DISCRIMINATORY ANALYSIS MODEL FOR BANKRUPTCY RISK DETECTION

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Abstract

The economic and financial activity can take place under the most diverse circumstances. Of course there are concerns to analyze the perspective of the risk effect of a commercial company, but at the same time of a financial-banking institution. Such an analysis involves a linear combination of the rates of return and financial equilibrium that can help to identify and calculate a score-type indicator on the basis of which the bank's risk of bankruptcy can be assessed. Rates that characterize the company's performance must be independent of each other, so that we can identify as many difficult issues as may lead to the emergence of a limitation of the bankruptcy risk. In fact, the risk of bankruptcy is determined by a series of far-fetched risks, and those entering into a correlation at a given moment may determine a state from which the agent can no longer exit. Thus, commercial risk, warranty risk, managerial risk, sensitivity risk are elements of financial risk. These risks can be calculated and may lead to a total credit risk in the case of a trading company or in the case of a banking institution granting these loans. None of these risks is insignificant or not taken into account. Based on these risk analyzes, the bank-specific rating can be performed. Based on this rating, it is possible to identify the company's position, solvency and liquidity available to this company, ultimately leading to a risk probability within that company. A concrete analysis based on BCR's lending data makes it easy to understand the content of this bankruptcy risk analysis phenomenon to which an economic agent may be exposed irrespective of its size and robustness.

Keywords: *model of analysis, profitability, bankruptcy, risk, rating*
JEL Classification: C40, G32, G33

Introduction

This article looked at a presentation of the discriminatory method that will include a number of other models, the Altman model, the Canon-Holder model, which on the basis of interpretations determines the obtaining and calculation of some indicators that reveal the content and possibility of identifying the risk bankruptcy. The risk classes are presented, the main risks, reaching the rating used based on these well-calculated indicators. In the article the economic environment is studied, it is the question of analyzing the

position of the enterprise in the context of the branch, taking into account its solvency and liquidity in the general context that exists in the field to which this activity refers. Data are used, a number of indicators are calculated and some theoretical aspects regarding the classification of risk items related to bankruptcy of the company.

Literature review

Agoraki, Delis and Pasiouras (2011) analyzed a series of issues regarding bank regulation and assumption of banking risks in transition countries. Aizenman (2010) highlighted the role of central banks in emerging markets. Anghelache (2008) presented statistical indicators used in economic analyzes. Anghelache (2010) studied the main models for banking performance and risk analysis. Awdeh et al. (2011) treated elements related to the effect of capital requirements on bank risk. Badea et al (2010) and Ciocoiu (2014) approached the notions of bank risk management. Claeysa, Vander Vennetb (2008) analyzed the determinants of bank interest margins. Elsinger, Lehar, A. and Summer, M. (2006) investigated methods of risk assessment for banking systems. Gasha et al. (2009) addressed aspects of credit risk modeling. Hakens and Schnabel (2010) studied the transfer of credit risk and banking competition. Hernández-Cánovas and Martínez-Solano (2010) analyzed the correlation between loans and SME financing. Jiménez, Lopez and Saurina (2013) tried to identify how competition is affecting bank risk. Pasiouras and Kosmidou (2007) analyzed the factors influencing the profitability of banks.

Methodology, data, results, discussions

• This analysis involves a linear combination of profitability and financial equilibrium rates, a combination that helps to determine an indicator called a score that approximates bankruptcy risk of that firm. This indicator is also called the score function or the Z function and has the following general model of determination:

$Z = \sum Ct\ Rt$

where:

Rt = rates of profitability and structure;

Ct = represents the correlation coefficient, respectively the ratio of the rate R by the score.

The rates that characterize the company's performance must be independent of each other, since a certain degree of correlation between them would lead to a redundant recording of the influence of the same phenomenon

within the score function. Each bank, according to the rules of its own organization and operation, uses a certain model for determining the score.

