	0,08	0,02	21	21	18	16	17
United Airlines Holdings Inc.	2,50	2,52	2,59	2,62	2,67	19,78	21,23	23,59	21,90	28,32	0,13	0,12	0,11	0,12	0,09	16	17	16	14	14
Nike	2,14	2,18	2,17	2,20	2,33	2,48	2,6	4,55	6,36	9,98	0,86	0,84	0,48	0,35	0,23	1	1	2	3	6
Exelon	2,96	2,96	2,97	2,99	↑	27,53	27,76	25,95	28,94	↑	0,11	0,11	0,11	0,10	↑	18	18	15	15	↑
Medtronic	2,86	2,87	2,82	2,81	2,82	11,87	11,41	10,96	11,22	11,30	0,24	0,25	0,26	0,25	0,25	8	7	5	6	5
CNH Industrial	2,51	2,53	2,51	2,52	2,53	24,87	27,48	22,85	19,79	24,57	0,10	0,09	0,11	0,13	0,10	19	19	14	12	13
Altria	2,55	2,53	2,64	2,60	2,58	20,02	26,53	34,46	36,17	46,23	0,13	0,10	0,08	0,07	0,06	15	20	17	17	16
Nucor	2,02	2,04	2,09	2,10	2,14	5,55	5,21	3,99	4,65	4,34	0,36	0,39	0,52	0,45	0,49	2	2	1	1	3
International Paper	2,42	2,42	2,42	2,41	2,37	24,75	17,65	17,86	18,15	12,46	0,10	0,14	0,14	0,13	0,19	20	15	13	13	7
Micron Technology	2,30	2,40	2,47	2,52	2,57	8,36	7,48	9,11	9,81	9,37	0,27	0,32	0,27	0,26	0,27	5	3	4	4	4
Dow chemical	2,77	2,77	2,77	2,66	2,67	11,19	9,83	6,24	14,54	14,96	0,25	0,28	0,44	0,18	0,18	7	5	3	8	8
Walt disney.	2,83	2,86	2,86	↑	↑	14,93	16,70	15,79	↑	↑	0,19	0,17	0,18	↑	↑	10	12	10	↑	↑
CVS Health	2,84	2,84	↑	↑	↑	9,59	9,54	↑	↑	↑	0,30	0,30	↑	↑	↑	4	4	↑	↑	↑
Amazon	2,79	2,98	↑	↑	↑	11,88	13,19	↑	↑	↑	0,23	0,23	↑	↑	↑	9	8	↑	↑	↑
JetBlue	↓	↓	↓	↓	2,01	↓	↓	↓	↓	13,86	↓	↓	↓	↓	0,14	↓	↓	↓	↓	10
Regeneron Pharmaceuticals	↓	↓	↓	↓	2,05	↓	↓	↓	↓	2,04	↓	↓	↓	↓	1,00	↓	↓	↓	↓	1

↑ - The normalized financial size of the company was one step higher during this period

↓ - During this period, the normalized financial size of the company was one step lower

American companies with a normalized financial size in the range of (2;3) were analyzed based on a mathematical approach and their place in the top power was determined. In 2016, the Nike company took one of the first places with its financial rating within the ranking equal to 0,86. Its balance sheet because of its excellent quality, it ranks first in 2016. Its normalized financial size has continued to grow in the following years. Despite being affected by the virus pandemic, Nike's normalized financial size in 2020 has grown significantly compared to the previous year. The company's 2020 indicator is equal to 2,33. But we can see that the balance sheet quality of this company has deteriorated over the years. If its balance sheet quality in 2016 was excellent (financial rating equal to 2,48), then by 2020 its balance sheet quality is good (financial rating is equal to 9,98). During such years, the deterioration of the quality of the company's accounting balance will affect its financial rating within the ranking. As a result of this, we can see from the analysis results in Appendix 2 that its position in the top power has decreased over the years. We see that the company "Nike" took the 6th place in the top strength among the companies in 2020 (2;3). This is definitely not a positive situation for the company.

We can see that the normalized financial size of the Nucor company has grown year by year from the results of the analysis presented in Table 2. If its normalized financial size in 2016 was equal to 2,02, despite the fact that 2020 will be a virus pandemic, its normalized financial size this year has increased compared to last year, and this indicator is equal to 2,14. At the same time, we can see that the quality of its balance sheet has improved slightly during 2016–2018. Initially, in 2016 and 2017, its balance sheet quality was good, but in 2018–2020, we see that its balance sheet quality is excellent. As a result, its financial rating has also improved, from 5,55 in 2016 to 3,99 in 2018. But its financial ratings for 2019 and 2020 have slightly worsened compared to 2018, with 4,65 and 4,34 respectively. As a result of all of the above affecting the financial rating within the ranking, its indicator in 2016 was equal to 0,36, and in 2020 this indicator was equal to 0,49. When the top strength is determined by the financial ranking within the ranking, we see that the Nucor company took the second place in 2016 and 2017, the first place in 2018 and 2019 and the third place in 2020.

