S. N. BORLEA, M. V. ACHIM

ISSN 0543-5846
METABK 53(2) 279-282 (2014)
UDC – UDK 669:338.93:658.15:368.025.6=111

ASSESSING BANKRUPTCY RISK FOR ROMANIAN METALLURGICAL COMPANIES

Received – Prispjelo: 2013-05-21
Accepted – Prihvaćeno: 2013-10-20
Review Paper – Pregledni rad

In this paper it propose to evaluate the bankruptcy risk of the companies which operate within the Romanian metallurgy industry, over the period 2001-2012, highlighting the impact of financial crisis on this sector. The bankruptcy risk assessing by Altman Model gives us a pessimistic view of the Romanian metallurgical industry. A little more optimistic perspective on the risk of bankruptcy in Romanian metallurgy is provided by the Conan Holder Model according to which the best two Romanian metallurgical companies traded at BSE (ALR and ART) face a low risk of bankruptcy. According to this model the financial crisis seems to have affected the first two Romanian metallurgical companies only in 2009, then in the following years the bankruptcy risk degrease, achieving satisfactory levels.

Key words: metallurgical companies, Romania, financial indicator, failure risk

INTRODUCTION

Romanian metallurgical industry has experienced in the last century, one of the most spectacular growth worldwide, came to be comparable with the same type of economic sectors in developed countries in Western Europe and overseas.

Romanian metallurgy ensured for many decades millions of jobs and significant revenues to the state budget.

After 1990, as well as other fundamental segments of the Romanian economy, the metallurgy came into phases of privatization, decommissioning and disassembly mixer, in one word, into a complete destruction stage of an industry in the national economy which has propelled Romania near industrial country status. A lot of metallurgical companies such as Mechel Oltchim, Arpechim Pitesti, Astra Cars Arad, Hunedoara Steel Plant, are just a few examples of plants about to be entirely or partly closed.

Bankruptcy occurs when firms lack sufficient capital to cover the obligations of the business. *Bankruptcy* can be defined as state in which a company is unable to pay its debts to creditors, suppliers, shareholders, state etc. Bankruptcy risk is part of internal business risks and is due to failure to meet timely payments. The term of bankruptcy comes from the Latin verb „fallo-fallere", which means "to miss, to escape" and indicating that debtor couldn't do the payments to its creditors.

Setting predictive models of financial problems which companies are facing represents a useful tool for diagnosing the financial health followed by adopting the best measures in order to redress the financial state of companies.

S. N. Borlea, West Vasile Goldis University, Arad, Romania, M. V. Achim, Babeş-Bolyai University, Cluj-Napoca, Romania.

PREDICTIVE MODELS OF BANKRUPTCY RISK

Bankruptcy risk analysis is performed by several methods, each revealing different aspects of the bankruptcy risk, as following:

a) Methods based on financial criteria: Economic methods (using the correlation between different indicators calculated on Financial Statements); Statistical method (discriminant analysis, Logit/ Probit Analysis Hazard Model; Expert System Models [1])
b) Methods based on non-financial criteria: Managerial methods; Methods of competitive strategy; Other methods (based on critical remarks of auditors, based on macroeconomic growth, laws, fiscal policies and so on).
c) Combined methods by using both financial and non-financial criteria (used by banks, rating agencies).

Based on the large study investigated by Bellovary et al in 2007 [2], he concludes that the multiple discriminant analysis basing on financial criteria is the most common method of predicting the risk of bankruptcy, being used in 38 % of the investigated studies.

According with the study of Chen and Shimerda (1981), by using financial ratios, the accuracy of the prediction the bankruptcy risk for a company exceeds 90 % [3]. More than that, it's impose that financial ratios of a specific business to be best interpreted as a group [4] rather than making judgments on individual ratios because the interpretation of one ratio may be altered by other ratios of the same business.

The earlier work of Beaver (1966) indicated that the financial ratios can predict the likelihood of bankruptcy The work began by Beaver was continued by Altman (1968) who introduced multivariate discriminant tech-

nique for predicting firms' failure (MDA). Both (Beaver and Altman) are considered pioneers of bankruptcy risk model based on financial criteria aggregates by multiple discriminant analysis technique.

