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PREDICTING THE FINANCIAL PERFORMANCE OF THE BUILDING SECTOR ENTERPRISES – CASE STUDY OF GALATI COUNTY (ROMANIA)

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Abstract. This paper predicts the financial performance of the enterprises acting in the building sector in Galati County (Romania). The financial performance was evaluated using the model Conan & Holder of assessing the risk of bankruptcy adjusted to the specificity of the Romanian building sector. This model was achieved using financial data of 11 enterprises acting in this sector in the period 2001-2006 and was tested on the same enterprises for the year 2006 with a success rate of 81.82%. Also, the model was tested on another sample of 10 enterprises, using financial data of 2006, with a rate of success of 77.78%. The aim of this paper is to predict the financial performance of all enterprises used to designing and testing the model, on the base of financial data from the balance sheets of enterprises in the period 2007-2008. The conclusions show the relevance of the adjusted model in forecasting the financial performance and ranking the enterprises by performance; also reflect the evolution of the financial performance registered by the studied enterprises in the actual economic environment.

1. Introduction

This study evaluates and predicts the enterprise financial performance of the enterprises acting in the building sector using the model Conan & Holder of assessing the risk of bankruptcy adjusted to the specificity of the Romanian building sector (Bărbuţă-Mişu, N., Stroe, R., 2010). Bankruptcy prediction of the enterprises is a great interest issue, which for several decades has continued such attention to researchers and specialists.

The development of bankruptcy prediction models, which made and still made the subject of numerous works of specialty in the country and abroad, show the importance of the bankruptcy models. Sharma and Mahajah (1980) present a general pattern of bankruptcy in which the ineffectual management doubled by the inability of anticipating events cause a systematic deterioration of performance indicators. In the absence of the corrective actions, this deterioration of the financial conditions determines the bankruptcy (Sharma S. and Mahajah V., 1980).

Mostly, the financial performance of the enterprises is influenced by the financial decisions taken by the enterprises' managers. The main trend in the financial theory states that taxes have an impact on financial decisions even if these decisions are taken by investors or by companies. From this perspective, if tax regulations are changed, it means that rational investors have to change their behaviour (Dragotă, M. et al., 2009), being put on to the financial performance.

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In this approach has been started to the Conan & Holder adjusted model that was used for 2 samples of enterprises: the first sample includes 11 enterprises to which data on the period 2001-2006 were used to determine the adjusted model variables and the second sample of 10 enterprises that were used for adjusted model testing. In this paper, the prediction of the bankruptcy was achieved using information from the balance sheets of the enterprises of those 2 samples on the period 2007-2008. This prediction is used for ranking the enterprises by their financial performance and for reflecting the evolution of the financial performance registered by the enterprises in the actual economic environment.

2. Theoretical and empirical literature

Models proposed until now have the disadvantage that can be applied only in the economies of countries in which the statistical study was performed or in the branch or sector of activity studied, their use unable to be generalized in the territorially profile. Also, the periods marked by economic instability determine the amendment of the correlation surprised by the score function developed, that limits temporally the using of these models and requiring their updating at regular time intervals, or developing other models valid in the new conditions (Siminică, M. I., 2005).

Researchers of the statistical models have used financial rates for building some predictive functions of bankruptcy. All predictive studies of enterprises' bankruptcy are based on original contribution of Beaver's (1966) and Altman (1968).

Beaver has brought the most important contribution to the univariate analysis of the company bankruptcy. The univariate analysis technique implies the using of a single financial rate into a model of bankruptcy forecasting. Beaver has analyzed separately few financial rates and had selected the critical point for each rate so as to maximize his prediction accuracy.

Altman achieved a multivariate analysis of bankruptcy (as we used within our model), which means that had been developed a multiple discriminate analysis. The main idea of the multivariate analysis means combining the information of several financial rates in a single function (index weighted).