When determining the top strength among American companies with a normalized financial size in the range (2;3), Tesla was initially ranked 12th and 16th in 2016 and 2017, respectively. Its 2016 normalized financial size was 2,24, and in 2017 it was the ratio increased slightly to 2,3. In the following periods, its normalized financial size continued to increase. Even in the period of the virus pandemic, Tesla's normalized financial size increased in 2020 compared to the previous year, and this indicator is equal to 2,56 in 2020. We can see the same situation with the quality of its balance sheet. Because the quality of its balance sheet in 2016 was at a good level, we can see that the quality of the balance sheet is at a satisfactory level in 2017. In the next 3 years of the study period, the quality of the balance sheet improved, and in 2020 we see that the quality is excellent has a 2020 financial rating of 4,87. As a result of this, its financial rating within the ranking has been improving since 2018. If its financial rating in the ranking in 2018 was equal to 0,14 in 2019 and 2020 we can see that this indicator is equal to 0,17 and 0,52 respectively. Such positive changes certainly serve to improve the position in the top power. That is why in 2016 and 2017 it took 12 and 16 places in the top power, respectively and in 2020 it took 2 places in the top power.

One of the American companies whose adjusted financial size has increased during the studied periods is Facebook company. Its adjusted financial size in 2016 was 2,61. In the following years, its adjusted financial size continued to increase compared to the previous year, and in 2019 we see that this indicator is equal to 2,94. Even though the virus pandemic will negatively affect many companies in 2020, Facebook's normalized financial size has grown and is one of the top companies. Because the quality of the company's accounting balance in 2016 was at a satisfactory level. Then, changing over the years, we see that by 2019, the quality of the company's balance sheet is at a good level. As a result of this, the company's financial rating within the ranks and its position in the top strength have been improving over the years. Because, in 2016, its financial rating within the ranking was equal to 0,12, and

it took 17th place in the top power. Over the years, his position in the top power has risen, and in 2019 he was in the top 2 position.

In the early years of the studied period, among the American companies, which were in the range of (2;3) and then increased by one point, there are also the companies “Walt Disney”, “CVS Health” and “Amazon”.

Analyzing American companies in the range (2;3) based on the mathematical approach of financial analysis, and determining their top strength, the company “Dell technologies INC” is one of the last. The decrease in the normalized financial size of the rest of the years compared to the previous year is a negative situation for the company. At the same time, initially in 2016, the quality of its balance sheet was satisfactory, but in 2018, we see that the quality of the balance sheet is poor. Although the quality of the balance sheet improved slightly in the following years 2019 and 2020, but it still remains of poor quality. Of course, all of this affects the financial rating within the ranking, which is the main indicator for determining the top strength of companies. Therefore, the company’s financial rating within the ranking in 2016 and 2017 was equal to 0.15. As a result, the company’s top position was 13. In the following years, this indicator decreased slightly, and as a result, we see that its place in the top power has decreased. This is definitely a negative situation for the company.

JetBlue and Regeneron Pharmaceuticals were among America’s (1;2) companies in the 2016–2018 study period. Although these two companies were affected by the virus pandemic, we see their normalized financial size increase in 2020. JetBlue and Regeneron Pharmaceuticals’ 2020 normalized financial ratios were 2,01 and 2,05 respectively. JetBlue’s financial rating for the period was 13,86, maintaining its balance sheet quality at a good level. Its financial rating due to its slightly lower position, the financial rating within the ranking is also lower. As a result, it ranks 10th among the companies in this range. However, Regeneron Pharmaceuticals has a slightly better financial rating in 2020, which is equal to 2,04. As a result, the quality of its accounting balance is also excellent let’s see if it’s true. We can see that the financial rating within the ranking scale, which incorporates the result of each elemental change in the normalized financial size and financial rating, is equal to 1. “Regeneron Pharmaceuticals” company can definitely take the first place with such a high result.

Conclusion

The mathematical approach to the comprehensive analysis of the financial situation of the companies and the comparative comparative assessment and ranking of the companies, based on the comprehensive analysis of the financial situation of foreign countries, the empirical analytical–test results of the comparative comparative assessment of the financial situation and the ranking of the countries (that is, the comparative comparative rating assessment based on the comprehensive mathematical analysis of the financial situation of the countries and the mathematical approach of determining the ranking and the principles and methodology of its application were developed, and the scientific validity of this mathematical approach was empirically confirmed based on the results of a comprehensive analysis of the financial situation, financial rating and ranking of prestigious companies in foreign countries). The methodological importance of this result is that the proposed mathematical approach, the principles and methodology of its application enriched and improved the existing theoretical–methodological basis of complex financial analysis of company. In this approach, based on the rules of its scientific–methodological base, within the scope of scientific research, it is possible to form relevant scientific conclusions, develop theoretical proposals and practical recommendations. The practical significance of companies in their strategic development plans is mainly two goals: to increase the value and financial size steadily; ensuring the quality of the accounting balance. If these two goals are met, the overall financial rating of the company will also increase. In this case, as a rule, it is important that the financial size of the companies whose financial condition is stabilizing and improving from year to year should be

higher than the inflation level and the general financial rating has been confirmed to increase from year to year. Practical effect—the established rule is that companies should serve as a program in the development of strategic development plans, and the annual growth rate of the financial size should be higher than the current inflation rate.

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