Since 1968, the primary methods that have been used for model development are multivariate discriminant analysis (MDA). In a general approach, scoring method is based on a block rate (indicators) statistically determinated, weighted by some coefficients in a mathematical model which could determine with some probability the future health of entity . Thus, the analyzed entity is assigned a note Z, called "score" which is a linear combination of several installments, as follows:

Z = a1R1+a2R2+a3R3+…anRn , unde

- R1, R2, R3…Rn - represents the values of discriminant financial ratios;
- a1, a2, a3 – represents selected importance of financial ratios.

Depending on the score value obtained, the entity shall be presumed healthy or bankrupt. Synthetically , multiple discriminant analysis is a statistical technique used to classify an observation in two or more groups, depending on observable individual characteristics.

After the study made by Altman, this type of analysis has not ceased to grow , creating other discriminant models for assessing the risk of bankruptcy by various schools such as:

a) **Anglo-Saxon school** (Beaver 1966; ***Altman*** 1968,2000; Lis 1972; Diamond 1976; Yves Collongues 1976; Bilderbeek 1977; Deakin 1977; Taffler 1974,1977,1980,1982 Tisshaw 1976; Springate 1978; Koh and Killough, 1980; Ohlson 1982; Zavgren1983; Fulmer, 1984; Grammatikos & Gloubos 1984; Peel, 1987; Keasey & Watson, 1986; Eidleman 1995; Lennox 1999; Christidis,2010;

b) **Continental European school** (Beerman, 1976; Weinrich 1978; ***Conan & Holder*** *(1979);* French Central Balance Sheets Model of French National Bank (1977-1979), Poddig 1995; Danemarks National Bank Model 2004, Mateos and López, 2011);

Many researchers (Collins1980; Mossman et al.1998)have compared different models of bankruptcy and concluded that, despite some theoretical and practical limits, the Altman method is superior because of its simplicity, practicality and accuracy.

DATA AND METHODOLOGY

Data

In order to assess the failure risk, we use the financial statements of companies in the metallurgical industry, operating within the capital market.The companies' financial reports are posted on their websites or on companies' from Bucharest Stock Exchange (BSE) website (www.bvb.ro).

The period covered by the study is 2001-2012, showing separately two periods: period before the crisis 2001-2008 and post-crisis period 2008-2012.

Sample selection

At the current date (May 2013) there are 20 large metallurgy companies trading on the capital market but only three of them are traded on the Bucharest Stock Exchange (BSE) as a primary market, namely ALRO Company (ALR), TMK - ARTROM Company (ART) and MECHEL TARGOVISTE Company (COS). The others 17 metallurgical companies are traded on the secondary market Rasdaq.

We include in our sample the metallurgy companies listed on primary market (Bucharest Stock Exchange) consisting in the first three companies in Romania:ALRO Company (ALR), TMK – ARTROM Company (ART) and MECHEL TARGOVISTE Company (COS).

Methodology

Building our methodology of predicting the risk bankruptcy we use two representative models in this respect, namely Altman Model (representative of the American school) and the French Conan Holder Model (representative for Continental European School).

Altman Model

The "Z" Model used for prediction bankruptcy of companies has emerged in the U.S. in 1968, being developed later, in 1977, by Professor Altman who is considered the "pioneer" of statistical models for predicting the risk of bankruptcy.

With the aid of "Z" Model,Altman have managed to predict about 75 % of the companies' bankruptcies about two years before their occurred. Calculating of "Z" variable is based on the following equation [5]:

$$Z = 1{,}2\ X1 + 1{,}4\ X2 + 3{,}3\ X3 + 0{,}6\ X4 + 0{,}999\ X5$$

The financial ratios of model with a strong interdependence between are:

- X1 - *Flexibility ratio or working capital ratio* (Working capital/ Total assets);
- *X2 - Self-financing rate of total assets* (Retained earning / Total assets);
- *X3 - Basic earning power* (Earning before interest and taxes/Total assets);
- *X4 - Debts capacity ratio* (Book value equity/Total debts);
- *X5 - Total assets turnover (* Net turnover/Total assets).

Bankruptcy risk assessment is based on the variable "Z" as follows:

- **Zone A-Safe zone,** if Z > 3. The company records a very good financial state and a reduced risk of bankruptcy.
- **Zone B-Grey/Uncertain zone**, if $Z \in [1, 8, 3)$.

The company faces financial difficulties but it can recover the activity only by adopting a proper strategy;

- **Zone C- Distress zone,** if Z < 1,8. There is a major bankruptcy risk area within the company bankruptcy is imminent.

