DEVELOPMENT OF COMPARATIVE-QUANTITATIVE MEASURES OF FINANCIAL STABILITY FOR LATVIAN ENTERPRISES

Nadezhda Koleda[1], Natalja Lace[2]
Riga Technical University, Latvia
[1]nadezhda.koleda@ge.lv, [2]natalja.lace@rtu.lv

Abstract

Financial stability has drawn serious attention of companies operating in the condition of economic recession. Discovery of new approaches in prediction of financial stability should foster improving the financial stability.

This article is the development of theoretical model of evaluation of company's financial stability, examined in "Selecting the right tool for evaluation of solvency: case from Latvia" (N. Lace, N. Koleda, 2008).

Bankruptcy predictions and solvency measurements have become important research topics after applying of financial ratio methodology in analysis by Beaver (1966) and Altman (1968). As the world's economy has been facing several challenges during the past decades, more and more companies are addressing the problems of fighting insolvency. Within the current context of dynamic changes in business environment the theory and practice of financial management face a question of what the effective method of evaluation of company's financial stability is and what theoretical and methodological awareness is necessary for minimizing the risk of bankruptcy of company of the 21 century.

The main points examined in this paper are 1) the methods of evaluation of financial stability and prediction of bankruptcy; 2) the assessment of methods; 3) new approach of combined evaluation of financial stability 3) evaluation of financial stability of Latvian companies based on combined approach.

Keywords: financial stability, methods of bankruptcy prediction, combined approach.

Introduction

The actuality of the problem of low financial stability of the companies is proved by facts. The Latvian statistical data shows that the average rate of the owners' equity to total assets of company is equal 32.89% (LR CSP, 2008). Having made the analysis of the values of solvency coefficients of enterprises (ratio of owners equity to assets total), the authors came to conclusion that during the period of recent three years the average solvency indicator of Latvian enterprises is the following: in manufacturing – 34%, in retail – 20%, in wholesale – 21%, in construction – 32%, in business management – 48% and in art and entertainment industry – 55%. The results of the analysis of statistical information taken from the data base Amadeus show that Latvian enterprises apply an incredibly high ratio of loan capital that may expose them to the risk of insolvency (Amadeus, 2007). More than 7.5 thousand Latvian companies have been announced bankrupt during the recent 15 years. During that period the dynamics of growth of insolvency cases on average constituted 13 percent a year (Lursoft, 2008).

The findings encouraged the authors to apply grade assessment of the existing models of prediction of corporate bankruptcy and evaluation of financial stability, combine these methods using these grade assessment results, evaluate the level of financial stability of Latvian companies, operating in Riga's services market, based on new approach of complex analysis.

The aim of research is to develop new combined approach of evaluation of financial stability in order to help Latvian enterprises keep financial stability on the highest level and monitor the risk of bankruptcy in time. The authors combine many methods of evaluation of financial stability to find out the most objective result.

Representativeness and validity of statistical sample for research

Number of observations selected on a systematic basis was chosen by authors according to the following principles:

1) Industry sector, which has major contribution to Latvian economics, should be analyzed. The level of its impact on successful state of economic can be evaluated by GDP. The contribution of services branch to Latvian economic is crucial - 42% of total GDP (LR CSP, 2009).
2) The most economically active region should be chosen for analyses according to the quantity of companies operating in Latvian regions. The most economically active region is Riga. It is proved by fact that 67% of all active business units operate in Riga region (LR CSP, 2009).

3) The sample of statistical information should be limited according to the sizes of the companies. 39681 micro enterprises, 7176 small enterprises, 1454 medium-sized enterprises and only 258 large companies operate in Riga region (LR CSP, 2009). Statistical sample should consist of information on small and medium sized companies.
4) The results of analyses should present the most important stages of Latvian economy – before and after accession to European Union, peak of economic, world financial crises. That means the time diapason of research is going to be limited by years 2003 – 2007.

The authors consider that it is important to evaluate the financial stability of small and medium-sized enterprises, which are operating in Riga region on service market, because they have crucial influence on Latvian economy. The dimensions of sample for statistical research are presented in the figure 1.

