E.S. Volna, I.P. Borchaninova
Ural Federal University named after the first President of Russia B.N. Yeltsin
Yekaterinburg, Russia

RUSSIAN COMPANIES: A 10-COEFFICIENT MODEL TO PREDICT A POSSIBLE BANKRUPTCY

Abstract: The gravest consequences for the counter-agents, in the author's view, are the risks of failure to pay the debts. An insolvent organization is a big generator of business risks, as the zeroed credit debt undermines the creditors' financial well-being. The author's main concern in this research was to first deal with the statistical data of bankruptcy cases of Russian companies and work out a model of 10 coefficients to forecast a possible bankruptcy in order to eliminate its consequences.

Keywords: bankruptcy proceeding, assets, liquidation value, current liability, revenue, profitability, payables, receivables, tangible assets.

Е.С. Волна, И.П. Борчанинова
Уральский федеральный университет имени первого Президента России Б.Н. Ельцина
Екатеринбург, Россия

БАНКРОТСВО РОССИЙСКИХ ПРЕДПРИЯТИЙ: 10-КОЭФФИЦИЕНТНАЯ МОДЕЛЬ ОЦЕНКИ ВЕРОЯТНОСТИ

Аннотация: В качестве цели работы автор ставит задачу разработать или усовершенствовать существующую модель, способную определить вероятность банкротства предприятия и установить характер проблемы на предприятии.

Ключевые слова: оборотные активы, выручка, кредиторская задолженность, дебиторская задолженность, пассивы, ликвидационное покрытие, рентабельность, ликвидность, санация.

Company bankruptcy has become familiar in Russia since the arrival of the market economy. It is hard to say if it is good or bad. The process is both constructive and destructive. Examples, trivial as they are, of Lehman Brothers or Bear Sterns can be sited here. A blow to budget, counter-agents, logistics, and the growth of unemployment are the effects of a company bankruptcy, which require corrective measures.

The economic science has methods and mathematical models to evaluate the danger of a company bankruptcy. In the authors' opinion, each of them has its positive and negative sides. First, the time factor is crucial in economy, so each model has to go through corrections to comply with trends. The methods were put forward by foreign authors, so they can be unsuitable for the Russian reality.

According to the studied statistics, (which cannot be presented here for space limitation reasons), in the last five years the annual number of bankruptcies among legal persons varied from 12990 to 13434.

Next, the regional aspect. The period under analysis is the IV quarter 2017 – III quarter 2018. Based on the data given by the FTS (Federal Tax Service), the authors have calculated the average chronological number of Russia's legal persons in the analyzed period – 4291766 organizations. The total number of bankrupt legal persons in the period is 13448. The authors suggest using a straightforward bankruptcy intensity coefficient (1st coefficient):

$$\text{Ciban} = \frac{Q\text{ban}}{Q_{\square}} \text{x} 1000$$

Where Qban is the number of bankrupt legal persons in the subject under consideration, Q is the number of legal persons in the subject under consideration. The index gives the number of bankrupt legal persons per each 1000 legal persons in the subject under consideration, or in the total number of subjects.

Using the index, it is possible to calculate the intensity of bankruptcies by region, as well as define the average number of bankruptcies throughout Russia, which was 3.13 in the analyzed period. Next is the form of business organization. It is interesting to note, that ¾ of the largest bankrupts in Russia in the analyzed period were limited liability companies, which means that bankruptcy forecasting methods based on

share analysis using the market value of shares (the fourth coefficient in the Altman five factor model) could be applied to just 26% of companies. Just ¼ of companies are organized as joint stock, 70% of them are PLCs. Out of all legal persons studied two were state unitary enterprises, which the authors find interesting.

Now let us turn to the study of the bankrupts by line of business. The larger part of enterprises are wholesale and retail ones. They are more than half of bankrupts. The algorithm put forward by the authors has six stages, which help to form an opinion about the possible bankruptcy of an enterprise and the consequences of its elimination.

Stage 1 is the analysis of the company's own capital, which is quite easy if it is positive. Negative own capital enterprises have inadequate liquidity and profitability coefficients and had to be dropped out.

Stage 2 is the analysis of current assets on the balance. The specific character of trade determines a large share of current assets in possession. The analysis of the company's own current assets is calculated as follows (2^d coefficient):

$$OCA\ share = \frac{OCA}{Balance\ \ currency} \times 100\%$$

Where OCA is the total of section III of the balance (capital and reserves), the total of section I (non-current assets).

