Prediction by financial and economic analysis in the conditions of forest enterprises

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Abstract: Individual companies need to know their financial condition. They have a wide range of methods and procedures to create a system of the financial and economic analysis of a company. The analysis is focused on the evaluation of a specific group of methods for predicting the financial health of a business entity. Evaluations of the financial situation of a company are divided into point methods, mathematical and statistical methods and neural networks. The individual methods differ from each other in difficulty, in the extent of the analyzed areas and possibilities of application. The aim of this work is to assess the possibilities of using selected methods of comprehensive evaluation of companies as a tool for an analysis of the position of each company in the branch. The suitability and feasibility of each method are tested on a selected group of companies. Quick Test, Tamari Model, Beaver Model are included in this work. Based on the results, improvements and recommendations for the practical use were suggested. The results showed that the best predictive methods are Quick Test and Tamari Model, because they are quick and unequivocal when assessing the analyzed companies. An inappropriate prediction method is the Beaver model, which uses only two financial indicators to evaluate companies.

Keywords: financial and economic analysis; prediction analysis; Quick test; Tamari model; Beaver model

The financial analysis is an important part of complex financial management. It provides feedback between the financial plan and the real condition. The real plan is based on information from financial accounting. The quality of results is affected by the quality of input information. It is important to choose suitable methods of financial analysis and to explain the way of reaching results (Krištofík et al. 2010).

The financial and economic analysis consists of several levels. The financial analysis focuses on the identification of individual results and the economic analysis focuses on interpreting the results. Based on the financial analysis, we can examine the reasons that affect the current status of the financial situation. The financial situation includes the volume and quality of business production, marketing activity and other activities (Vlachynský et al. 2002).

The factors that affect the financial analysis can be divided into two groups. The first group includes external factors. The second group includes internal factors. The external factors are inflation, monetary policy and others. The internal factors are profits, volume of sales, transformation processes and others (Kráľovič et al. 2006).

The financial analysis is to review the financial policy of the enterprise at a given time in the past

and its makes future decisions easier. It is achieved by the analysis of financial statements because it involves examining the development or trends of the company's business that can be compared with other firms in the same area and analyzed by means of specific indicators (Stoenoiu 2012).

Prosperity and bankruptcy models are the basic tools of prediction. The bankruptcy models show whether the company is endangered by bankruptcy. The features of bankruptcy are problems with current liquidity, net working capital and profitability of total capital. The prosperity models are created to determine the financial health of the company (Hajdúchová et al. 2014).

The Quick test (Kralicek 1991) is a method that makes it possible to evaluate the company very quickly. This method uses indicators that must represent the information capacity of the balance sheet and profit and loss statement (Sedláček 2011).

The Tamari model (1966) is a method that can be used to assess companies in terms of the industry and size. The point scale is from 0 to 100. If the companies have over 60 points, it means that they are profitable. The companies with average results are in the range of 31 to 59 points. If the companies are weakened, they have less than 30 points (Marinič 2008).

The Beaver model (1968) analyses the average values of the indicators in two files. This author evaluated how to distinguish the indicators from each other. This method is called a profile analysis. On the basis of profile analysis, he concluded that the best indicators of companies are cash flow/ foreign capital and return on total capital (Zalai et al. 2002). W. Beaver was one of the founders of models for bankruptcy prediction that were based on financial ratio indexes. He was the first author to apply a one-dimensional model to results of financial ratio indexes and compared individual results of prosperous and non-prosperous companies (Beaver 1966).

Several authors dealt with the use of prediction models in financial and economic analysis in the current conditions (see Csikosova et al. 2019; Kacer et al. 2019; Jackon, Wood 2018). However, there are no analyses to take into account possible specificities of predicting the future development of forestry enterprises. Based on the application of selected methods of financial and economic analysis ex-ante, this paper tries to identify the possibilities of their use in the conditions of Slovak forest enterprises.

MATERIAL AND METHODS

The company needs to know the present financial and economic situation and the factors that have influenced it. Predictive methods represent a separate area within these methods. Their aim is to assess the financial health of a company in the future and to predict its possible future development. The widest group consists of creditworthy and bankruptcy models, which can be complemented by other procedures as needed. The aim of the article is based on the application of selected methods of the comprehensive evaluation of companies to assess the possibilities of their use as a tool to analyse the position of a company in the industry.

