

PROBLEMS OF RISK IN THE SYSTEM OF CRISIS MANAGEMENT SMALL BUSINESSES

Irina Ugrimova, Ph.D., Associate Professor of Management and Taxation Department of National Technical University "Kharkiv Polytechnic Institute", Kharkiv, e-mail: ugrimova1309@gmail.com

Anna Gryshchenko, director's assistant LLC «ZIVELEOS», Kharkiv, e-mail: 19121726z@gmail.com

Угрімова Ірина Володимирівна, доцент кафедри менеджменту та оподаткування Національного технічного університету «Харківський політехнічний інститут», Харків, к. е. н.

Грищенко Анна Олександрівна, помічник директора ТОВ «Зівелеос», Харків

I. Ugrimova, A. Gryshchenko. Problems of risk in the system of crisis management small businesses.

The issues of small businesses survival are critical and require using a new methodological approach in management of their activities with the mutual integration of anti-crisis management and risk management methods. The advisability of its implementation in the diagnostic provision of anti-crisis financial management in this article is based on the financial analysis and subsequent processing of financial indicators of a sample of small businesses, with the justification of the scientific and methodological principles of integrated assessment of the financial risks level and formation of preventive anti-crisis measures. The practicality of this approach lies in the fact that a head of a small business has the opportunity independently, using the Excel application, to assess the level of risk based on assessing the achieved potential with minimizing subjective influences and to determine management priorities to maintain the financial safety of the enterprise operation. This is shown on the example of the proposed approach approbation on the actual data of one of the sample population enterprises. Using the proposed methodology for risk assessment and recognition of the priorities sequence, an investor (creditor) is also able to assess the feasibility of its participation in financing activities of the company or a certain set of them.

Угрімова І. В., Грищенко А. О. Антикризове фінансове управління ризиками підприємствами малого бізнесу.

Питання виживання суб'єктів малого бізнесу надважливі і потребують в управлінні їх діяльністю нового методичного підходу з взаємною інтеграцією методів антикризового управління і методів ризик-менеджменту. Доцільність цього в даній статті доводиться на основі фінансового аналізу і наступної обробки фінансових показників вибіркової сукупності підприємств малого бізнесу, з обґрунтуванням науково-методичних засад комплексної оцінки рівня фінансових ризиків та формування превентивних антикризових заходів. Практичність цього підходу полягає в тому, що керівник малого підприємства має можливість самостійно, з використанням програми Excel проводити оцінку рівня ризику, що ґрунтується на оцінці досягнутого потенціалу з мінімізацією суб'єктивних впливів, та визначати пріоритети управління задля збереження фінансової безпеки функціонування підприємства, що показано на прикладі апробації запропонованого підходу за фактичними даними одного з підприємств вибіркової сукупності.

Угрімова И. В., Грищенко А. А. Антикризисное финансовое управление рисками предприятий малого бизнеса.

Вопросы выживания субъектов малого бизнеса требуют в управлении их деятельностью нового методического подхода с взаимной интеграцией методов антикризисного управления и методов риск-менеджмента. Целесообразность этого в данной статье доказывается на основе финансового анализа и последующей обработки финансовых показателей выборочной совокупности предприятий малого бизнеса, с обоснованием научно-методических основ комплексной оценки уровня финансовых рисков и формирования превентивных антикризисных мер. Практичность этого подхода заключается в том, что руководитель малого предприятия имеет возможность самостоятельно, с использованием программы Excel проводить оценку уровня риска, основанного на оценке достигнутого потенциала с минимизацией субъективных влияний, и определять приоритеты управления для сохранения финансовой безопасности функционирования предприятия, что показано на примере апробации предлагаемого подхода исходя из фактических данных одного из предприятий выборочной совокупности.

Formulation of the problem generally. Doing business in Ukraine is full of risks due to significant turbulence of economic and political life in the country. This particularly affects

an activity of small enterprises, the quantity of which decreased by 4.8% from 2012 to 2015. 26.1% of them perform with negative financial results (earnings before taxes) [1]. The question of surviving in the current conditions of external impact is extremely important for subjects of small business. It is because staff of the enterprise is limited and a top-manager of it (often this person is an owner too) is primarily focused on operational activity risks, making no cautious assessment of any given type of risk and making decision without complex situation analysis. This can threaten with an active development of crisis phenomena. Properly organized anti-crisis financial management can contribute toward their resolving. Development and implementation of risk assessment approaches in the diagnostics of the financial management is becoming a question of current concern now, because it is an effective instrument of providing financial security of enterprises.