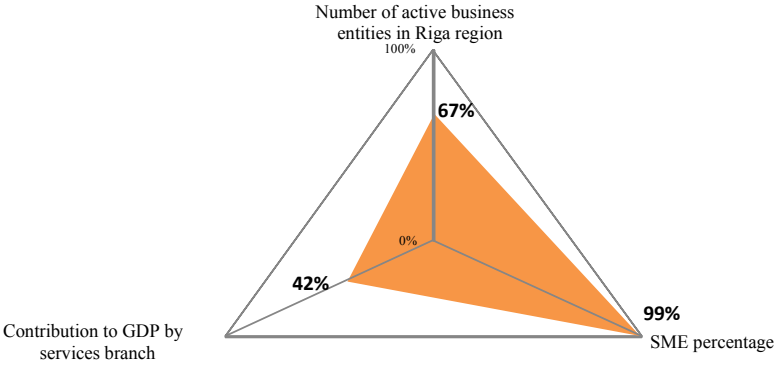

Figure 1. Dimensions of statistical sample

The methodology of research

This report presents practical implementation of model of financial stability evaluation (Lace&Koleda, 2008), which combines the most famous methods of evaluation of financial stability and prediction of bankruptcy such as Two factors model, Altman coefficient, Taffler model, Analogy method, A-score, R-model, D-score, Credit risk analysis, Method of bankruptcy prediction taking into account specifics of industry, Solvency measurement for a period, ownstream dumping analysis, Bankruptcy coefficient, Profitability analysis, Expert valuation method.

Developing the research methodology, authors suggest to calculate priority of methods using coefficient of priority:

$$CP_x = \sum_{j=1}^{4} (K_{jx} / \sum_{x=1}^{l} K_{jx}) / 4, \qquad (1)$$

where

CP_x – coefficient of priority of method x;

x - ranking of method, $x = \{1,..,l\}$;

K_{jx} – weighted average grade of the model (method) x by the specific feature of the classification j;

j – specific feature of classification, $j = \{1,..,4\}$,

$$K_{jx} = (\sum_{i=1}^{n} A_{ijx} * F_{ijx}) / \sum_{i=1}^{n} F_{ijx}, \qquad (2)$$

where

F_{ijx} – priority of i factor of j specific feature of classification in model x,

i – element of the specific feature of classification $i = \{1,\ldots,n\}$,

A_{ijx} – grade of i element of j specific feature of classification in model x.

The grade assessment (K_{jx}) was prepared taking into account the following specific features (j):

1. Credibility of information on the basis of which the models are developed;
2. Factor completeness, when developing the model; its significance and amount;
3. Complexity of calculations;
4. Effectiveness of results, their possible use in future.

From the authors' point of view every specific feature of classification may include different elements (*i*) with different impact on model reliability (F_{ijx}) (Lace&Koleda, 2008).

Due to limited available statistical information authors decide to make the analyses of financial stability of companies applying the methods: Two factor model, Altman coefficient, Taffler model, R-model. The results of calculations of these methods priority are demonstrated in the table 1.

Table 1. Priority of methods

Model	Two factors model	Altman coefficient	Taffler model	R-model
Coefficient of priority (CP_x)	0,055	0,058	0,056	0,051

The Altman model has the highest priority ratio; the result of it will have significant impact on value of financial stability. Description of the models under analysis is presented in the table below.

