

# Application creditworthy and bankruptcy model in the current environment

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## Abstract

The financial situation of the company is an integral expression of the results, which the company achieved in various areas of its activities. The aim of this paper is to present a credible bankruptcy forecasting models of financial situation. Point out the use of some models, financial analysis from the perspective of the future in the current conditions on the production of business entities. The paper is on a particular company introduced the multivariate discriminant analysis model and Altman credit index. Of the methods of scoring the application Tamarine model, Quick Test and balance analysis Douche Rudolf I, II.

**Key words** Prediction, Prediction models, Creditworthy models

## INTRODUCTION

Predictive models based on the evaluation and interpretation of results obtained in the present and to foresee the development of financial-economic situation of the company. Such an analysis is financial analysis "ex ante". The literature ex-ante method called multiple terms, eg. prediction of failure, bankruptcy prediction, prediction of financial difficulties, the basic prediction, prediction of default, credit risk assessment, early warning analysis, forecasting analysis of financial situation, predictive analysis, and so on. Effort forecasting methods and models is to recognize in time the situation in the company and thus prevent potential problems. Scoring models are a tool of knowledge synthesis and performance analysis and analysis of financial position in order to assess the state of the financial situation.

## METHODS OF SCORING A MATHEMATICAL STATISTICAL METHODS

Predictive models by (Pilch 2008) popular discipline of financial analysis by integrating the entire business analysis in a single index, coefficient, or within a certain number of points. All models are based on the assumption that some time in the company from bankruptcy, there is a certain characteristic differences in development compared to the financially healthy firms. In the literature we meet with a lot of prediction models, which affected various characters failure of businesses. According to (Kočišová, Cuba 2012), these models have been constructed on the basis of actual data businesses that have gone bankrupt in the past, but also from businesses that "survived". The models are based on the fact that several years before bankruptcy occurs anomalies. These anomalies are manifested, for example, in a different level, variability, certain other development indicators in comparison with thriving businesses (mostly these are common problems with liquidity and profitability).

Creditworthy models respond to the question of whether the company is financially sound, or has financial difficulties. The method of scoring is significant that the values of selected financial indicators are transformed into points using a scale. These scales are usually determined by expert methods. Simple, respectively, weighted sum of points is then variable, under which predicts the next financial development of the company. Depending on the construction point scale in some methodologies considered positive for the greatest number of points in others the least number of points.

Mathematical-statistical methods are widely used in forecasting financial development companies. Their advantage is that the conclusions drawn from them using, are not affected by subjective views and experiences of experts, but they are exact. The group of mathematical and statistical methods include univariate and multivariate discriminate analysis. Univariate analysis classified only as a prosperous company or ailing, based on only one indicator. Multivariate discriminant analysis takes into account the classification of companies and their development in the future, a number of indicators that do not overlap. Only to be expected that the analysis will result in a more comprehensive knowledge and conclusions (Jenčová 2014).

Figure 1 provides a schematic overview of the different models of ex ante financial analysis.

#### APPLICATION OF SELECTED PREDICTIVE METHODS IN MANUFACTURING ENTERPRISES

The most widely used methods of estimating a company's financial viability are the Tamarine risk index (1966) and Kralickuv Quicktest. Implementation of rapid tests and Tamarine risk index as methods of scoring to assess a company's financial viability were examined. The Tamarine index shows that, for a different era, a score of greater than 60 points on the Tamarine risk model implies that a company has good financial standing and therefore good prospects for surviving (Table 2). Modelling based on rapid tests relies on four indicators: these scales assessed the financial situation in 2010 as bad and in 2008 as a moderate.

Table 1 Quick Test

| Indicator                | 2010   |        | 2011    |        | 2012    |        | 2013    |        |
|--------------------------|--------|--------|---------|--------|---------|--------|---------|--------|
|                          | Value  | Points | Value   | Points | Value   | Points | Value   | Points |
| SSAM                     | 75,96% | 1      | 77,42%  | 1      | 82,36%  | 1      | 83,54%  | 1      |
| Return Capital           | -16,08 | 5      | 5,83    | 3      | 3,24    | 2      | 3,51    | 2      |
| Cash Flow II. / Revenues | -1,02% | 5      | 2,36%   | 4      | 3,44%   | 4      | 3,21%   | 4      |
| Return on Investment     | 5,85%  | 4      | 10,09%  | 3      | 6,04%   | 4      | 5,55%   | 4      |
| Sum                      | zlý    | 15     | stredný | 11     | stredný | 11     | stredný | 11     |
| Quick Test               | bad    |        | medium  |        | medium  |        | medium  |        |