The aim of the article is also to assess the suitability of the methods used in the conditions of forest holdings and expect the need to modify them in accordance with the responsible conditions of forest land management (long production cycle, specific market conditions, the impact of natural conditions etc.).

The following procedures use existing methods of indicators as well as prediction and bankruptcy models to assess the health of the business as a whole.

Based on the theoretical background, the financial and economic analysis was done. In this part the importance of financial and economic analysis is explained, evaluation of ratios and analysis of systems of indicators are carried out. The next part is determined by the aim of the article which is focused on the use and consequently on the evaluation of used systems of indicators. The main part of the article is the application of prediction methods such as Quick test, Tamari model and Beaver model.

Ko (2001) stated that there were numerous research projects that were conducted on corporate financial distress. In the 60s, researchers used statistical models to identify financial ratios that could classify companies into profit or non-profit companies. Beaver (1966) used 30 financial ratios and 79 pairs of companies. The best financial factor was the working capital/debt ratio, which correctly identified 90 percent of the companies. Another suitable financial factor was the net income/total assets ratio, which had 88 percent accuracy.

The companies were assessed according to forest management companies, according to the method of accounting (Slovak accounting standards, double-entry accounting), according to the legal form of business and size of companies. The analyzed

Table 1. QUICK TEST – LESY SR, state enterprise

Item	2013		2014		2015		2016		2017	
	Values	Points	Values	Points	Values	Points	Values	Points	Values	Points
Current Ratio	0.35	4	0.32	4	0.30	4	1.07	1	0.57	4
Equity Turnover Time	1,324	5	1,354	5	1,273	5	1,268	5	1,232	5
Average Collection Period	43	2	37	2	36	2	93	5	44	4
Creditor Payment Period	125	5	116	4	118	4	87	3	77	3
Debt Ratio	11%	1	11%	1	12%	1	16%	1	16%	1
Degree of Financial Independence	790%	1	799%	1	756%	1	532%	1	540%	1
Return on Sales	4.04%	2	4.46%	2	3.57%	2	3.33%	2	3.34%	2
Return on Investment	0.99%	4	1.07%	3	0.91%	4	0.81%	4	0.83%	4
Total		24		22		23		22		24
Mark		3		3		3		3		3

methods were used in the conditions of the Slovak Republic in classic business entities.

Application of intended predictive methods. The first prediction method that is applied is the Quick test. This method tries to find out what chances to survive the company has. Also, it is the tool for identifying the weaknesses and strengths of the company. According to selected indicators the points from 1 to 5 were selected, while the worst value is attributed 5. The highest number of points is 40. For the company it is better when it gets the lowest number of points. The first analyzed company is LESY Slovenske republiky. The company reached the highest number of points for return on equity and creditor payment period. The company reached an average mark of 3 for each analyzed year (Table 1).

Another analyzed company is Mestské lesy, Banská Bystrica, s. r. o. The company reached the high-est points for the current ratio and for return on equity. The best rated indicators are the gross debt and the degree of financial independence, which is positive for the future progress of the company. The best evaluated year was 2013, when the company reached the average points 2 (Table 2).

A further evaluated company is POVINA Cooperative. The used analysis by the Quick test indicates that the company is at the risk of insolvency, especially in the last two years when the company reached the highest mark. The indicators of return on sales and return on total capital show a decreasing tendency, which was manifested by the negative numbers. The company has weaknesses in conversion of inventories to the cash (Table 3).

The last analysed company is Bioles, a. s. The company got an average mark 3. In the last year 2017, the company reached the upper limit of points. The company reached negative values in the indicators

Table 2. QUICK TEST – Mestske lesy Banska Bystrica Ltd.