• The ALTMAN model defines 5 variables and is based on the following formula:

Z = 1,2 X1 + 1,4 X2 + 3,3 X3 + 0,6 X4 + 1,0 X5

X1 = Circulating Capital / Total Assets;

X2 = Reinvested earnings / Total assets;

X3 = Profit before tax / Total asset;

X4 = Stock market capitalization / Long-term debt (over one year),

X5 = Turnover / Total Asset.

It is noteworthy that indicator levels are even better as they record higher absolute values. Depending on the value obtained for the score function, the credit manager can assess the bankruptcy risk of the requesting credit institution. Thus, the higher the value of the Z indicator, the lower the risk that the firm goes bankrupt, and therefore the credit risk is low.

The value of the Z indicator

Table no. 1

The value of the Z indicator	The situation of the firm
Z < 1,8	The state of bankruptcy is imminent
1,8 < Z < 2,7	The financial situation of the enterprise is difficult, with noticeably diminished performances close to the bankruptcy threshold
Z > 2,7	The financial situation is good and the banker can trust the company as being solvable in the next 2 years

Another model, that of J. Conan and M. Holder, can be applied to enterprises with a number of 10 to 500 employees and is based on the liquidity-exigibility analysis. The model was established in 1978 by observing a sample of 190 small and medium sized enterprises, of which half went bankrupt between 1970 and 1975.

• The Conan and Holder model has 5 variables and is based on the following formula:

Z = 0,2 X1 + 0,22 X2 + 0.16 X3 + 0,8 X4 – 0,10 X5

X1 = Gross operating surplus / Total debt;

X2 = Fixed / Total Assets;

X3 = Current assets without stocks / Total assets;

X4 = Financial Expenses / Turnover;

X5 = Staff costs / Value Added.

Value of the score

Table no. 2

Score value	The situation of the enterprise	Risk of bankruptcy
Z > 0,16	Very good	Less than 10%
0,10 < Z <0,16	Good	From 10% to 30%
0,04 < Z < 0,10	Alert	From 30% to 65%
Z < 0,04	Failure	More than 65%

The credit risk analysis and evaluation activity is carried out with the following categories of risks obligatory:

- financial risk determined using the Score Method (Z) - J. Conan and M. Holder;

- Business risk for legal entities is the uncertainty that may arise in collecting receivables and / or paying suppliers and will be evaluated using the following indicators:

- the average receivable collection period, representing the average number of days in which receivables against the turnover of the respective period (PMIC)

- average supplier payment period, representing the average number of days payable to suppliers over their respective turnover (PMPF).

If PMIC > PMPF – high risk;
PMIC = PMPF - average risk;
PMIC <PMPF - low risk.

- the risk of collateral is represented by the possibility of difficulties arising from the capitalization of the collateral placed in the situation where the borrower does not repay the loan and does not pay the interest under the credit agreement. Thus, the risk assessment of the guarantee is based on their value level and the speed of recovery, considering that each degree of safety corresponds to specific situations:

a) maximum security: unclaimed and irrevocable guarantees issued by the Ministry of Finance on the basis of the mandate of the Romanian Government granted by normative acts, warranty letters issued by banks, unconditional, bank notes issued by banks, collateral with dispossession, deposits in lei and currency and guarantees issued by the Romanian Loan Guarantee Fund

b) average safety: mortgages on industrial premises, commercial spaces, as well as intangible land, mobile goods purchased from credits

c) unsafe guarantees: dwelling buildings, agri-food, industrial, semi-manufactured goods, raw materials, mortgages on buildings in rural and extra-urban areas, other guarantees.

- the company's management risk is determined by the quality of the company's management team and will be analyzed on the basis of

direct knowledge of the firm by the referent of the bank to whom the credit application was made;

- the sensitivity risk is established on the basis of profile analysis for medium and long-term investments (both for legal entities and for individuals).