The authors think it is reasonable to note that calculating of the coefficient only makes sense when the operating capital share in the assets is lower than 0.8 (80%). This indicator has a high correlation with the autonomy coefficient, which present the next indicator (3^d coefficient):

$$Caut = \frac{Own\ capital}{balance\ currency} \times 100\%$$

The ratio of payables and receivables is found with the formula (4th coefficient):

$$C = \frac{Payables}{Receivables}$$

At **Stage 3** the authors suggest examining the "Operation Coefficient", which stands for defining the relative shares of payables and receivables on the balance (5th coefficient):

$$Coper = \frac{Payables \times Receivables}{(Balance\ currency)^2} = Payables\ share \times Receivables\ share$$

Stage 4 is the examination of the coefficient of revenue variation, which shows the size of revenue spread, weighed against the assets size. The preferable period of the indicator is over 4 years, as at smaller number of time periods the dispersion increases significantly.

The overview of the variation coefficient:

$$V = \frac{\sigma}{\bar{x}}$$

Where: σ is the average quadratic deviation in the samples and Diacritic x is the average value in the samples.

$$\sigma = \sqrt{D}$$

Where D is the dispersion in the samples.

$$D = \frac{\sum_1^n (x_i - \bar{x})^2}{n - 1}$$

Where n is the number of periods and xi is the revenue weighed against the assets variation coefficient (6th coefficient):

$$Xi = \frac{Revenue_i}{C_i^{assets\ variation}}$$

$$C_i^{assets\ variation} = \frac{Balance\ currency_i}{Balance\ currency_{max}}$$

Where *Balance currencymax* is the maximum volume of assets in the studied period. The coefficient shows how the revenue varies in the different periods in the life of the enterprise.

Stage 5 of the methodology is the analysis of constructiveness of structural changes. The analysis is time-bound. The basis is the assets and the own capital growth rates. It is a two-part analysis:

1. Policy type defining (Extention/reduction/pyramid)
2. The constructive extension/reduction coefficient analysis.

The coefficients analysis shows how the assets growth rate exceeds the own capital growth rate.

The final stage 6 in the methodology is the analysis of liquidation value and liquidation covering. The coefficients demonstrate the residual assets value after bidding, given in the table below.

Table – liquidation value coefficients for trade companies

Non-current assets	
Intangible assets	0,2
Fixed assets	0,4
Financial investment	0,7
Deferred tax assets	1
Other non-current	0,2
Current assets	
Reserves	0,7
VAT on AV	0,9
Accounts receivable	0,8
Financial investment	0,9
Monetary assets	1
Other current	0,7

As the liquidation value of the most liquid assets approaches one, the coefficient of 0.8 has been chosen for trade companies' receivables

because it is the receivables that take up around 70% of trade companies assets.

$$C_{liqud} = \sum A_i \times K_{li}$$

Where Cliqud is the liquidation value, Ai is i-group assets, and Ki is the liquidation value coefficient for i-group assets. The liquidation value coefficient is used for calculating the liquidation covering coefficients calculation.

The borrowed funds covering coefficient (7th coefficient):

$$\text{Cbf} = \frac{Liquidation\ value}{Borrowed\ funds}$$

The current liabilities cover coefficient (8th coefficient):

$$\text{Ccl} = \frac{Liquidation\ value}{Current\ liabilities}$$

The payables cover coefficient (9th coefficient):

$$\text{Cp} = \frac{Liquidation\ value}{Payables}$$

The creditors' risk coefficient (10th coefficient):

$$\text{Rcred} = \frac{(Receivables \times 0.8 - Payables)}{Own\ capital}$$

The model offered by the authors can help, through 10 simple coefficients, to see what is going on at an enterprise, what policy it has, and how the company's indicators are different from the average. The authors are aware that putting this model into practice will require a considerable IT support, databases of enterprises, audit information, region data, line of business, date of registration, average number of employees and affiliated persons. It would be expedient, in the authors' view, to set up a special department on the basis of Ministries of Finance of the Federation subjects. Assuming that large and medium-sized companies' bankruptcies are responsible for the 30% of unpaid debt, we have 43.2bn loss for creditors. Every 10% saved with the help of the method equals to 4.32 bn rubles of creditors' losses. This is also 864 mln of taxes missed by the budget.

This model is a small investment into creating a better life in Russia. Yearly, according to the UFRB (United Federal Register of Bankruptcy), 13,000 of Russian enterprises go bankrupt. The 10 coefficients represented in the model enable to give a complex estimation of a company's state, its operation and the financial consequences of its bankruptcy.

REFERENCES

52

1. Пак В.Н., Антикризисное управление предприятием: Курс лекции. – Екатеринбург: Изд-во Урал. гос. экон. ун-та, 2006. – 266 с.
2. Семеней А. Проблемы прогнозирования банкротства на отечественных предприятиях // Люди дела XXI. – 2006. – №36 (март).
3. Ендовицкий Д.А., Щербаков М.В. Диагностический анализ финансовой несостоятельности организации: учебное пособие / М.: Экономист, 2007. – 287 с.