# BANKRUPTCY RISK ANALYSIS IN ROMANIAN COMPANIES

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**Abstract**
The dynamics of Romanian enterprises can be measured using several scoring methods, such as: Altman and Robertson model as well as Romanian models provided by BRD and BT. According to these methods the creditworthiness and bankruptcy risk level varies. This article presents a study made on three companies which were classified by using the methods mentioned above. Additional to the results, the paper present an economic perspective of the evaluation.
**Keywords:** bankruptcy, financial analysis, financial standing, Altman model, Robertson model, financial indicators, financial position.
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## 1. Introduction

Financial analysis provides a set of concepts, techniques and methods that allow treatment of internal and external information, interpretation, issue of value judgments and appreciations on business activity in order to formulate relevant recommendations on evolution, the level and quality of performance, degree of risk in a highly dynamic competitive environment.
Besides analyzing the financial position, financial performance and cash flows, a good business assessment model highlights the financial standing of the company, provides more complete information about the real situation of the enterprise because often people working in the financial sector tend to omit certain details in order to ''cosmetize'' the image of the enterprise and this jeopardizes fair view of shareholder wealth.
Modern and efficient management of the company must be evaluated by means of financial performance criteria aimed , on the one hand, operational activities , and on the other hand, the actual financial activity conducted over a period of time determined usually a financial year.
Through financial standing managers can see for themselves at any time, if the firm has failed to pay debts to suppliers, why it has not paid its budgetary obligations, the causes which led to this situation and understand how to prevent this from happening in the future.
The main objective of this paper is to emphasize the importance of financial analysis, including financial standing, especially in the current economic environment. To have an accurate view on any organization's financial status is

vital to all the participants in the economy. There are a lot of tendencies to embellish and create scenarios in which companies seem perfect when in fact they have serious financial issues.

It is very important to highlight that for the future: "The Basel III Agreement benefits overlap the implementing costs, because a stable banking system is the panacea of the durable development and, consequently, with long term benefits….regarding the new Basel III agreement it is important to evaluate and assess the adoption of it's framework by the national authorities, consequently the adoption and the implementation process, because of it's possible divergence across different jurisdictions" (Dumiter, 2013, pp. 109).

**2. Literature review/Theory/Calculation**

According to the Dictionary of Finance and Investment Terms, financial analysis is defined as the ''use and transformation of financial data into a form that can be used to monitor and evaluate the firm's financial position, to plan future financing, and to designate the size of the firm and its rate of growth. Financial analysis includes the use of financial statement analysis and funds-flow-adequacy ratio.'' (www.allbusiness.com)

As a field of study, financial analysis is relatively recent, dating from the late nineteenth century, with the development of entrepreneurship due to the growing demand for investment funds which are provided mainly by the banking system.

During the twentieth century, as a result of the development of businesses, financial analysis showed a pronounced development.

The financial analysis is the reverse of the actual evolution of the phenomenon. The analysis is based on the results of the completed process, including the following steps:

- The delimitation of the object of analysis, which involves the finding certain facts, events, results. This delimitation is done in space and time, quality and quantity;
- Determining elements, factors and causes of the phenomenon in question. The decomposition of the elements implies a structural analysis. Factors are followed sequentially, from those of direct action to those of indirect action pending the establishment of the final causes;
- Establishing the factors also entails determining the correlation between each factor and the analyzed phenomenon and the correlation between the acting factors;
- Measuring the influences of various elements or factors, we use quantitative analysis to quantify the influences, internal reserves, to have an accurate assessment of the results;
- Compiling the analysis results, establishing conclusions and assessments on the activity of the studied area;
- Develop measures which are the basis for making decisions to ensure optimal use of resources, to enhance the future efficiency of the entity.

According to the Cambridge Business English Dictionary financial standing is defined as "how strong a person's or company's financial situation is considered to be''.

In assessing the financial standing of the company a set of financial and non-financial indicators must be considered.

The set of non-financial and financial indicators consists of the following components (Bătrâncea I., 2006):

- net statement of property = total assets - liabilities outstanding
- working capital = capital + noncurrent assets
- the need for working capital = supplies + receivables - current liabilities
- net treasury = working capital - the need for working capital
- reliability indicators - reflect the entity's ability to honor debts respectively

The multivariate analysis involves the use of quantitative data regarding the situation of the company, to achieve a financial score, so as to assess the general financial situation.

