THE FINANCIAL ANALYSIS OF THE MAIN FINANCIAL INDEXES AND ITS USE

Belarusian State University of Informatics and Radioelectronics
Minsk, The Republic of Belarus
KasmykovaT.S.

Getmanchuk E.A. – scientific adviser

The bankruptcy risk and the possibility of bankruptcy are of a major interest for banks, financial institutions, clients, etc. but also for investors and for the firms' managers. In the course of time, the diagnosis of bankruptcy had an impetuous development due to the use of statisticalmethods in the risk analysis.

If this organization is insolvent, it is important to examine the level of insolvency (in other words, to check if it is temporary or permanent insolvency). It is necessary for making the decision what to do with the organization (if it is possible to reorganizateit or it is better to liquidate this organization (to let it pass through the procedures of bankruptcy).

The simplest way of financial analyses of bankruptcy is to examine some important indexes.

This type of analysis allows to investigate the levels of insolvency and to divide enterprises to bankrupts, enterprises with difficult financial situation and solvent enterprises.

According to the bankruptcy legislation of our country, there are three main financial indexes:

The first is the index of current liquidity (K1). It shows the level of working assets of an organization for its business.

The second is the index of the provision of an organization with own working assets (K2) which are needed for its financial stability.

And the third one is the index of the provision of financial obligations with assets (K3). It shows the possibility of an organization to pay all its debts after its assets are sold.

All this indexes have their norms, which are different for different branches of economy. Only K3 has its permanent norm for all branches.

If the level of indexes K1 and K2 of an organization are higher than their norms and the level of index K3 is lower than its norm, that means the organization is solvent.

If the situation is the opposite, that means that the organization is insolvent.

In this case the level of insolvency can be defined. So, if K1 and K2 are lower than their norms during one financial period (financial quarter) that means that the organization has temporary insolvency. And it is possible to rescue its financial situation by taking some simple financial measures.

If K1 and K2 are lower than their norms during four financial periods (financial quarters), that means that the insolvency of the organization is going to be permanent. And more serious financial measures are to be taken (like reorganization).

If K1 and K2 are lower than their norms during one financial period (financial year) and K3 is higher than its norm that means that the organization has permanent insolvency and this organization is a bankrupt. Only the liquidation of this organization is possible in this case.

Nowlook at some examples. So, for thatlet us imagine that 6 organizations are working in the sphere of heavy industry. The norms of indexes for heavy industry in our country are the following: K1 has to be higher or equal to 1.30; K2 has to be higher or equal to 0.20 and K3 has to be lower or equal to 0.85.

Table 1

Example of insolvency levels of organizations

organizations	indexes	financial periods					norms	the level of solvency (insolvency)
		1	**2**	**3**	**4**	**5**		
		01.01.12	**01.04.12**	**01.07.12**	**01.10.12**	**01.01.13**		
A	K1	1.32	1.34	1.36	1.40	1.36	1.30	solvent
	K2	0.21	0.23	0.25	0.27	0.25	0.20	
	K3	0.64	0.66	0.68	0.70	0.68	0.85	
B	K1	1.26	1.24	1.20	1.01	0.20	1.30	permanent insolvency
	K2	0.18	0.16	0.12	0.08	-0.34	0.20	
	K3	0.85	0.85	0.90	0.98	2.08	0.85	
C	K1	1.30	1.24	1.20	1.01	0.60	1.30	the insolvency is going to be permanent
	K2	0.20	0.16	0.12	0.08	-0.10	0.20	
	K3	0.70	0.74	0.74	0.78	0.80	0.85	
D	K1	1.32	1.34	1.32	1.21	1.32	1.30	temporary insolvency
	K2	0.21	0.23	0.21	0.11	0.21	0.20	
	K3	0.64	0.66	0.64	0.74	0.64	0.85	
E	K1	1.32	1.30	1.26	1.24	1.20	1.30	the insolvency is going to be permanent
	K2	0.21	0.19	0.18	0.16	0.12	0.20	
	K3	0.64	0.79	0.85	0.85	0.87	0.85	
F	K1	1.32	1.26	1.28	1.29	1.32	1.30	temporary insolvency
	K2	0.21	0.14	0.16	0.19	0.21	0.20	
	K3	0.64	0.85	0.86	0.75	0.64	0.85	

To make it clear, I would like you to pay attention to the following table with the calculated significance of the three main indexes for five financial periods (quarters) for 6 different organizations.