Beaver and Altman have had numerous successors who developed performance models for analysis the risk of bankruptcy, initiating alternative ways of analysis. Thus, in the bankruptcy prediction have been shown two schools (Anghel, I., 2002): *Anglo-Saxon school* represented by Beaver model, models developed by Altman, Edmister model (1972), Diamond model (1976), the probabilistic model of Deakin (1977), Springate model (1978), Koh and Killough model (1980), Ohlson model (1982), Zavgren study (1983), Fulmer model (1984), Koh model (1992), Shirata model (1999) developed in Japan and based on studies of Anglo-Saxon school; *mainland school* represented by Yves Collongues (1976), Conan and Holder model (1979), Central Bank of France model, model of French Commercial Credit (CCF), the model of Accountants Approved (CA Score – 1987), the score function AFDCC 2 (1999).

Also, Shumway (2001) elaborates a corporate default prediction model based on the financial indicators of Altman and Zmijeski to which he adds the company history and the standard deviation of the return on equity and return on assets (Triandafil, C. M. et al., 2008).

Kahl (2002) elaborates a research based on a group of companies which are close to the corporate default threshold. He concludes that only a third of these companies manage to survive independently, while the other companies either are taken over or disappear. Consequently Saretto (2004) creates a model of corporate risk of bankruptcy assessment in a continuous way (Duration model) using financial ratios which reflect both book value and market value (Triandafil, C. M. & Brezeanu, P., 2008).

Davydenko (2005) makes a research on the financial indicators which impact in an essential way corporate default probability, valorising Moody's database CRD – Customer Research Database. He concludes that bankruptcy probability is determined by alarming ratios assets (Triandafil, C. M. et al., 2008).

In the *Romanian school* (Anghel, I., 2002) are known: Manecuta and Nicolae model (Mânecuţă C., Nicolae, M., 1996) proposed in the metallurgical industry, Model B – Bailesteanu (Băileşteanu Ghe., 1998) and Model I – Ivonciu (Ivonciu P., 1998). Credit-scoring models have been contested by the limited cut-off rationale (Crosbie, 2003). Siminica, M. I. has achieved a *Model for analysis of bankruptcy risk in the Romanian industrial firms* (Siminică, M. I., 2005). Also, we designed an aggregate *index of financial performance for the building sector enterprises* from Galati (Bărbuţă-Mişu, N., 2009).

Also, the country and industry risk have become important elements of the corporate bankruptcy risk at the global level. RiskCalc Model success is due to the multinational companies' orientation towards emerging countries and international Moody's approach allowed them to perform a more rigorous credit risk management. Excepting emerging countries, Moody's has elaborated models in order to assess Expected Default Frequency (EDF) for every country (Fernandes, 2005).

The prediction models of the bankruptcy risk have mostly a statistically character, being developed on the basis of the last financial situation of enterprises which went bankrupt (hence very low financial performance) and some enterprises which haven't had financial difficulties (hence the high financial performance).

3. The Conan & Holder adjusted model description

Due to the relevance enhanced to the internationally of the Conan & Holder model (Conan and Holder, 1979), we proposed in a preview paper "The Adjustment of the Conan & Holder Model to the Specificity of Romanian Enterprises – A Local Study for Building Sector", the adjustment of this model to the specificity of the Romanian economy, using enterprises acting in the building sector (Bărbuţă-Mişu, N., Stroe, R., 2010).

The present article is a continuation of the article mentioned above, where we realized the model testing during 2007-2008 both on companies in the initial sample (11 companies) and on other 10 companies used only for testing. The article also contains the explanation of the correlations found in this function, the causes which have generated these correlations and analyze the evolution of the enterprises financial performance in the period 2007-2008 compared to the previous period.

This adjusted model as well as Conan & Holder model uses the **score method**, which has wide practice applicability in bankruptcy prediction, and which involves finding a linear combination of financial rates (function Z) to allow a separation of enterprises bankrupt by enterprises without financial difficulties.

The general shape of such function is: $Z = \sum a_i \times X_i$, where:

a_i is the coefficient of weighting related to the financial rate X_i;

X_i is the financial rate i;

i is the number of financial rates used, $i = 1 \div n$.