Source: Own processing

Table 2 Tamarine risk index

| Indikátor             | 2010    |        | 2011   |        | 2012   |        | 2013   |        |
|-----------------------|---------|--------|--------|--------|--------|--------|--------|--------|
|                       | Value   | Points | Value  | Points | Value  | Points | Value  | Points |
| Equity / Liabilities  | 3,159   | 25     | 3,428  | 25     | 4,670  | 25     | 5,075  | 25     |
| Return on Equity      | 0,077   | 25     | 0,130  | 25     | 0,073  | 25     | 0,066  | 25     |
| Current liquidity     | 1,700   | 15     | 2,413  | 20     | 3,103  | 20     | 3,749  | 20     |
| Cost /Nedok. V        | 9,299   | 3      | 19,111 | 6      | 19,955 | 6      | 21,326 | 10     |
| Sales / Ø Receivables | 4,379   | 6      | 3,842  | 3      | 4,095  | 6      | 3,942  | 3      |
| Cost /Cash Flow       | -93,981 | 0      | 39,708 | 0      | 27,952 | 0      | 29,957 | 0      |
| Sum                   |         | 74     |        | 79     |        | 82     |        | 83     |
| TRI                   | high    |        | high   |        | high   |        | high   |        |

Source: Own processing

Ultradimension diskriminatory analysis

Table3 Altman model (Z-score)

| Indicator   |                | Scales | 2010  | 2011  | 2012  | 2013  |
|---|----------------|--------|-------|-------|-------|-------|
| Net working capital / Total liabilities and Equity                  | X <sub>1</sub> | 0,717  | 0,404 | 0,456 | 0,481 | 0,505 |
| Retained profits from previous years / Total liabilities and Equity | X <sub>2</sub> | 0,847  | 0,077 | 0,103 | 0,174 | 0,197 |
| Earnings Before Interest and Taxes / Total liabilities and Equity   | X <sub>3</sub> | 3,107  | 0,071 | 0,128 | 0,077 | 0,077 |
| Equity / liabilities  | X <sub>4</sub> | 0,420  | 3,159 | 3,428 | 4,670 | 5,075 |
| Revenues / Total liabilities and Equity                             | X <sub>5</sub> | 0,998  | 1,463 | 1,639 | 1,583 | 1,462 |
| $Z = 0,717 X_1 + 0,847 X_2 + 3,107 X_3 + 0,42 X_4 + 0,998 X_5$      |                |        | 3,363 | 3,889 | 4,271 | 4,359 |
| Financial Health is   |                |        | good  | good  | good  | good  |

Source: Own processing

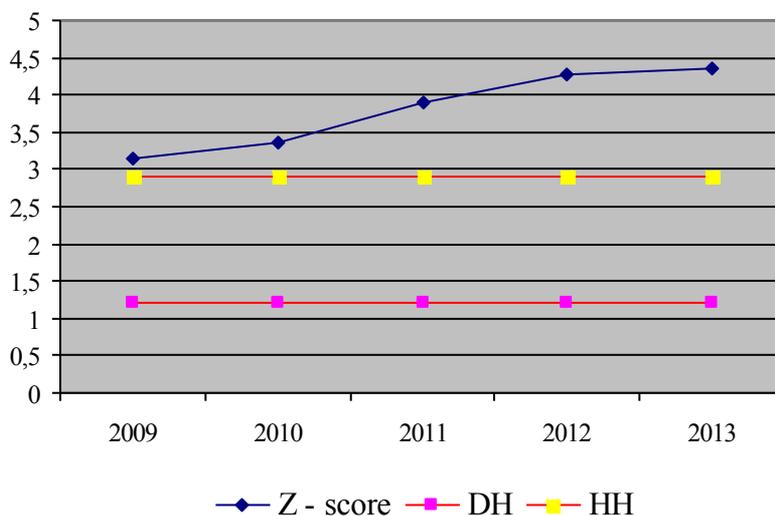


Figure 1 Z-score 2009-2013

Source: Own processing

Altman index was developed in the United States and does not follow the conditions of Slovak businesses, yet in practice very popular. Based on the model, it is possible the financial health of the company described as good, the Z-scores are above 2.9. According to the methodology for quantifying credit index it can be stated that the application of credit index pointed in different periods in extremely good financial situation.