Any decision of the economic agents regarding the development and restructuring of production, the retrofitting or upgrading of fixed funds that can be implemented with medium- and long-term loans, entails a risk in obtaining the initial estimated results due to the influence of the changes that take place unceasingly in the ethnic, financial, economic, social, internal and external environment. Hence, the need to analyze the sensitivity of the variants studied against the probable changes as well as the risk coefficient under the influence of the factors that could not be explicitly taken into account. The sensitivity analysis uses two very important indicators:

RIRB = Financial Rapportability Rate calculated based on the cash flow for the base variance, an indicator so far calculated for all investment projects;

RIFF = Financial Return Rate calculated on the same cash flow, with a 1% increase in production costs versus income. The risk coefficient against the base variance is calculated according to the formula:

$$\frac{(RIRB - RIRF)*100\%}{RIRB}$$

The conditions to be met for credit admission and therefore for the bank to assume the sensitivity risk are as follows: the IRR is higher than the interest rate on the proposed credit for approval and the risk ratio is less than 75%.

The total credit risk will be determined on the basis of scores awarded on risk classes:

RT=RF+RC+RG+RM+RS (only for investment credits)
Clasele de risc:
Clasa 1: 100-80 points
Clasa 2: 79-65 points
Clasa 3: <65 points

The significance of the risk classes:

Risk Class 1 - Companies in this class have very good financial performance, which makes it possible to settle their obligations to the bank on maturity. It presumes that financial performance is maintained and in the

future, and the guarantees offered by these customers provide maximum security. The credit risk is minimal.

Risk class 2 - The financial performance of the companies analyzed is good, but the current level can not be maintained in the future. The customer's guarantees provide medium security. The credit risk is medium, the favorable opinion will only be given if additional conditions for financial indicators and guarantees are met.

Risk Class 3 - Financial performance is low or indicates loss, debt can not be paid to the bank, and the collateral presented does not provide opportunities for rapid liquidity transformation. The credit risk is very high. For applicants in this class, the Committee will propose to the Risk Committee the unfavorable opinion with its justification.

Assessment of total credit risk

Table no. 3

Categories of risk	Indicatori	Scores
1. Financial risk	Z>0,16 0,13<Z<0,16 0,10<Z<0,13 0,04<Z<0,10	50 40 30 10
2. Commercial risk	PMIC<PMPF PMIC=PMPF PMIC>PMPF	10 8 2
3. Warranty risk	-Guarantees secure - Guarantees with medium security - Unsafe guarantees	20 10 2
4. Managerial risk		
* experience and skill	- experienced team in the field - heterogeneous skills and low experience -Unqualified team and team with no experience	5 2 1
* Relations with the bank and third parties	- very good relations with the bank and third parties - good relations with the bank and third parties - Inappropriate relations with the bank and third parties	5 3 1
5. Sensitivity risk	**R<75%** **R>75%**	10 0

• Against the backdrop of strong financial market development, payment instruments as well as risk assessment techniques and procedures, the role of Rating agencies is becoming increasingly important. The idea of seeing the Rating Agency as an intermediary in the bank's relationship with its clients is becoming more and more a place among the specialists and not only, although the autonomy of financial analysis services in the form of these agencies raises the credibility of the information provided by them.

The requirements of the International Banking Supervisory Committee of Basel contributed to the increasing interest and public perception of the importance and significance of Ratings. It requires banks, when determining the necessary coverage of their credit to their clients by their own means, not to apply the ochiometric law, but to make it conditional on different rating symbols.

On this issue, in the banking environments and especially in Germany, after this decision, intense discussions took place over the years. The result was that already in the early 1990s, there was no longer the question of accepting the need for a rating note, but only the way in which analyzes were made and the rating was given. At present, the need for a bank to replace its traditional way of looking at a black and white business, assessing its creditworthiness in multiples and fines, giving it a note, a rating symbol, is a general consensus .