Item	2013		2014		2015		2016		2017	
	Values	Points	Values	Points	Values	Points	Values	Points	Values	Points
Current Ratio	0.45	5	0.43	5	0.94	5	2.64	4	2.06	4
Equity Turnover Time	329	5	238	5	284	5	316	5	315	5
Average Collection Period	20	2	12	3	35	4	131	5	84	5
Creditor Payment Period	44	2	28	2	38	2	50	2	41	2
Debt Ratio	38%	1	42%	1	34%	1	76%	1	56%	1
Degree of Financial Independence	175%	1	167%	1	162%	1	137%	1	141%	1
Return on Sales	9.01%	1	5.61%	1	1.54%	4	1.41%	4	1.57%	4
Return on Investment	6.36%	2	5.76%	2	1.22%	3	0.94%	4	1.06%	3
Total		19		20		25		26		25
Mark		2		3		3		3		3

Table 3. QUICK TEST – Povina Cooperative

Item	2013		2014		2015		2016		2017	
	Values	Points	Values	Points	Values	Points	Values	Points	Values	Points
Current Ratio	18.09	5	6.86	5	4.70	5	4.70	5	2.21	5
Equity Turnover Time	292	5	353	5	409	5	440	5	483	5
Average Collection Period	209	5	122	5	205	5	200	5	64	5
Creditor Payment Period	21	2	63	3	78	3	126	5	315	5
Debt Ratio	24%	2	18%	3	24%	3	0	5	0	5
Degree of Financial Independence	313%	1	441%	1	324%	1	288%	1	153%	1
Return on Sales	14.74%	1	25.47%	1	2.66%	1	−8.50%	5	−74.79%	5
Return on Investment	13.98%	2	21.45%	1	1.81%	3	−5.24%	5	−34.18%	5
Total		23		24		26		36		36
Mark		3		3		3		5		5

of return on sales and return on total capital. Based on the results it is possible to claim that the company does not have the best prospects for the future. The liquidity of the company has the higher values, because these values are accumulated on the current account (Table 4).

Another method is the Tamari model. This method used 6 indicators. Based on the scoring scale we determined points of the individual indicators. The results of the company LESY SR had a fluctuating character. In the first analyzed year, the company had a stable financial situation. In the next years, the values decreased and the company reached average values. The value of private capital reached the maximum points. It means that the company is not dependent on foreign resources and the company is stable (Table 5).

The company Mestske lesy, Banska Bystrica shows a stable position in trade. However, in 2016 the values decreased, especially as regards the accounts receivable of the company. Also in 2016, the net profit increased, which influenced the evaluation (Table 6).

The Povina Company had the negative values, which is not positive for the future development of the company. At the beginning of the period, the company had the average values, but in thelpast two years, the company fell into the values that suggested a possibility of bankruptcy and unstable development of the company (Table 7).

The last evaluated company is Bioles, Inc. The company showed unstable development, especially in 2017, when the company had a negative value. In 2017, the company reached negative net profit, which classified the company as an unstable company (Table 8).

Another evaluation method is the one-dimensional discrimination analysis called Beaver model

Table 4. QUICK TEST – Bioles, Inc.

Item	2013		2014		2015		2016		2017	
	Values	Points	Values	Points	Values	Points	Values	Points	Values	Points
Current Ratio	14.88	4	6.15	5	5.62	1	27.65	1	0.33	4
Equity Turnover Time	981	5	616	5	402	5	1287	5	1355	5
Average Collection Period	47	4	129	5	130	5	10	1	89	5
Creditor Payment Period	17	1	41	3	83	4	7	1	402	5
Debt Ratio	75%	2	53%	1	51%	1	86%	4	99%	5
Degree of Financial Independence	34%	5	90%	4	96%	4	33%	5	11%	5
Return on Sales	11.52%	1	30.08%	1	15.13%	1	11.93%	1	−28.98%	5
Return on Investment	5.53%	3	17.10%	2	7.93%	3	4.68%	3	−5.53%	5
Total		25		26		24		21		39
Mark		3		3		3		3		5

Table 5. TAMARI MODEL – LESY SR, state enterprise

Item	2013	Points	2014	Points	2015	Points	2016	Points	2017	Points
Equity/Total Capital	0.888	25	0.889	25	0.883	25	0.842	25	0.844	25
Net Profit/Equity	0.011	25	0.012	20	0.010	15	0.010	15	0.010	15
Current Assets/ Current Liabilities	1.286	10	1.366	10	1.311	15	1.957	10	1.948	15
Production Costs/ Inventory	5.301	6	4.473	6	5.286	6	5.305	6	5.470	6
Revenue/ Receivables	8.477	6	9.765	3	10.223	6	3.938	3	8.302	6
Operating Costs/Net Working Capital	8.725	10	7.532	10	8.570	10	4.394	10	3.433	10
Total		82		54		52		49		52

Table 6. TAMARI MODEL – Mestske lesy BB, Ltd.