Table 2. Description of the methods

Method	Model	Ratios	Description of results
Two factor model	C1=-0.3997+(1.0736)*K1+ +0.0579*)K2 (3)	C1-ratio of bankruptcy risk; K1-ratio of liquidity; K2-debts to total assets	If C1=0, bankruptcy risk is 50%; If C1>0.3, bankruptcy risk is high; If -0.3<C1<0.3 bankruptcy risk average; If C1<-0.3, bankruptcy risk is low. (Sneidere, 2004)
Altman coefficient	Z=1.2*X1+1.4*X2+3.3*X3 + +0.6*X4+X5 (4)	X1=current assets to total assets; X2=retained profit to total assets; X3=operating income to assets; X4=equity to debts; X5=income to total assets	If Z<1.81, company is bankrupt, If 1.81<Z<2.7, bankruptcy risk is high; If 2.7<Z<2.99, unpredictable condition; If Z>2.99, financial stability (Altman, 1968)
Taffler model	Z = 0,53 K1 + 0,13K2 + +0,18K3 + 0,16 K4 (5)	K1 = Income to current liabilities, K2 = Current assets to total liabilities, K3 = Current liabilities to assets K4 = Income to total assets	If Z> 0.3, bankruptcy risk is low. If Z < 0,2, bankruptcy risk is high; (Taffler, 1983)
R-model	R = 8,38k1 + k2 + 0,054k3 + +0,63k4 (6)	k1=current assets to total assets; k2=net profit to equity; k3=income to total assets k4 = net profit to running costs.	If R<0, bankruptcy risk is 90-100%, If 0<R<0.18 bankruptcy risk 60-80%, If 0.18<R<0.32 bankruptcy risk 35-50%, If 0.32<R<0.42 bankruptcy risk 15-20%, If R > 0.42, bankruptcy risk is less then 10%. (Davidova, 1999)

The results of research

The following actual values of financial stability were found out processing data from financial reports of service companies in Riga region:

Table 3. Flow of actual values of financial stability

Model	2003	2004	2005	2006	2007
Two factors	-1.79	-1.92	-1.69	-1.61	-1.68
Altman	2.06	2.84	2.29	2.11	1.88
Taffler	0.40	0.62	0.47	0.44	0.38
R-model	3.95	3.68	4.17	4.10	3.81

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To make actual values comparable the rationing of values of financial stability should be done.

Rationing of values of financial stability

Each method of evaluation of financial stability defines zones of financial stability and bankruptcy with their numerical values. Authors analyzed two alternatives in distribution of zone frontiers.

1. Alternative

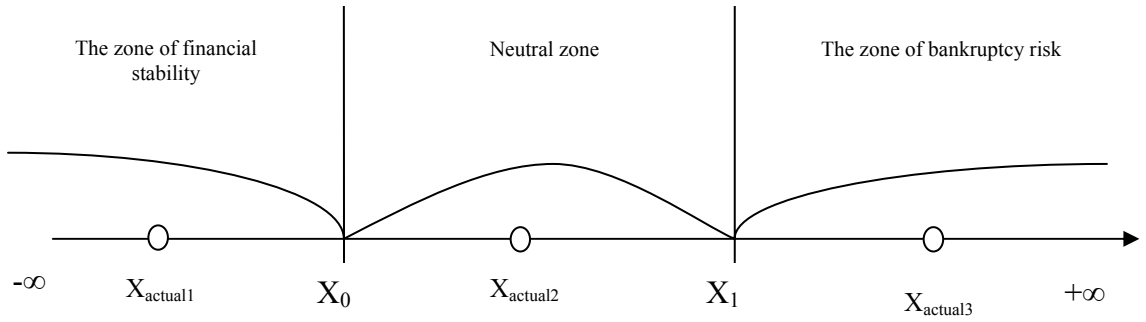


Figure 2. Distribution of financial stability frontiers (Alternative 1)

2. Alternative

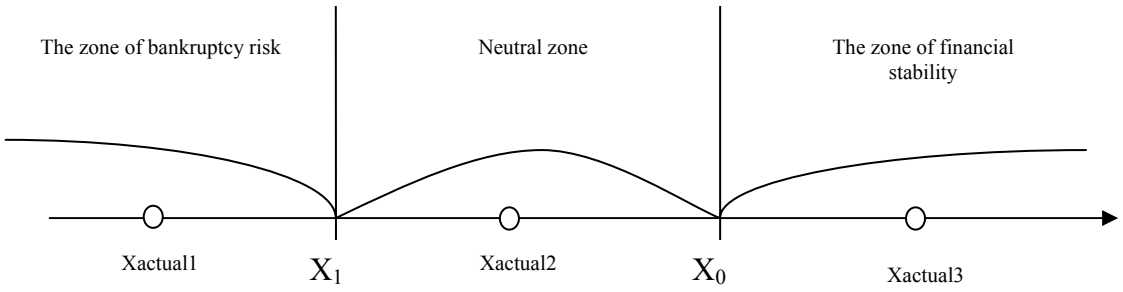


Figure 3. Distribution of financial stability frontiers (Alternative 2)