Ratings are opinions of a specialized agency (it should be noted that rating agencies do not analyze firms known as potential candidates at a low grade), expressed by specific symbols, from a fixed scale, characterizing the economic capacity and the legal connection of a economic entities (debtor, issuer: firm, bank, insurance company, credit ordinator, etc.). Newer Rating Agencies, which have medium-sized market segment, also express themselves through the rating and the future ability of the firm.

Differentiation between two levels of evaluation reports: creditworthiness, primary level, and rating as an evolved level of a firm in scale. The Rating Rating, expressed by a symbol, is the opinion of the agency about the economic capacity and the legal connection of the firm to fully and permanently fulfill its payment obligations.

The Agency therefore asks for a preliminary analysis to determine whether the notification is useful or not, a file containing the following: Status, Evidence of registration with the Trade Registry, Last 5 annual reports, Latest balance sheets and annual accounts, Current situation indicators financial.

If, as a result of this analysis, the grade is accepted, the applicant firm must submit to the Rating Agency an explicit request for scoring, which provides for firm adherence to the terms of the notation, the obligation to communicate the information, the agreed price and the way of payment.

A survey study follows this request, conducted through an analyst appointed by the agency, based on the analysis of both financial statements and organizational elements such as market positioning and technical and commercial efficiency.

The process is extremely complex and laborious, assuming the analysis of the risks faced by businesses as well as the influences existing in the macroeconomic environment.

Thus, first, the rating agency studies the economic environment of the enterprise, looking in particular at: the state of the sector to which it belongs, the specificity of the enterprise, the level of competition in the sector of activity, the degree of technology of the branch, the qualification level of the labor force, integration of the world market and / or the enterprise, in the case of transnational firms, the influence of regulations on their activity.

This analysis determines the boundaries between which the note will be, since each sector is characterized by a risk that is essential in determining the overall risk of the enterprise.

After this analysis, it is a question of analyzing the position of the enterprise in the branch, for which the rating agency follows: the degree of technology and the quality of the labor force: it compares the technology used by the company with the existing technology on the market, the qualification degree of its own staff with that of competing enterprises and assessing the level of R & D spending, trade policy: strengths and weaknesses of negotiating teams, firm's ability to assert itself on the market, managerial capacity of executive management, risk factors that influence the firm's activity.

The Rating Agency also monitors the solvency and liquidity of the firm under review, permanently tracking the status of the financial indicators and their evolution, the capital structure and its change over time, the structure of the sources of financing and the degree of indebtedness of the enterprise.

The analysis of liquidity is complemented by that of the enterprise's profitability, analyzing the rate of return on invested capital, the rate of return on assets, and the gap between the expected rate of return and the real rate of return. In its analysis, the rating agency also takes into account asset depreciation methods, the way of recording the expenses, the inventory recording method and the depreciation methods of the intangible assets that the company currently uses.

Irrespective of the mathematical-statistical model used for credit rating calculations after the evaluation and analysis process, the plausibility of the ratings proposed is verified through critical discussions within the agency's rating agency.

The team of one or two analysts present in the evaluated company collects the necessary data in a process that can take even a few months. The data processing and integration of the rating agency follows in the mathematical-statistical model of interpretation of the evaluation report.

The symbol, or rating note, is fixed by the agency only after it believes that all possibilities for objective analysis and evaluation have been exhausted. The decision taken by the Rating Commission is communicated to the company under review with all necessary explanations and is only published

with the agreement of the subject. On the other hand, the rating can not be used by the firm in business relationships except with the written approval of the rating agency. The notes provided by the agency may be modified if the business environment in which the company evolves changes.

Conclusions

The study underlying this article highlights the conditions under which the economic risk of a commercial company may occur. Based on the complex system of risks that make up the full risk, the final phase of such a trading company is that it will be on the verge of bankruptcy. The calculated indicators lead to the conclusion that it is necessary to synthesise them in a system of indicators reflecting one or other of the main aspects of the company's activity to ensure the possibility of identifying, estimating the bankruptcy risk that may arise.

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