Item	2013	Points	2014	Points	2015	Points	2016	Points	2017	Points
Equity/Total Capital	0.636	25	0.626	25	0.618	25	0.578	25	0.585	25
Net Profit/Equity	0.100	25	0.092	20	0.020	20	0.016	15	0.025	25
Current Assets/ Current Liabilities	4.715	20	4.732	20	3.742	20	4.819	20	3.372	20
Production Costs/ Inventory	14.034	10	24.299	10	22.650	10	59.611	10	27.395	10
Revenue/ Receivables	18.594	10	29.359	10	12.583	10	16.292	6	12.487	10
Operating Costs/Net Working Capital	2.159	6	3.409	6	3.787	6	1.998	6	4.111	10
Total		71		66		66		57		75

(Table 9). Two indicators are important for the evaluated health of the company: financial assets/foreign capital and net profit/total assets ratios. These two indicators are illustrated in Figure 1 and Figure 2. The figures also show the curves for the prosperity and problems of the companies. The first figure shows the ratio of financial assets to foreign capital. The individual companies reached the results of fluctuating character. In the last year, the Bioles Company, Inc. belonged to the curve of problematic companies. The

Table 7. TAMARI MODEL – Povina Cooperative

Item	2013	Points	2014	Points	2015	Points	2016	Points	2017	Points
Equity/Total Capital	0.758	25	0.815	25	0.764	25	0.742	25	0.605	25
Net Profit/Equity	0.184	25	0.263	15	0.024	15	−0.071	0	−0.565	0
Current Assets/ Current Liabilities	18.087	20	6.856	20	6.875	20	4.702	20	2.537	20
Production Costs/ Inventory	0	0	0	0	0	0	0	0	0	0
Revenue/ Receivables	1.745	0	3.001	0	1.776	0	1.822	0	2.208	0
Operating Costs/Net Working Capital	0.832	0	0.669	0	0.741	3	0.845	3	1.312	3
Total		45		35		38		23		23

Table 8. TAMARI MODEL – Bioles, Inc.

Item	2013	Points	2014	Points	2015	Points	2016	Points	2017	Points
Equity/Total Capital	0.255	10	0.474	20	0.489	20	0.248	10	0.100	0
Net Profit/Equity	0.105	25	0.298	15	0.130	15	0.119	15	−0.713	10
Current Assets/ Current Liabilities	20.139	20	3.895	20	5.624	20	27.653	20	0.327	0
Production Costs/ Inventory	0	0	0	0	0	0	0	0	0	0
Revenue/ Receivables	2.639	3	10.081	6	2.799	3	35.299	10	4.121	3
Operating Costs/Net Working Capital	0.872	3	1.677	3	0.726	0	3.043	3	−1.636	0
Total		51		44		38		48		13