According to the Z score obtained, the enterprises are framed in a given area of risk. Thus, we can say that the score is an external diagnosis method consists in the measurement and interpretation of the risks to which are exposed the enterprise investor, creditor and the enterprise as system in its future activity. He is based on issue the value judgments that combines linear the group of financial rates or significant variables (Anghel, I., 2002).

In this context, the problem that must be solved is the indicators significance, depending on the specific concern of the information user. The variables significance of the model Conan & Holder has been proven along time. The score function joins in the preventive intervention, and having the character of a forecast instrument.

Therefore, the score is constitutes a barometer of economic and financial conditions of the enterprise, an instrument learned not only available shareholders, but also to the enterprise management.

In the scope of elaboration the adjusted model for building sector enterprises from Galati were followed next stages: compiling the database necessary for the case study; hierarchy of

the building sector enterprises in accordance with their financial performances; designing the adjusted model; testing the model, both individually on the initial sample of enterprises, as well as on a subsequent sample, by analyzing the success rate, so as to establish the relevance degree (Bărbuţă-Mişu, N., 2009).

The selected enterprises act in the building sector, to which Romania ranked in the first place in the European Union according to the rate of increase in production, in March 2008, with an advance of 32.5% over the same period in 2007, according to the European statistical office, Eurostat.

The primary factor to reinvigorate the building sector had been developing of the real estate market, which were in a continuous dynamic. Subsequently, this role was taken over by the major infrastructure projects supported by the international financial institutions. In this market triggers a series of factors, such as National Housing Agency strategy for recovery of the housing building, offices, large shopping centres, business centres; the programme of heat insulation of the buildings, the programme of construction of the sports halls and further work on urban infrastructure began in many cities in the country, which currently are not to the level of expectations of the foreign investors.

In this sector there were funds available from the World Bank, European Bank for Reconstruction and Development, and pre-structural funds of the European Union, allotted through programmes such as PHARE, ISPA and SAPARD. Also, the building sector ensured many working places and can be considered an important supplier of work force at European level, as the majority of Romanian workers that work abroad are employed in the building sector.

One essential condition taken into account when establishing the sample was that the enterprises active in this sector to show continuous activity during the chosen time interval. This condition greatly reduced the number of potentially sampled enterprises, as a great number of enterprises closed their activity while other was only beginning it.

The greatest problem we faced was to identify the building sector companies active in Galati County, for which the site of the Ministry of Finance still no offers a solution. Thus, searching for these enterprises was mainly based on their notoriety. As the website of the Ministry of Finance does not offer detailed financial information, we furthered our research with an additional research with the Commerce Registry by studying the balances filed by the 11 enterprises, and by collecting the necessary information for our database. The method we used for building the database was to directly extract the data from the balance sheets - Profit and loss account, Debts and liabilities situation, Fixed assets situation, and Distribution of the profit - for a six years period, in order to eliminate any occurring conjunctive issues.

Thus, to elaboration of the adjusted model were used data from balance sheets of the selected enterprises in the period 2001-2006. These chosen enterprises are representative for the building sector in the Galati county. In 2006, these enterprises had represented 0.93% of the total number of business activity in the building sector of the county level (of 1,177 enterprises) and have achieved in 2006 a turnover of 100.04 million euros i.e. 35.85% on turnover of the building sector County, i.e. and 5.78% of total turnover made at county level Galati.

The classification of the sample as non-bankrupt enterprises or bankrupt were made by studying a significant number of financial rates and granting a minimum score to enterprises with the highest financial performance – non-bankrupt and a maximum score to enterprises with the lowest financial performance - bankrupt.

These scores determined for those 11 enterprises have contributed to the separation of enterprises in non-bankrupt and bankrupt, to establish the function of the model Conan & Holder adapted to the specificity of the enterprises in the building sector in the Galati county.