The most commonly used method by the banking and financial entities for their own credit assessment is the "score" method based on the ''Z" model, which allows the quick positioning of bankruptcy risk which the borrowers present. This method is a tool for detecting the risk of bankruptcy for a company, namely what is the probability that it is a normal business.

The ''Z'' Score appears as a linear function of several variables (rates limited in number) characterized by weighting coefficients determined by the method of least squares, as a result of the observations on the representative businesses and grouped from the start in "healthy" and "poor".

Concerns regarding the development of methods for prediction of this risk start of a group of rates closely related to the health of the companies, aiming to determine a function to estimate the probability that a company records losses and consequently be unable to meet its customers and banks credit requirements.

The most often used method is based on the model Z developed in the U.S. in 1968 by Professor Altman. This model used information from studying a broad sample of companies, both those who went bankrupt and the survivors, all from the manufacturing sector. He that the analysis based on multiple variables with the help of 5 indicators allows the forecast of 75 % of bankruptcies two years prior to their occurrence.

The Altman model includes as the key factor the profitability of the assets, weighted with a value close to the other four indicators together. Analysts have tried to develop the prediction ability of the original model.

The "Z" by Altman is as follows (Altman E.I., 1968):

$$Z = 1,2\ XI + 1,4\ X2 + 3,3\ X3 + 0,6\ X4 + 1,0\ X5$$

In which the variables XI,..., X5 are financial indicators, and the constants with which they are amplified are statistical in nature and expresses the weight or the importance of the variable in assessing the risk of bankruptcy.
XI = working capital / total assets
X2 = reinvested earnings / total assets
X3 = profit before payment of tax and interest / total assets
X4 = market capitalization / long-term debt
X5 = turnover / total assets
XI - indicates a measure of the flexibility of the company. The higher the result of this report is, the better the use of working capital.
XI - indicates how efficiently working capital is used.
X2 - measures the internal financing ability of the company; is recommended that the value of the ratio to be as high as possible.
X3 – refers to the rate of economic profitability or efficiency of asset utilization; the ratio is desired to be as high as possible.
X4 – expresses the degree of indebtedness of the company through long term loans. In practice, when evaluation companies in our country, the social capital is used as the counter of the ratio; the result of the report is advised to be as high as possible.
X5 – measures the return on assets, it is their economic efficiency indicator and it expresses the rotation of total assets in the turnover. The more efficient the activity is, the higher sales will be and the faster the assets will renew in the turnover.
It should be noted that the higher the levels of the indicators are, the better absolute values they record.
Professor Robertson has identified four factors that produce changes in the financial health of the company, namely: market stability, decreased profits, decrease working capital, loan growth. Professor Robertson's score function has the following form (Robertson J., 1983):

$$Z = 3,0X1 + 3,0X2 + 0,6X3 + 0,3X4 + 0,6X5$$

In which:
X1 = (net turnover - total assets) / net turnover
X2 = gross profit for the year / total assets
X3 = (current Assets - total liabilities) / total debt
X4 = (equity - loans) / total debt
X5 = (liquid assets - bank overdrafts) / loans
The Z function seeks the modifications which interfere with the financial situation of the company from one period to another. If the Z score depreciates by 40% or more than 40%, in one year, automatically the analysis should identify the causes of the Z score reduction. If the Z score reduction is of 40% or above 40% in two consecutive years, then company cannot survive due to its financial instability.
Both Romanian models are based on the Altman model, which I mentioned above and the Conan-Holder. This model can be applied to enterprises with a number of 10 to 500 employees and is based on the analysis of liquidity - chargeability. The

model was established in 1978, by observing a sample of 190 small and medium, half of which went bankrupt during the period 1970-1975.
The model has five variables:

$$Z = 0,24\ XI + 0,22\ X2 + 0,16\ X3 - 0,87\ X4 - 0,1\ X5$$

where
XI = gross operating surplus / total debt
X2 = permanent equity / total assets
X3 = Current assets (without stocks) / total assets
X4 = financial expenses / turnover
X5 = personnel costs / value added
Bankruptcy risk depends on the value of the score, as follows:
Z> 0.16 - the company's situation is very good, the risk of bankruptcy is less than 10%
0.1 <Z, 0.16 - the company's situation is good, the risk of bankruptcy from 10% to 30%
0.04 <Z <0.1 - the company is in a warning situation, the risk of bankruptcy from 30% to 65%
0.05 <Z <0.04 - the situation of the company is in danger, the bankruptcy risk is from 65% to 90%
Z <0.05 - failure, the risk of bankruptcy is higher than 90%
Both model used by these banks have been adapted to their own clients and services as well as the economic conditions in Romania.