Table 9. Beaver model

	Item	2013	2014	2015	2016	2017
Lesy SR, state enterprise	Financial Assets/Liabilities	0.474	0.434	0.469	0.155	0.300
	Liabilities/Gross Assets	0.112	0.111	0.117	0.158	0.156
	Net Working Capital/Gross Assets	0.024	0.028	0.025	0.055	0.050
	Net Profit/Gross Assets	0.010	0.011	0.009	0.008	0.008
	Current Assets/Current Liabilities	1.286	1.366	1.311	1.957	1.948
Mestské lesy, BB, Ltd.	Financial Assets/Liabilities	0.806	0.780	0.535	0.454	0.199
	Liabilities/Gross Assets	0.364	0.374	0.382	0.756	0.558
	Net Working Capital/Gross Assets	0.315	0.278	0.225	0.623	0.242
	Net Profit/Gross Assets	0.064	0.058	0.012	0.017	0.014
	Current Assets/Current Liabilities	4.715	4.732	3.742	4.819	3.372
POVINA Cooperative	Financial Assets/Liabilities	1.779	3.835	2.607	2.570	2.009
	Liabilities/Gross Assets	0.248	0.186	0.236	0.257	0.394
	Net Working Capital/Gross Assets	0.944	0.854	0.854	0.787	0.605
	Net Profit/Gross Assets	0.143	0.216	0.018	-0.052	-0.341
	Current Assets/Current Liabilities	18.087	6.856	6.875	4.702	2.537
BIOLES, Inc.	Financial Assets/Liabilities	0.214	0.305	0.762	0.159	0.032
	Liabilities/Gross Assets	0.745	0.526	0.511	0.752	0.900
	Net Working Capital/Gross Assets	0.250	0.154	0.443	0.122	−0.182
	Net Profit/Gross Assets	0.027	0.141	0.063	0.030	−0.071
	Current Assets/Current Liabilities	20.139	3.895	5.624	27.653	0.327

Povina Company is located above the curve of prosperous companies. The development is caused by the fact that the cooperative has many shareholders. Figure 2 shows the ratio of net profit to total assets. This ratio is also called return on total capital. The stable companies are Lesy SR and Mestské lesy BB, Ltd. The latter company reached the average values. However, Bioles, Inc. and Povina Cooperative got to the curve of problematic companies.

RESULTS AND DISCUSSION

Based on the used methods such as Quick test, Tamari model and Beaver model, we can evaluate the suitability of using these methods. The individual models used different indicators to predict of the financial health of the company. The individual methods have some advantages and disadvantages. The Beaver model is considered to be a model of bankruptcy pre-
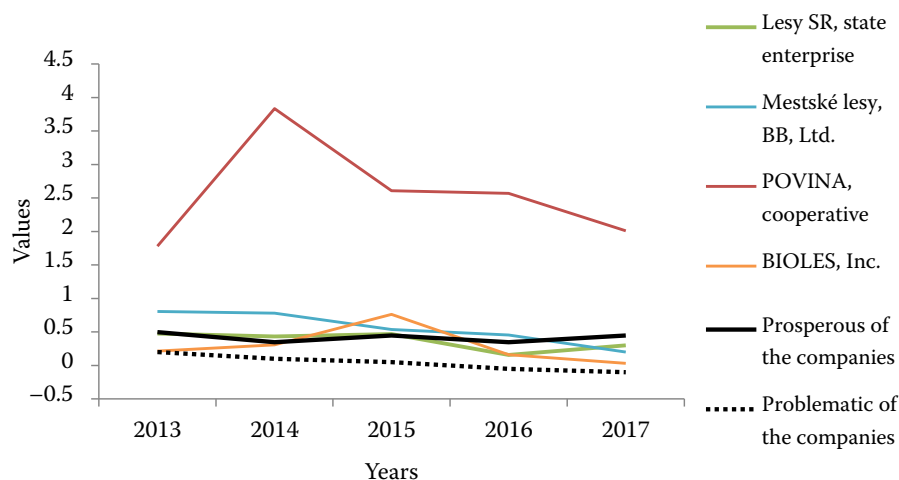

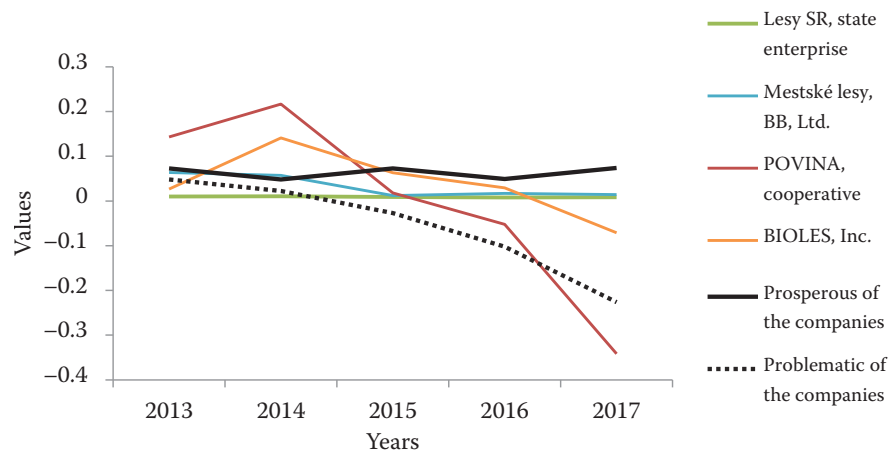Figure 1. The financial assets/foreign capital ratio