Explanation:
X_0- the numerical value of low frontier of financial stability zone. It characterizes the condition of company as financial stabile.
X_1 - the numerical value of low frontier of neutral zone.
A_{actual} - actual value of financial stability calculated according to the model

The comparability of results is provided by using standardized values. Standardized value of financial stability (X_{st}) is defined as following:

$$X_{st} = (X_{actual} - X_0)/(X_0 - X_1), \qquad (7)$$

After standardization the zones of financial stability are arranged as follows:

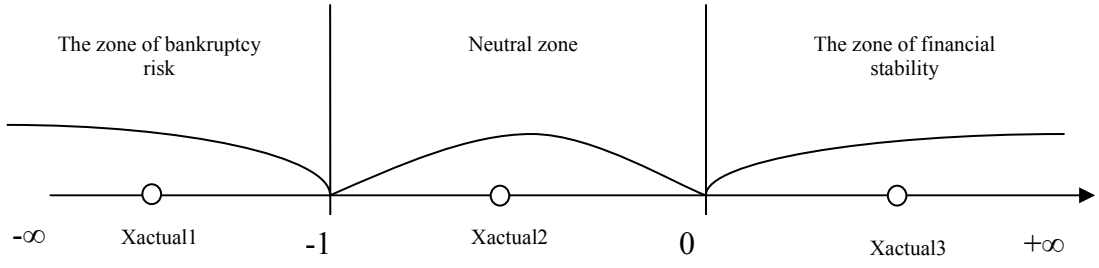


Figure 4. Distribution of financial stability frontiers after standardization

Standardized values of financial stability according to the models are presented in the table 4:

Table 4. Standardized values of financial stability

Results	2003	2004	2005	2006	2007
Two factors model					
X_{actual}	-1,79	-1,92	-1,69	-1,61	-1,68
X_1	0,3				
X_0	-0,3				
X_{st}	2.48	2.70	2.32	2.18	2.30
Altman model					
X_{actual}	2.06	2.84	2.29	2.11	1.88
X_1	2,99				
X_0	1,81				
X_{st}	-0.79	-0.13	-0.59	-0.75	-0.94
Taffler model					
X_{actual}	0.40	0.62	0.47	0.44	0.38
X_1	0,3				
X_0	0,2				
X_{st}	1.00	3.20	1.70	1.40	0.80
R-model					
X_{actual}	3,95	3,68	4,17	4,10	3,81
X_1	0,42				
X_0	0				
X_{st}	8.40	7.76	8.93	8.76	8.07

The graph (Figure 5) of flow of standardized values shows the tendency of diminishing of financial stability from 2004 year.

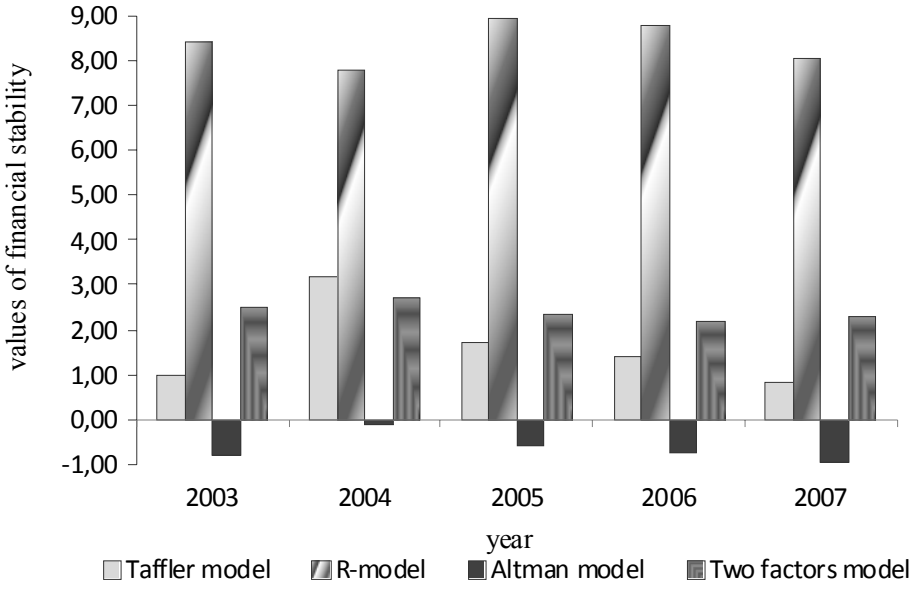


Figure 5. Flow of financial stability values (standardized)

Altman model with high priority level shows the most pessimistic result. R model has the lowest priority and shows the most optimistic result.