Conan Holder Model

The model belongs to Joel Conan and Michel Holder and it has determined the probability of failure for over 50 % of the bankruptcies of companies in the 70s [6].

Financial ratios underlying the model are of "liquidity-exigibility" type as shown in the following [6]:

$$Z = 16\,X1 + 22\,X2 - 87\,X3 - 10\,X4 + 24\,X5 ,$$

where

X1 - Acid test ratio (Current assets/Current liabilities)

X2 - Financial stability ratio (Long term sources / Total sources)

X3 - Sales financing from funds raised (Financial expenses/Turnover)

X4 - Remunerated staff ratio (Staff expenses/Value added)

X5 - Return on value added (Gross operating profit/ Value added).

The classification of a certain class of risk by "Z" Conan-Holder model is as follows:

- **Zone A-Safe zone,** if Z > *9* .The company is solvent facing a low bankruptcy risk.
- **Zone B-Grey/Uncertain zone**, if Z ∈ [4, 9). The company facing financial uncertainness but its can be redressed. The bankruptcy risk is medium.
- **Zone C- Distress zone,** if Z < 4. There is a high bankruptcy risk area for companies within.

RESULTS AND DISCUSSES

According to Altman Model the bankruptcy risk of metallurgical companies listed at BSE is shown in the Figure 1.

As we can see from the graph above, up to the triggers of financial crisis in 2008, only one metallurgical companies in Romania, namely Alro (ALR) recorded a very low risk of bankruptcy, until 2003 (situated within Safe Zone-A) and a medium risk, over the period 2003-2008 (situated within Grey Zone-B)

Since the crisis in 2008, even for the biggest metallurgical companies (ALR) theAltman Z-score has failed below the critical threshold of 1,8 reflecting reduce of financial performances and increase of uncertainties that may cause hazards in manifesting bankruptcy risk. Year 2012 is a disastrous one for the most powerful company in the Romanian metallurgy, Alro Company records its first year with losses of about 188 million RON (42 million Euro) over the period 2001-2012. In 2012 the bankruptcy risk registered its minimum level over the analyzed period, classifying for the first time the company in Distress Zone-Zone C).

Another metallurgical company Mechel Targoviste Company (COS) has faced a systematic financial redress until 2008, whereupon it is strongly affected by the crisis, its financial performances have dramatically decreased after 2008. Currently the company enters into insolvency process.

Tmk – Artrom Company (ART) is situated in the high bankruptcy risk zone (Distress Zone- C) till 2010, whereupon in 2011 and 2012 faces a significant financial redress, moving from high risk area (Zone C) towards the medium-risk area (Grey Zone- B).

Year 2012 brings greater financial problems and thus a higher risk of bankruptcy for all analyzed metallurgical companies. The Z Altman values declining in 2012 compared to previous year (see the Figure 1).

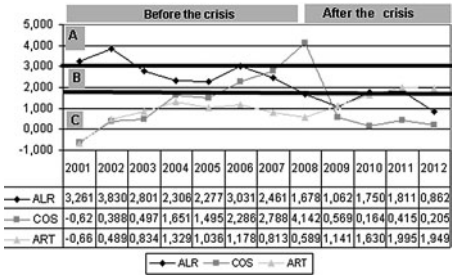
According to the Conan Holder Model the assessing risk of bankruptcy Romanian companies in the metallurgical industry is presented in the Figure 2.

The results of applying the Conan Holder Model reflects that Alro Company has registered the extremely good performances until 2008, the value of "Z" score being well above the critical threshold (Z is much more than 9 for the entire period 2001-2008).The bankruptcy risk is very low, over the period 2001-2008 (Zone A).

Year 2009 marks for Alro Company a dramatic decrease of its financial performances and an increase of bankruptcy risk (the risk are moving towards a grey zone- Zone B). Alro Company succeeds in financial redress in the following years 2010 and 2011 and consequently the bankruptcy risk achieves a very good level, situating in a very safe zone of risk (Zone A).

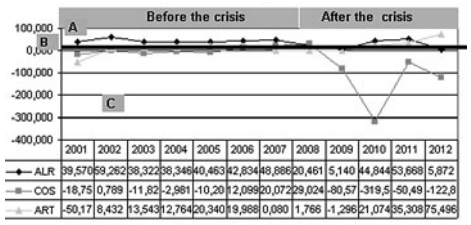
In 2012, the value of Z Conan Holder highly decreased reflects a much higher bankruptcy risk for Alro Company in 2012 (it is situated in Grey Zone- Zone B).