The detailed analysis of the individual financial performance and of the ranking achieved after the indicated score have result the following grouping of non-bankrupt enterprises and insolvent:

- 7 business non-bankrupt (S1-S7), totalling at the end of 2006 a value of 70.161.163 euros total assets and a turnover of 83.846.529 euros;

- 4 enterprises bankrupt (S8-S11), with a combined value of assets at 31 December 2006 of 17.343.847 euros, i.e. a turnover of 16.190.468 euros.

Included by theoreticians in the "professional applications for financial analysis" (Cohen, E. & Sauriel, A., 1990) or from practitioners "to other methods of financial analysis" (Barbier, A. & Proutat, J., 1990), the discriminated analysis of the enterprises by the sample carried out on the basis of 13 financial rate (Table I) permitted the establishment of differences between the two groups of enterprises. In this analysis we used both average values, as well as the median values of the financial rates, which are more relevant whereas deleted the inconclusive values.

The relevance of the sample has been demonstrated by discriminate analysis achieved and thus the variables of the original model Conan & Holder could be maintained (Bărbuţă-Mişu, N., Stroe, R., 2010). Also, the score function entails a deviation of probabilities a posteriori and an uncertainty area. According to the definitions given by authors, the retained rates for the building sector enterprises are as follows:

$R_1 = \frac{EBE}{D_t}$, where: R_1= profitability by creditors; EBE = gross surplus of exploitation; D_t = total debts;

$R_2 = \frac{CP}{TP}$, where: R_2 = solvency; CP = own capital; TP = total liabilities;

$R_3 = \frac{AC-S}{TP}$, where: R_3 = liquidity; AC = current assets; S = stocks;

$R_4 = \frac{Ch_f}{CA}$, where: R_4 = rate of financial expenses; Ch_f = financial expenses; CA = turnover;

$R_5 = \frac{Ch_p}{VA}$, where: R_5 = rate of personnel costs; Ch_p = personnel costs; VA = added value.

The values of these 5 financial rates were calculated for the 11 enterprises of the sample. For those financial rates was calculated an average value as a weighted arithmetic average, the share of each year was determined as follows: 8 percent for the year 2001, 10 percent for the year 2002, 15 percent for the year 2003, 20 percent for the year 2004, 22 percent for 2005 and 25 percent for the year 2006, to give a higher importance to values of recent years.

These average values have been used to build the equation system used to estimate the factors a_i of the Z score function. Thus, the score function found for the adjusted **model for determining the risk of bankruptcy** was:

$$Z = 0.868 \times R_1 + 0.4779 \times R_2 - 0.6473 \times R_3 + 21.6624 \times R_4 + 0.3178 \times R_5 \qquad (3.1)$$

The appreciation of the Z score is based on the next classification:

- $Z < 0,244 \rightarrow Riskofbankruptcy > 65\%$;
- $0,244 < Z < 0,592 \rightarrow$ Uncertainty area $\rightarrow 10\% < Riskofbankruptcy < 65\%$;
- $Z > 0,592 \rightarrow$ Non-bankruptcy $\rightarrow Riskofbankruptcy < 10\%$.

In this adjusted model, the estimated coefficients indicate a direct link between liquidity and probability of bankruptcy which shows that the companies are closed to bankruptcy when the liquidity rate is higher. The favourable values of liquidity are between 0.8 and 1. Over these values, the risk of bankruptcy is high. Such a direct link is explained by the fact that in the construction companies, the most part of the current assets represents customer claims. These claims are immobilized funds and liquidated in the sector with great delay. That means the Romanian enterprises acting in the building sector have difficulties in debt recovery; hence the direct link. The seasonal nature of the building sector has a significant impact on the enterprises liquidity, too.

Also, the model shows an inverse link between rate of financial expenses and the probability of bankruptcy. Usually, large financial expenses occur when there is a high degree of indebtedness. This relation can be normal when the rate of return on assets is higher than the interest rate (leverage effect) leading to the increase of return on equity as the indebtedness increases. Thus, the model shows that the enterprise profitability increases as the financial costs grow. So, the inverse link between rate of financial expenses and risk of bankruptcy may be partially explained by the positive leverage.