Table 4 Index Creditworthiness

| Indicator   |                | Scales | 2010           | 2011           | 2012           | 2013           |
|---|----------------|--------|----------------|----------------|----------------|----------------|
| Net working capital / Total liabilities and Equity                | X <sub>1</sub> | 1,50   | 1,681          | 2,019          | 2,726          | 3,066          |
| Total liabilities and Equity / Liabilities                        | X <sub>2</sub> | 0,08   | 4,159          | 4,428          | 5,670          | 6,075          |
| Earnings Before Interest and Taxes / Total liabilities and Equity | X <sub>3</sub> | 10,0   | 0,070          | 0,127          | 0,076          | 0,077          |
| Earnings Before Interest and Taxes / Revenues                     | X <sub>4</sub> | 5,00   | 0,048          | 0,078          | 0,048          | 0,053          |
| Inventory / Total Assets  | X <sub>5</sub> | 0,30   | 0,268          | 0,189          | 0,172          | 0,160          |
| Revenues / Total liabilities and Equity                           | X <sub>6</sub> | 0,10   | 1,463          | 1,639          | 1,583          | 1,462          |
| $IC = 1,5 X_1 + 0,08 X_2 + 10 X_3 + 5 X_4 + 0,3 X_5 + 0,1 X_6$    |                |        | 4,025          | 5,265          | 5,757          | 6,316          |
| Financial Health is   |                |        | extremely good | extremely good | extremely good | extremely good |

Source: Own processing

Balance analysis system according to Rudolf Doucha in the manufacturing business in 2013:

#### Balance sheet analysis I.

Financial Leverage Ratios (S) = Equity / Non-current assets = 2,187990401

Liquidity ratios (L) = (Cash and cash equivalents total + Receivables) /  $2,17 \times$  (Current liabilities total) = 1,727746224

Asset Management Ratio (A) = Production / ( $2 \times$  Liabilities)

Profitability Ratios (R) =  $8 \times$  Earnings After Taxes / Equity = 0,443632606

$C = (2 \times S) + (4 \times L) + (1 \times A) + (5 \times R) / 12 = 12,37906491$ ; These Values are Good.

#### Balance sheet analysis II.

Indicators of stability:

S1 = Equity / Non-current assets =  $13\,451\,629 / 5\,940\,931 = 2,264229125$

S2 =  $2 \times$  (Equity / Non-current assets) =  $(2 \times 13\,451\,629) / 5\,940\,931 = 4,52845825$

S3 = Equity / Liabilities =  $13\,451\,629 / 2\,639\,577 = 5,096130554$

S4 = Total assets / ( $5 \times$  Current liabilities total) =  $16\,102\,279 / 5 \times 2\,017\,846 = 1,595986909$

S5 = Total assets / ( $15 \times$  Inventory total) =  $16\,102\,279 / (15 \times 2\,579\,571) = 0,416148758$

$S = (2 \times S1) + S2 + S3 + S4 + (2 \times S5) / 7 = 2,36876164$

Liquidity ratios:

L1 = ( $2 \times$  Cash and cash equivalents total) / Current liabilities total = 2,5145

L2 = (Cash and cash equivalents total + Receivables) / Current liabilities total = 3,749

L3 = (Current assets) / Current liabilities total = 5,0275

L4 =  $(3,33 \times$  Working capital / Liabilities = 2,056

$L = (5 \times L1) + (8 \times L2) + (2 \times L3) + L4 / 16 = 3,4173$

Asset Management Ratio:

A1 =  $(0,5 \times$  Sales) / Liabilities = 0,6155

A2 =  $(0,25 \times$  Sales) / Equity = 1,3684

A3 =  $(4 \times$  Value added) / Sales = 2,2776

$$A = (A1 + A2 + A3) / 3 = 1,0872$$

Profitability Ratios:

$$R1 = (10 \times \text{Earnings After Taxes}) / \text{Liabilities} = 0,7910$$

$$R2 = (8 \times \text{Earnings After Taxes}) / \text{Equity} = 0,5310$$

$$R3 = (20 \times \text{Earnings After Taxes}) / \text{Liabilities} = 1,109$$

$$R4 = (40 \times \text{Earnings After Taxes}) / (\text{Sales} + \text{Production}) = 0,8314$$

$$R5 = (1,33 \times \text{EBIT}) / \text{Earnings After Taxes} = 1,878$$

$$R = (3 \times R1) + (7 \times R2) + (4 \times R3) + (2 \times R4) + R5 = 0,827$$