**3. Material and methods/research methodology**

When dealing with the topic of financial analysis the specialized literature offers a variety of papers, theories and works. First of all, the research began by reviewing the theoretical background of the subject, reaching to both international and Romanian authors who have approached this topic. Furthermore, the research continued with analyzing several statistics, such as the one released by Coface.
As far as financial standing is concerned, the resources are limited but the most important and relevant theoretical aspects can be found in books written by Robertson, Altman or Bătrâncea.
A next step in the research was searching for companies which were willing to share financial information. After gathering the data the next stage was selecting the relevant information for the analysis. Then the analysis itself was carried out, using the models offered by the specialized literature, namely the Altman model, the Robertson model, the financial standing model elaborated by professor Bătrâncea, and, also, two models given by two Romanian banks which are developed for local economical requirements. After the analysis the results were reviewed and discussed.

## 4. Results/Findings

The analysis was made using the financial information provided by the companies below.

| **Company: S.C. BELLA CONSULTING CONSTRUCTION S.R.L.** | | | | | |
|---|---|---|---|---|---|
| | | ***The synthesis*** | | | |
| **Indicators** | 31.12.2008 | 31.12.2009 | 31.12.2010 | 31.12.2011 | 31.12.2012 |
| ***"FINANCIAL STANDING" MODEL*** | | | | | |
| **ACTIVITY** | | | | | |
| **Points** | 2,70 | 7,20 | 6,30 | 6,30 | 6,30 |
| **Rating** | Weak | Very Weak | Very Weak | Very Weak | Very weak |
| **FINANCING** | | | | | |
| **Points** | 7,80 | 9,60 | 7,20 | 7,20 | 7,20 |
| **Rating** | Good | Good | Good | Good | Good |
| **ECONOMIC GROWTH** | | | | | |
| **Points** | 0,90 | 3,60 | 1,50 | 1,20 | 2,40 |
| **Rating** | Good | Good | Good | Good | Good |
| **TOTAL SCORE** | | | | | |
| **Points** | **11,40** | **20,40** | **15,00** | **14,70** | **15,90** |
| **Rating** | ***Good*** | ***Weak*** | ***Good*** | ***Good*** | ***Good*** |
| | | | | | |
| ***ALTMAN MODEL*** | | | | | |
| **"Z" SCORE VALUE** | **0,81** | **0,27** | **0,66** | **1,23** | **0,86** |
| ***Rating*** | ***Bankruptcy*** | ***Bankruptcy*** | ***Bankruptcy*** | ***Bankruptcy*** | ***Bankruptcy*** |
| | | | | | |
| ***ROBERTSON MODEL*** | | | | | |
| **"Z" SCORE VALUE** | **-597,07** | **-2061,74** | **-1084,16** | **-82,70** | **-519,05** |
| ***Difference previous year*** | *x* | ***-1464,67*** | ***977,59*** | ***1001,45*** | ***-436,35*** |
| ***Rating*** | *x* | ***Difficulty*** | ***Solvent*** | ***Solvent*** | ***Difficulty*** |
| | | | | | |
| ***"BANCA ROMANA DE DEZVOLTARE" MODEL*** | | | | | |
| **TOTAL SCORE** | **145,00** | **137,00** | **136,00** | **120,00** | **96,00** |
| ***Rating*** | ***Good*** | ***Good*** | ***Good*** | ***Average*** | ***Average*** |