Complex evaluation of financial stability

Weighted average value of financial stability is estimated according to the priorities of the models, as following:

$$WAFS = \sum CP_x * X_{st\_x} / \sum CP_x \qquad (8)$$

where
WAFS- weighted average value of financial stability;
x = {1...4}.

The weighted average value of financial stability of service companies in Riga region is presented in the figure 6.

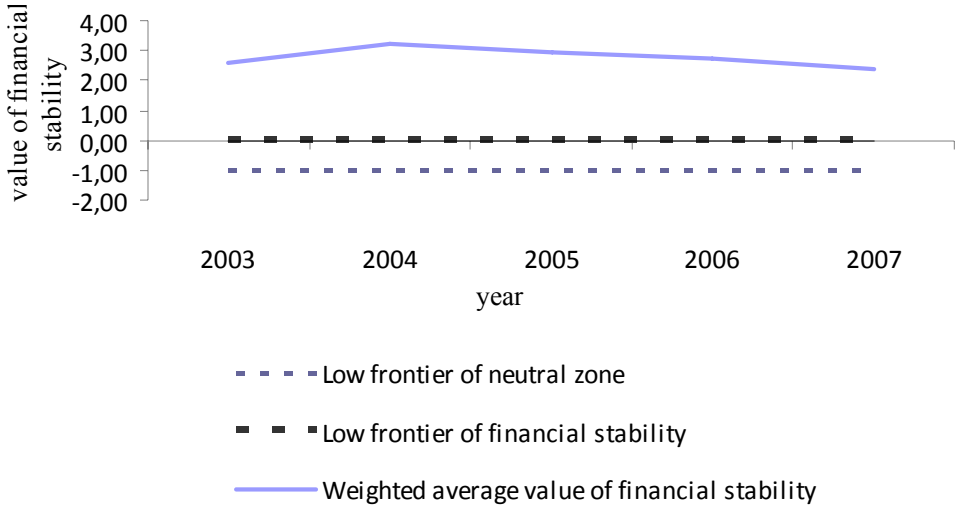
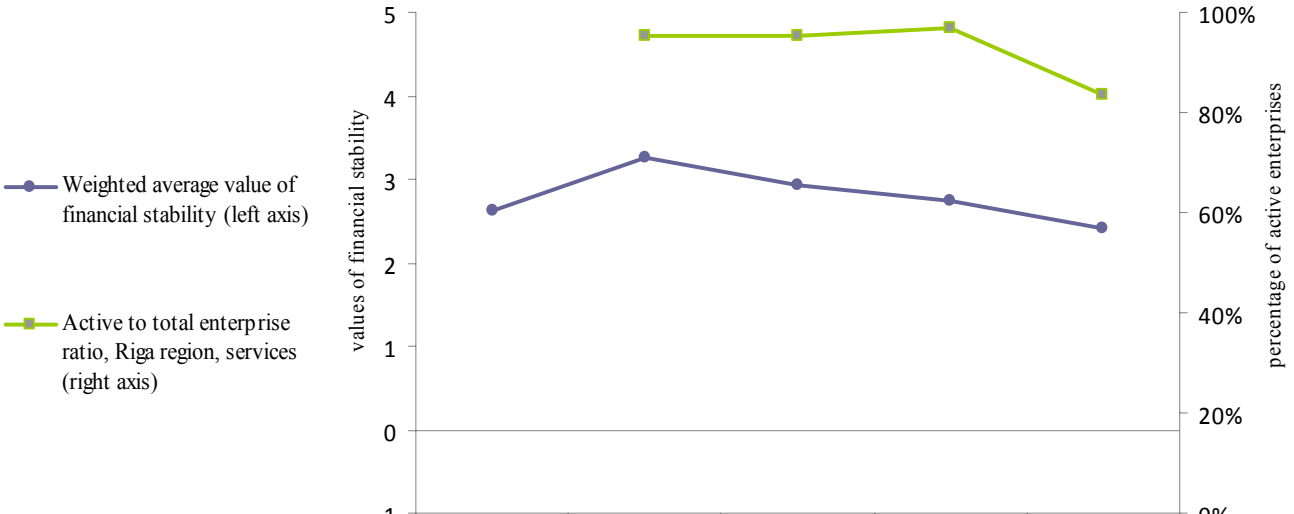