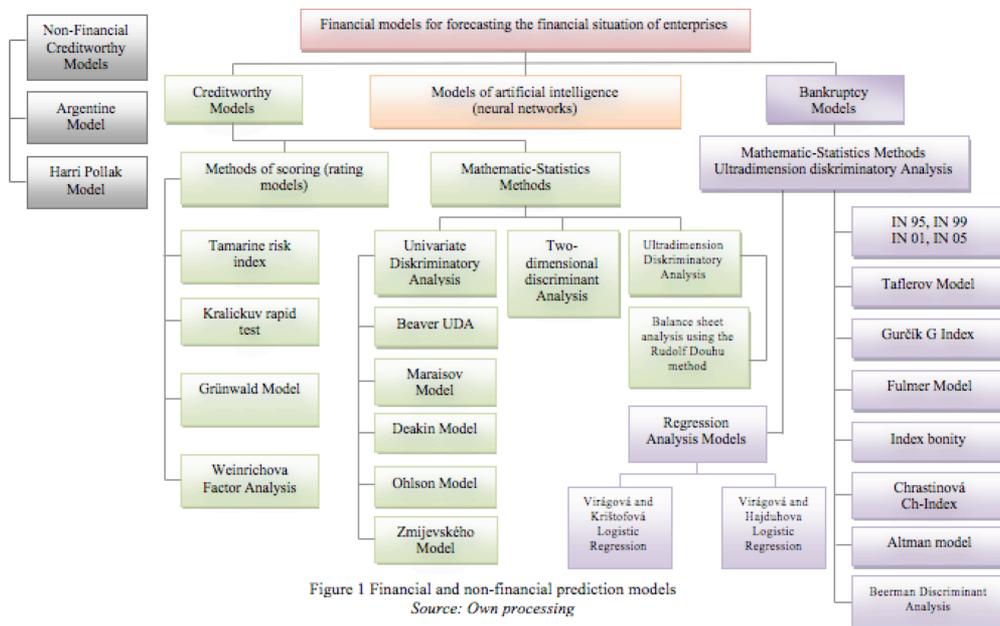
$$\text{The overall indicator } C = (2 \times S) + (4 \times L) + (1 \times A) + (5 \times R) / 12 = \mathbf{1,9693}$$

The overall indicator of the balance equation Douchová II in 2013 reached a value greater than 1, indicating a good situation.

## ADVANTAGES AND DISADVANTAGES IN APPLIED MODELS

| Model                      | Advantages of the model   | Disadvantages of the model  |
|----------------------------|---|---|
| <b>Models Altman</b>       | Variables in the models reflect different aspects of the business model provides the possibility of dynamic forecasting of financial stability. Different models are developed: for companies whose shares are publicly traded on a stock exchange; for companies whose shares are not publicly traded on a stock exchange; for developing markets. | It does not take into account the particular characteristics of the functioning of the economy. Weight indicators are based on statistics that reflect the dynamics of development of enterprises in other conditions, and are significantly different from Slovak. |
| <b>Quick test</b>          | Provides a more convenient and rapid calculation, the feasibility of external diagnostic analysis based on financial statements.  | It does not take into account sectoral and regional specificities functioning of the economy.   |
| <b>Tamarine risk index</b> | Enables comparison with average values in the industry.   | It is not possible to calculate the index on the basis only of the financial statements.  |
| <b>Model Rudolf Douchy</b> | Ease of calculation, the feasibility of external diagnostic analysis based on financial statements. Models are developed for the conditions of the Czech Republic, which are close to the SR.   | It does not take into account the particular characteristics of the functioning of the economy.   |

Source: (Bondareva 2011).



## CONCLUSION

Methods for comprehensive evaluation of enterprise excel in a certain transparency, but lose due to its inaccuracies. It is necessary that financial analysts to clarify the financial health of a company while simultaneously use several methods of assessing prognosis. Every financial analyst can assess the financial situation of enterprises generate their own model. In terms of the results achieved financial and economic analysis financial manager should be focused on one indicator summaries on which could prolong the situation in which the company is located.

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