About the inverse relation between staff costs rate and probability of bankruptcy we can argue that is an unusual situation that the share of staff costs in added value to be high to the enterprises with no risk of bankruptcy, especially because the high value of personnel expenses diminishing the profit. This situation show that the enterprise performance depends on the level of personnel incentive and that are some imbalances in the operating activity of the company, because the share of staff costs in value added is higher than it should be.

Although the model shows an inverse relationship between the rate of staff costs and risk of bankruptcy, the discriminate analysis shows that the rate of personnel costs is higher to bankrupt companies. These controversial issue is generated, and in this case, by the interpretation of the indicator. In the normal activity, the share of personnel costs should be between 25-60% of value added. Above this level, the activity efficiency is compromised.

Between model variables is a strong correlation: for example, a firm with a reduced financial performance has the share of personnel costs in value added greater than 1. This means that Z score is influenced upwards by an amount greater than 0.3178. But a staff cost ratio greater than 1 generates a negative gross surplus of exploitation and that a negative profitability by creditors. Thus, the positive impact of high value of the personnel costs rate is cancelled and often exceeded by the adverse effect of negative profitability, whose coefficient is much higher, e.g. 0.868.

Calculating the Z score for those 11 enterprises of *a priori* sample based on data from 2006 and ordering descending the enterprises by Z score result the following situation: a rate of success of 81.82% in the case of no taking into account of a range of uncertainty (grey area) and 87.50% in the case of consideration of an uncertainty range between 0.24 and 0.59 (grey area).

Still, the model has been tested for another sample of firms in the same sector. Thus, there was collected information from financial and accounting situations of the firms of 2006 for *a posteriori* sample composed of 10 enterprises, of which 5 non-bankrupt and 5 enterprises bankrupt. In this case the rate of success was 70% in the case of no taking into account of a range of uncertainty (grey area) and 77.78% in the case of consideration of an uncertainty range between 0.24 and 0.59 (grey area).

In conclusion, comparing of the parameters values of the model Conan & Holder and of the adapted model to the specificity of the Romanian economy we saw clear the significant differences, and it results as models for assessing the risk of bankruptcy are relevant only if there are satisfied conditions related to the presence of some similar economic characteristics in the analyzed period and enforceability on some enterprises in the sector of activity had referred to. The rate of success demonstrates that this sector is experiencing profound changes and that the model will have to be adjusted periodically, in accordance with the evolutions registered in the building sector.

This model is created on 11 enterprises, representative to Galati County. The Region South-east has a share above average in the total building sector. For this reason we can conclude that the sample used to model designing may have national representation.

4. Methodology and data prediction

The capacity of prediction of this model was tested on those 2 samples of enterprises in the period 2007-2008. The first sample includes 11 enterprises to which data on the period 2001-2006 were used to determine the adjusted model variables and the second sample of 10 enterprises that were used for adjusted model testing. The data for period 2007-2008 were collected also, from the balance sheets of the enterprises. There were calculated the values of the variables considered and determined the Z score for both samples.

Firstly, starting to the adjusted model Conan & Holder it was achieved the prediction of risk of bankruptcy for the period 2007-2008 for the first sample (a priori). The ranking and appreciation of enterprises after the financial performance in 2007 and 2008 are presented in the Table II and III.

If in 2006, the enterprises **S1**, **S2**, **S4**, **S5** and **S3** were classified as being at risk of bankruptcy less than 10% (Bărbuţă-Mişu, N., Stroe, R., 2010), the Table II show that in 2007, only enterprises **S4**, **S2** and **S1** are maintaining to the same range of risk, the enterprises S5 and S3 being now in the uncertainty area. In 2008 (Table III), the enterprises **S4**, **S2**, **S3**, **S9**, **S6**, **S5** were classified as being at risk of bankruptcy less than 10% that proves the significant changes take place in the building sector and that the effects of the economic and financial crisis not felt yet. The effects of the financial crisis occurred later in the enterprises mentioned above, that were in the stage of completion of works and that managed to recover the most of the debts in 2008.