Source: own computations of authors

| **Company: S.C. CLASS TEX S.R.L.** | | | | | |
|---|---|---|---|---|---|
| | | ***The synthesis*** | | | |
| **Indicators** | 31.12.2008 | 31.12.2009 | 31.12.2010 | 31.12.2011 | 31.12.2012 |
| ***"FINANCIAL STANDING" MODEL*** | | | | | |
| **ACTIVITY** | | | | | |
| **Points** | 5,85 | 4,50 | 0,45 | 3,60 | 0,90 |
| **Rating** | Very Weak | Very Weak | Good | Weak | Good |
| **FINANCING** | | | | | |
| **Points** | 15,00 | 10,20 | 10,80 | 10,80 | 10,20 |

| | | | | | |
|---|---|---|---|---|---|
| **Rating** | Weak | Good | Good | Good | Good |
| **ECONOMIC GROWTH** | | | | | |
| **Points** | 0,90 | 3,60 | 1,80 | 1,50 | 1,80 |
| **Rating** | Good | Good | Good | Good | Good |
| **TOTAL SCORE** | | | | | |
| **Points** | **21,75** | **18,30** | **13,05** | **15,90** | **12,90** |
| **Rating** | ***Weak*** | ***Weak*** | ***Good*** | ***Good*** | ***Good*** |
| | | | | | |
| ***ALTMAN MODEL*** | | | | | |
| **"Z" SCORE VALUE** | **0,72** | **0,70** | **0,95** | **0,85** | **1,44** |
| ***Rating*** | ***Bankruptcy*** | ***Bankruptcy*** | ***Bankruptcy*** | ***Bankruptcy*** | ***Bankruptcy*** |
| | | | | | |
| ***ROBERTSON MODEL*** | | | | | |
| **"Z" SCORE VALUE** | **-303,31** | **-222,48** | **-233,18** | **-138,08** | **-8,28** |
| ***Difference previous year*** | *X* | ***80,83*** | ***-10,70*** | ***95,09*** | ***129,80*** |
| ***Rating*** | *X* | ***Instability*** | ***Difficulty*** | ***Instability*** | ***Solvent*** |
| | | | | | |
| ***"BANCA ROMANA DE DEZVOLTARE" MODEL*** | | | | | |
| **TOTAL SCORE** | **118,00** | **127,00** | **142,00** | **130,00** | **134,00** |
| ***Rating*** | ***Average*** | ***Good*** | ***Good*** | ***Good*** | ***Good*** |
| | | | | | |
| ***"BANCA TRANSIVANIA" MODEL*** | | | | | |
| **TOTAL SCORE** | **30,00** | **33,00** | **40,00** | **33,00** | **41,00** |
| ***Rating*** | ***Good*** | ***Good*** | ***Very good*** | ***Good*** | ***Very Good*** |

Source: own computations of authors

**Company: S.C. EUROPEAN HIDROCONSTRUCT S.R.L.**

***The synthesis***

| **Indicators** | 31.12.2008 | 31.12.2009 | 31.12.2010 | 31.12.2011 | 31.12.2012 |
|---|---|---|---|---|---|
| ***"FINANCIAL STANDING" MODEL*** | | | | | |
| **ACTIVITY** | | | | | |
| **Points** | 9,00 | 9,00 | 3,60 | 2,25 | 9,00 |
| **Rating** | Very Weak | Very Weak | Weak | Weak | Very weak |
| **FINANCING** | | | | | |
| **Points** | 19,20 | 19,20 | 12,00 | 9,60 | 16,80 |
| **Rating** | Weak | Weak | Good | Good | Weak |
| **ECONOMIC GROWTH** | | | | | |
| **Points** | 3,60 | 3,60 | 2,40 | 0,00 | 2,40 |
| **Rating** | Good | Good | Good | Very Good | Good |
| **TOTAL SCORE** | | | | | |
| **Points** | **31,80** | **31,80** | **18,00** | **11,85** | **28,20** |
| **Rating** | ***Weak*** | ***Weak*** | ***Weak*** | ***Good*** | ***Weak*** |
| | | | | | |
| ***ALTMAN MODEL*** | | | | | |
| **"Z" SCORE VALUE** | **0,00** | **1,20** | **3,14** | **4,21** | **0,42** |
| ***Rating*** | ***Bankruptcy*** | ***Bankruptcy*** | ***Solvent*** | ***Solvent*** | ***Bankruptcy*** |
| | | | | | |
| ***ROBERTSON MODEL*** | | | | | |
| **"Z" SCORE** | **0,00** | **0,00** | **-12,22** | **270,20** | **0,44** |