Figure 2. The net profit/total assets ratio

diction. This model is based on the financial ratio indices. W. Beaver was the first to use a one-dimensional model. The results of this model often differ from practice when a number of ratio indexes have a non-linear dependence on the bankruptcy status (Keasey, Watson 1991). This method has been criticized because of the correlation between ratios and problems in obtaining information when various factors provide contradictory predictions about the company. There are many factors that effectively describe the financial condition so that one ratio cannot fully yield information about the company's financial condition (Edmister 1972). According to Polo and Caca (2014), the Quick test is a method that divides a company's financial situation into excellent, very good, good, poor and dangerous. All indicators are not of the same importance. It is important to determine the weight of each indicator for the crisis prediction. When being compared with another model the Quick test seems very tolerant, as data for cash flow before the reduction of taxes have been used. The negative indicator of capital can show that an economic unit is not able to complete its financial liabilities, holding the risk of bankruptcy threat.

The Quick test is a quick and easy-to-use method. The use of this model is the right choice for companies if they want to quickly and timely determine the status of the company. If the company uses a low number of indicators, the testing ability will be weaker. We recommend using and comparing more indicators.

The Tamari model is more complicated than the Quick test because of the collection of information. The evaluations of the individual indicators are important to find the average values for the industry. The evaluated data may be deceptive and may not give a realistic condition of the company. We recommend using more exact information. The Beaver model is a complicated method because it is based on more complex evaluation and collection of information. The advantage of this method is simplicity of the calculation of the analyzed indicators. The disadvantage of this method is that one indicator indicates solvency and the other indicator suggests insolvency. We recommend using more indicators for the final evaluation of the company.

If the company wants to quickly find out information about its status, the company should use the Quick test. In a short time, this method represents the most advantageous method to evaluate the health of the company. If the company wants more information about the health of the company, we recommend the Tamari model. The Beaver model is the least suitable in the Slovak Republic.

CONCLUSION

The financial and economic analysis is an important tool for the description of the real condition of a company. The financial analysis is designed for calculations of the individual ratio indicators and the economic analysis interprets these results.

The LESY SR Company had the average values. This was confirmed by the results of the Quick test, where the score was in the middle of the point field. The achieved results had a fluctuating character, but we can say that the company is a stable company with the positive prospects of the future. According to the Tamari model, the company reached the highest number of points. According to the Beaver model, the company's evaluation is based on two indicators

which include the company among the prosperous companies.

According to the method of the Quick test, the Mestské lesy BB Company, Ltd. reached an average rating. Based on the Tamari model, the company is evaluated as a very prosperous company. In 2016, the company reached the average values. In 2017, the company was included among the prosperous companies. According to the Beaver model, the company is the good-quality and stable company.

The Povina Cooperative showed the negative values. According to the Quick test, the company is classified among the prosperous companies. The company is threatened by insolvency. The Tamari model shows that the company had a negative value. The company had a negative economic result. According to the Beaver model, we found out that the financial assets of the company are above the level of prosperous companies. Based on the second indicator, the company is classified as a problematic company, because the net profit had the negative values.

The development of the Bioles Company, Inc. was adverse. Based on the reached results, the company was unstable. According to the Tamari model, the company's results fell from the average values to the risky values. Also, the Beaver model evaluated the company as the problematic company.

We can say that the most advantageous methods are Quick test and Tamari model. The least advantageous method is Beaver model. This method evaluates the companies based on two indicators. The companies are divided into prosperous and problematic companies. The reached results need a deeper analysis. The problem takes into account the specific legal forms of the companies, which probably influenced the total evaluation of Povina Cooperative.

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