Studding the individual values of the model variables we can conclude that were more affected by the crisis effects the enterprises that have established large debts unpaid or with large terms of collection and those who have several works in progress which have not been able to find financing sources at a reasonable cost. This is an explanation for enterprise **S1** that in 2008 presents a risk of bankruptcy more than 65% in conditions which in the preview period had a risk of bankruptcy less than 10%. The enterprise **S10** has a similar situation because has passed from the uncertainty area to a risk of bankruptcy over 65% in 2008.

The share of staff costs in added value has been significantly reduced due to layoffs resulting from the economic crisis which there is another cause that has generated the increasing of the bankruptcy risk to the assessed enterprises.

Secondly, the adjusted model Conan & Holder was applied for prediction the risk of bankruptcy on the period 2007-2008 for the second sample of enterprises (a posteriori) used in the testing of this adjusted model. The ranking and appreciation of enterprises after the financial performance in 2007 and 2008 are presented in the Table IV and V.

If in 2006, the enterprises **E1**, **E2**, **E6**, **E3**, **E7** and **E5** were classified as being at risk of bankruptcy less than 10% (Bărbuţă-Mişu, N., Stroe, R., 2010), the Table IV show that in 2007, only enterprises **E2**, **E3**, **E1** and **E5** are maintaining to the same range of risk, the enterprise **E7** being now in the uncertainty area and the enterprise **E6** was removed from the Register of Commerce. In 2008 (Table V), the enterprises **E2**, **E3**, **E1**, and **E5** were classified as being at risk of bankruptcy less than 10% that proves some enterprises acting in the building sector are affected by the economic and financial crisis as well as the first sample, in function of the stage of works. This situation appears to be a generalized evolution in the building sector.

The enterprise **E7** passed from a risk of bankruptcy lower than 10% in 2006 to uncertainty area in 2007 and maintains this status in 2008. The enterprise **E8** has a fluctuating evolution: if in 2006 it was assessed as a risk of bankruptcy over 65%, in 2007 it was at the limit between a risk of bankruptcy less than 10% and area of uncertainty, then in 2008 entered in the zone of uncertainty. The variables that cause this fluctuation are the current liquidity and the share of financial expenses in turnover. In the analyzed period, the enterprises **E7**, **E9** and **E10** are fluctuating between uncertainty area and a risk of bankruptcy more than 65%.

In general, according to the coefficients of the model variables, the low risk of bankruptcy was registered by the enterprises with high profitability of creditors, solvency, rate of financial expenses and rate of personnel costs and low liquidity.

5. Conclusions

In conclusion, the adjusted model was created using financial data of the enterprises in the period 2001-2006, a relatively stable period that generated some exigency in assessing the financial performance of the enterprises. If the model had taken into account and the period 2007-2008 or 2009 (when the effects of economic and financial crisis had been felt more) then the model exigency would be lower. Under these conditions, it is possible that some companies evaluated in this paper having a high risk of bankruptcy may actually be in the area of uncertainty and the enterprises from uncertainty area may be in fact assessed having a minimum risk of bankruptcy.

Although the study conducted in this paper took into account a limited number of enterprises acting in the building sector, but it reflect the reality at the national level as it shown in the statistics related to this sector. The building companies have seen an exponential growth of business in the recent years; also, it was the sector with the fastest growth rate (33% in the first half of 2008).

In 2009, the world crisis affected the Romanian economy, particularly the sectors with high indebtedness, the more exposed were the building sector and real estate developments, which affect the economic growth. The companies in the building sector are threatened in the highest degree of insolvency situation, slow down or delayed payments. So, currently, the building sector faces a liquidity crisis, generating a chain reaction in the time of the payment incident. Thus, in this context of the actual financial crisis the companies become more and more exposed to macroeconomic volatility and the link between micro and macro is strengthened (Triandafil, C. M. & Brezeanu, P., 2009).

Anyway, the capacity of prediction of this model was proved and its most important advantage is providing a way of ranking of the enterprises after their financial performance.