As we can see, organization A is absolutely solvent, because all the indexes are within the norms. The other organizations are insolvent. Let us check the level of their insolvency.

So, the insolvency of organization B is permanent and this organization is a bankrupt because it has had bad indexes during 5 financial quarters. Organization C is facing a very difficult financial situation. It is not a bankrupt yet, but because of bad indexes (K1 and K2) during 4 financial quarters the insolvency of this organization is going to be permanent.

You can see that organization D was insolvent in the fourth period and the insolvency was temporary, because the financial situation in this firm has changed for the better.

All of these examples are very simple. Let us discuss a more difficult situation when an organization has been insolvent during three periods in succession. The dynamics of indexes' changes plays the main role in financial analysis in such situations.

For instance, we have two organizations which have been or were insolvent during three periods in succession. These are organizations E and F.

The insolvency of organization E is going to be permanent because the financial situation in this firm is changing for the worse.

The situation in organization F is the opposite. The insolvency of this organization is not permanent because we can notice positive changes in their financial situation.

This kind of analysis (financial analysis) is used only to identify the companies' present situation. To assay the future of financial situation of these companies we have to use another type of analysis (for instance – the discriminant analysis) which is based on different models and will be the best one for concrete organization.

References:
1. Mandru, L., Begu, L.S., Optimizing decisionsunder risk and uncertainty, Meridian EngineeringJournal, No. 2, 2009, Chisinau, ISSN 1683-853X, pp.78-81.
2. Pripoaie, R., Onica, M.C., Sirbu, C.G., TheAnalyze and Prognose of Risk Bankruptcy – CaseStudy, Arcelor Mittal Steel Galati, MIBESTransactions International Journal, June, 2008,Larissa, Greece, pp.182-194.
3. Resolution of The Council of Ministers of The Republic of Belarus from the 12-th of December, 2011 № 1672. About the determination of solvency criteria of economic entities.

ARTIFICIAL NEURAL NETWORKS

Belarusian State University of Informatics and Radioelectronics
Minsk, The Republic of Belarus

S.M. Dovguchits

A.M. Lazarenko – senior lecturer

A traditional digital computer does many tasks very well. It's quite fast, and it does exactly what you tell it to do. Unfortunately, it can't help you when you yourself don't fully understand the problem you want to be solved. Even worse, standard algorithms don't deal well with noisy or incomplete data, yet in the real world, that's frequently the only kind available. One answer is to use an artificial neural network (ANN), a computing system that can learn on its own.

An artificial neural network, often just named a neural network, is a mathematical model inspired by biological neural networks (brain). ANN involves a network of simple processing elements exhibiting complex global behavior determined by the connections between the processing elements and element parameters. Artificial neural networks are used with algorithms designed to alter the strength of the connections in the network to produce a desired signal flow.

Artificial neural networks are among the newest signal processing technologies nowadays. The field of work is very interdisciplinary. Basically, an artificial neural network is a system. A system is a structure that receives an input, process the data, and provides an output. Commonly, the input consists in a data array which can be anything such as data from an image file, a sound wave or any kind of data that can be represented in an array. Once an input is presented to the neural network, and a corresponding desired or target response is set at the output, an error is composed from the difference of the desired response and the real system output. The error information is fed back to the system which makes all adjustments to their parameters in a systematic fashion (commonly known as the learning rule). This process is repeated until the desired output is acceptable. The structure of neural computation and simple network topology are shown in pictures 1 and 2.