Figure 6. Flow of weighted average value of financial stability

Adding the information about number of active enterprises (Lursoft, 2009) authors made analysis to proof correctness of research results:



	2003	2004	2005	2006	2007
Weighted average value of financial stability (left axis)	2,62	3,26	2,93	2,74	2,40
Active to total enterprise ratio, Riga region, services (right axis)		0,9515	0,9513	0,9705	0,8340

Figure 7. Comparative analysis of results

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Insolvency cases usually last for 2 years. It means that factor of time should be taken into account comparing the results of evaluation of stability with level of active enterprises. The corrected comparative analysis is presented below:

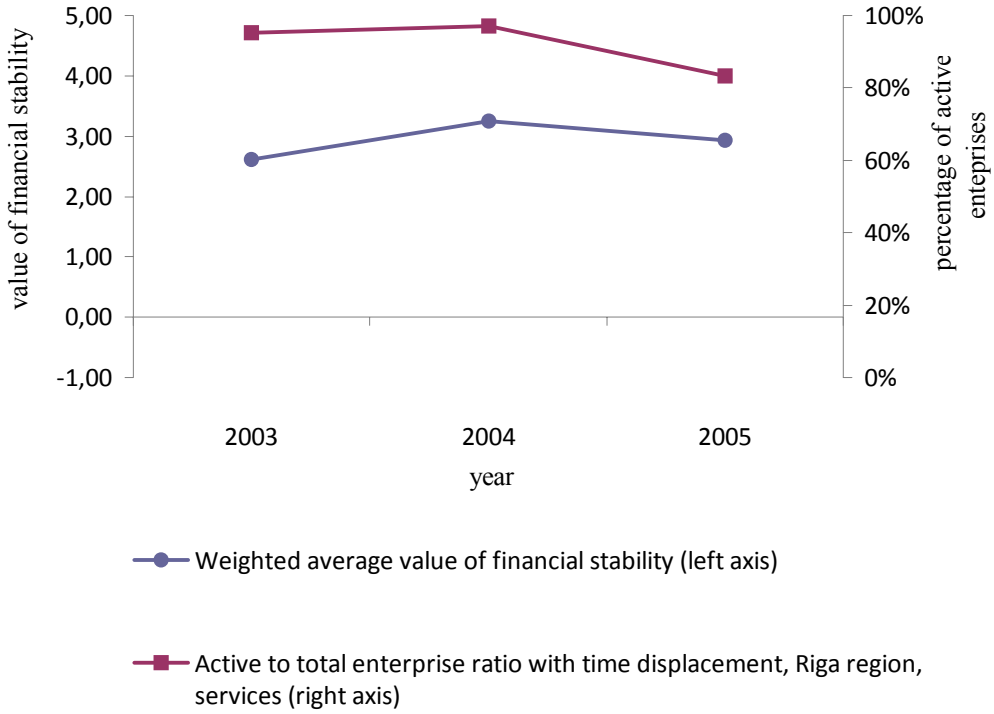

Figure 8. Corrected comparative analysis of results

Figure 8. presents the similarity of the outlines of weighted average values of financial stability and active enterprises' percentage. Consequently the approach of combined evaluation of financial stability of company is objective enough for reliable conclusions about condition of the company.

Without a scientific approach to evaluation and proper analysis of financial stability, enterprises can not ensure economic growth and general welfare. The suggested approach is acceptable for analyses of financial stability of company, for comparing actual level of financial stability with average level in the industry sector, for following up the tendency of changes of this ratio, for decisions making.

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