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APPENDIX

Table I. The discriminate analysis of the financial rates for the two groups of enterprises: non-bankrupt/bankrupt

No	Indicator	Non-bankrupt enterprises		Bankrupt enterprises	
		Average	Median	Average	Median
1	Total asset profitability	0.211	0.193	-0.313	-0.212
2	Economic asset profitability	0.384	0.343	-0.067	-0.056
3	Return on equity	0.392	0.320	-0.289	-0.168
4	Profitability in the face of creditors	0.478	0.418	-0.00014	-0.015
5	General liquidity	1.149	0.989	1.511	1.487
6	Immediate liquidity	0.553	0.548	0.325	0.237
7	Solvency rate in the medium and long term	1.942	1.871	1.088	1.056
8	Solvency	0.453	0.447	-0.580	-0.289
9	The degree of total debt	1.162	1.232	-0.076	-0.191
10	The share of financial debts in total debts	0.122	0.131	0.065	0.025
11	The financial expenses rate	0.017	0.016	0.013	0.006
12	The staff expenses rate	0.429	0.492	1.061	1.026
13	Reinvested profit rate	0.942	0.983	0.017	0.052

Source: Calculus performed by authors

Table II. Ranking of the enterprise after the financial performance in 2007 (a priori sample)

Enterprise	**Z score**	**Interval Z**	**Appreciation**
S4	0.8788	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S2	0.8706	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S1	0.7554	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S6	0.7118	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S9	**0.5908**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
S3	**0.5744**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
S10	**0.5053**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
S8	**0.4483**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
S5	**0.4009**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
S7	0.1370	$Z < 0,244$	$Risk of bankruptcy > 65\%$
S11	-0.1312	$Z < 0,244$	$Risk of bankruptcy > 65\%$

Source: Calculus performed by authors

Table III. Ranking of the enterprise after the financial performance in 2008 (a priori sample)

Enterprise	**Z score**	**Interval Z**	**Appreciation**
S4	1.1276	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S2	0.8702	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S3	0.8548	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S9	0.7816	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S6	0.6545	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S5	0.5944	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
S8	**0.4325**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
S7	**0.3243**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
S1	0.1830	$Z < 0,244$	$Risk of bankruptcy > 65\%$
S10	0.0764	$Z < 0,244$	$Risk of bankruptcy > 65\%$
S11	0.0262	$Z < 0,244$	$Risk of bankruptcy > 65\%$

Source: Calculus performed by authors

Table IV. Ranking of the enterprise after the financial performance in 2007 (a posteriori sample)

Enterprise	**Z score**	**Interval Z**	**Appreciation**
E2	3.0137	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E3	1.6172	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E1	1.2696	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E5	0.8354	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E4	0.7726	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E8	0.6550	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E7	**0.3752**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
E9	**0.2613**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
E10	0.0690	$Z < 0,244$	$Risk of bankruptcy > 65\%$
E6	-	$Z < 0,244$	$Risk of bankruptcy > 65\%$

Source: Calculus performed by authors

Table V. Ranking of the enterprise after the financial performance in 2008 (a posteriori sample)

Enterprise	**Z score**	**Interval Z**	**Appreciation**
E2	6.3226	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E3	1.4140	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E1	1.3280	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E5	0.8347	$Z > 0,592$	Non-bankruptcy or $Risk of bankruptcy < 10\%$
E8	**0.5125**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
E7	**0.4247**	$\mathbf{0,244 < Z < 0,592}$	**Uncertainty area** $\rightarrow$ $10\% < Risk of bankruptcy < 65\%$
E9	0.1593	$Z < 0,244$	$Risk of bankruptcy > 65\%$
E4	0.1478	$Z < 0,244$	$Risk of bankruptcy > 65\%$
E10	-0.0668	$Z < 0,244$	$Risk of bankruptcy > 65\%$
E6	-	$Z < 0,244$	$Risk of bankruptcy > 65\%$

Source: Calculus performed by authors