The second analyzed company Mechel Targoviste Company (COS) has faced a high bankruptcy risk area almost over the entire analyzed period (2001-2012), ex-



Source: own calculations

Figure 1 Z Altman Model for Romanian metalurgical companies over the period 2001-2012



Source: own calculations

Figure 2 Z Conan Holder Model for Romanian metalurgical companies over the period 2001-2012

cepting the years before the crisis (2006, 2007) when company registered some financial recovery.

The company's financial problems worsen in 2010 when it registered the biggest losses recorded until this date of approximately 155 million RON (about 35 million Euros).

Third analyzed Tmk – Artrom (AR T) registered good financial performances with a low bankruptcy risk over the period 2002-2006 (Zone A). The following crisis years 2007-2009 marks an increase of bankruptcy risk, standing the company within Grey Zone of risk (Zone B). Since 2010, Tmk – Artrom Company has registered a systematic financial redress, year by year, the risk of bankruptcy being very low (Zone A).

CONCLUSIONS

The bankruptcy risk assessing by Altman Model gives us a pessimistic view of the Romanian metallugical industry, Z-score values reflects a degrease of bankruptcy risk until the period before the crisis triggered (year 2006,2007 even 2008 for some companies) following an increase bankruptcy risk for Romanian metallurgy represented by metallurgical companies' trade at Bucharest Stock Exchange (BSE). The financial crisis has strongly affected the Romanian metallurgical companies, the values of Z Altman score reflects a high risk of bankruptcy for all these companies.

A little more optimistic perspective on the risk of bankruptcy in Romanian metallurgy is provided by the Conan Holder according to which the best two Romanian metallurgical companies traded at BSE (ALR and ART) face a low risk of bankruptcy. According to this model the financial crisis seems to have affected the first two Romanian metallurgical companies only in 2009, then in the following years the bankruptcy risk achieves satisfactory levels for these two companies.

Regarding the third big Romanian metallurgical companies, namely MechelTargoviste Company (COS), it has recorded big losses year by year, the Z Canon Holder values indicating an extremely high bankruptcy risk. Moreover, in 2013 the company has entered in insolvency process and is now in a reorganization status.

Conan Holder Model is a continental model so it fits much better on specific Romanian economy, thus being closer to economic reality in Romania, compared with Altman model adaptable to Anglo-Saxon economies (mainly the American ones.) Moreover, even in our study the economic reality in Romanian metallurgical companies has confirmed the good predictions of bankruptcy risk of these companies by using Conan Holder Model.

Among the world factors that conduct to increase the failure risk of Romanian metallurgical companies we can mention economic globalization which has imposed very tough competition rules now and financial crisis triggered in 2007.

These factors join the specific Romanian factors that contributed to deepening problems of the Romanian metallurgy. Among these factors we can highlight the privatization process specific for the transition countries towards a market economy (also for Romania), the higher taxation including also high taxes for renewable energy payable by metallurgical companies as intensive consumers of energy companies.

These difficulties do not apply only to Romanian metallurgy economy but in many countries, regardless of their economic development. For all that, Romanian metallurgical companies make huge efforts to not give up, trying to keep the flag up even for what was before the '90.

REFERENCES

[1] E. Iancu, I Ciubotaru, Theoretical and experimental research on the use of expert systems (ES) in assessing risk of failure in metallurgical companies, Metalurgija, 52 (2013) 2, 279-281.

[2] J. Bellovary, D. Giacomino, M. Akers, A Review of Bankruptcy Prediction Studies: 1930 to Present, Journal of Financial Education, 33 (2007).

[3] K. H. Chen, T.A. Shimerda, An Empirical Analysis of Useful Financial Ratios, Financial Management, 10(1981)1, 51-60.

[4] P. Walton, A. Haller, B. Raffournier, International accounting, second edition, Ed. Thomson, London, 2003.

[5] E.I. Altman, Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy, Blackwell Publishing, American Finance Association, Journal of Finance, 23(1968)4, 589-609.

[6] J. Conan, M. Holder, Explicatives variables of performance and management control, Doctoral Thesis, CERG, Universite Paris Dauphine, 1979.

Note: The responsible translator for English language is the lector from Babeş-Bolyai University, Cluj-Napoca