| VALUE | | | | | |
|---|---|---|---|---|---|
| *Difference previous year* | *X* | *0,00* | *-12,22* | *282,42* | *-269,76* |
| *Rating* | *X* | *Difficulty* | *Bankruptcy* | *Solvent* | *Difficulty* |
| | | | | | |
| *"BANCA ROMANA DE DEZVOLTARE" MODEL* | | | | | |
| **TOTAL SCORE** | **0,00** | **50,00** | **109,00** | **181,00** | **56,00** |
| *Rating* | *Very Weak* | *Average* | *Average* | *Good* | *Average* |
| | | | | | |
| *"BANCA TRANSIVANIA" MODEL* | | | | | |
| **TOTAL SCORE** | **10,00** | **10,00** | **40,00** | **39,00** | **20,00** |
| *Rating* | *Weak* | *Weak* | *Very good* | *Good* | *Average* |

Source: own computations of authors

## 5. Discussion

The Financial Standing model shows BELLA CONSULTING CONSTRUCTION LLC as having a good rating in all years except 2009 when its activity is rated weak. CLASSTEX LLC is rated weak in 2008 and 2009 followed by a rating of good in the remaining years. EUROPEAN HIDROCONSTRUCT LLC has been rated good only in 2011, the rest of the years showing a weak rating. According to this model the ranking is as follows BELLA CONSULTING CONSTRUCTION LLC with 5 good ratings, CLASSTEX LLC with 3 good ratings and EUROPEAN HIDROCONSTRUCT LLC with one good rating.

According to the Altman model BELLA CONSULTING CONSTRUCTION LLC is facing bankruptcy during the analyzed period. CLASSTEX LLC is in the exact same situation. EUROPEAN HIDROCONSTRUCT LLC is solvent only in 2010 and 2011, the rest of the years presenting a risk of bankruptcy. This situation is atypical because of the fact that companies go from solvent directly to bankruptcy. The Altman model show that EUROPEAN HIDROCONSTRUCT LLC is the only company that had 2 solvent years, the rest always having faced bankruptcy.

The Robertson Model presents BELLA CONSULTING CONSTRUCTION LLC as being solvent in 2010 and 2011, the company facing difficulty in 2009 and 2012. According to the same model CLASSTEX LLC goes from unstable in 2009 to facing difficulty in 2010 to unstable again in 2011 to finally being solvent in 2012. EUROPEAN HIDROCONSTRUCT LLC is solvent only 2011, facing bankruptcy in 2010 and difficulty in 2009 and 2012. According to the Robertson model EUROPEAN HIDROCONSTRUCT is the only company that had a risk of bankruptcy.

According to the Romanian Development Bank model BELLA CONSULTING CONSTRUCTION LLC has had 3 years of good activity followed by 2 years of average one. For CLASSTEX LLC only the year 2008 is average, the rest being rated as good. EUROPEAN HIDROCONSTRUCT LLC has a rating of very weak in 2008, a good rating in 2011, the rest of the years being average. The Romanian Development Bank model rates CLASSTEX LLC as being the best one and EUROPEAN HIDROCONSTRUCT LLC the worst.

The Transilvania Bank model shows a pattern similar to the Romanian Development Bank model according to which BELLA CONSULTING CONSTRUCTION LLC has 2 years of good activity, namely 2008 and 2011 and 3 years of average rating. CLASSTEX LLC has a rating of very good in 2010 and 2012 and a good rating in all the other years. EUROPEAN HIDROCONSTRUCT LLC is rated as follows: weak in 2008 and 2009, very good in 2010, good in 2011 and medium in 2012. As in the previous model the first position is occupied by CLASSTEX LLC.

**6. Conclusions**

The importance of using the models mentioned above is given by the fact that they have been put into practice for decades. It is simply easier to make certain adjustments in due time than to be faced with imminent bankruptcy.

The harmonized use of these models allows us to obtain certain indicators which accurately entail the financial position of the entity. The differences between the indicators included in the different models are explained in the applied calculus formulas. This is why, after using all of these models we have a well-grounded analysis.

Obviously there is the possibility of ranking the indicators within certain limits, and if the indicator's value is either on the highest or lowest limit we may state the fact that it its value is situated on the border.

This paper deals with a few entities which have been put through several bankruptcy risk analysis models. Through this process we have given a classic demonstration of the efficiency of these models.

In the crisis conditions we face today, using these models is much more important than in a normal, calm pace of the economy, due to the fact that the bankruptcy risk is a lot higher.

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