Brief Literature Review. In modern functioning conditions stability of business entities greatly depends on flawless anti-crisis financial management. Many scientific researches by Ukrainian and foreign scientists [2-7] deal with investigation of problems related to anti-crisis financial management of enterprises. Nevertheless, they are more devoted to large enterprises' activity, because differences in financing, taxation and accounting between small and large businesses are not considered. They do not often reflect peculiarities of an industry and proposed methods of problem solving require special software usage. The level of established normative values of financial indicators is problematic, the criterion of multicollinearity is ignored, and in cases of assessment by integral indicator a system of indicators selection and their weights definition are insufficiently reasonable and have subjective character. By its definition, anti-crisis financial management must be considered as a "process of management of financial and economic risks as well as financial rehabilitation of an enterprise with a purpose of financial crisis prevention and neutralization, ensuring continuous activity of the enterprise based on usage of a system of specific financial management methods and techniques" [8, p. 6]. However, assessment of risks is omitted in works of most scientists.

The purpose of the research is development and implementation of financial risks assessment methodology in the system of anti-crisis financial management diagnostics of small business subjects with considering their sectoral affiliation for selection of priorities in financial management and operative decision making in practical activity of such subjects.

Results. Critically evaluating available scientific and methodologic instruments of quantitative assessment of financial risk and, from the perspective of the developed algorithm of complex financial risk assessment (table 1), on the example of activity of Kharkov retailing companies (enterprises of this activity type occupy largest share in the total quantity of small businesses) the new methodological approach to financial risk assessment was developed. It is based on usage of integral function of assessment of multidimensional dynamic object potential, in framework of which a "weighing" of factors take place and which was proposed by Russian scientist M. V. Shalanov [9]. It also utilizes elements of system analysis and economic statistics methods with the purpose of minimization of subjective factor impact on the obtained results.

The financial potential of an enterprise of small business being a dynamic subject is considered by us as an opportunity for the enterprise to achieve optimal financial conditions assuming that possibilities to capital mobilization are used in amounts sufficient for doing efficient investment activity, availability of own capital that ensures accomplishment of conditions of stability (optimal structure of financing sources taking into account the industry features), liquidity, profitability of preliminary capital investments, sufficient level of business activity and an effective management system. In other words, the financial potential is a quantitative measure of the enterprise development level assessed by a complex of indicators describing the level. We define financial risk as a possibility not to achieve the reference (target, planned or normative) level of the potential.

Enterprises of small business can develop the hierarchy of indicators by themselves to include it to the model of quantitative integral risk assessment, using MS Excel software, the list of financial indicators and the database of their actual values in time. This is performed on the basis of assessment of the information amount for initial dataset (evaluation of homogeneity of empirical data by each feature, multicollinearity of coefficients based on matrix of paired correlation coefficients).

The developed hierarchy of indicators system by groups (table 2) considering the factor loading of indicators as well as groups is objectively reflecting both industry specificity of the enterprises and peculiarities of their financial activity. It is because the activity of the small enterprises of retail trade primarily concentrates on profitability indicators and turnover ratios for maintaining the self-financing of activity on an appropriate level.

Table 1 – Algorithm of complex financial risk assessment (developed by the author)

Stage	Substage title	Essence
Information analysis stage	Creating of financial indicators list considering their essential influence on forming of financial risk level	Requirements for selection: indicators must be calculated using publicly available forms of accountability, they must be relative (coefficients), they must have the same direction, give the possibility of spatial-temporal comparison, and be presented in the most of methodological investigations.
	Calculation of actual values of the selected indicators, assessment of information capacity of features, formation of indicators' hierarchy in context of groups of liquidity, capital structure, profitability and business activity	1. Analysis in initial information amount (evaluation of homogeneity of indicators and strength of relationship between them, exclusion of linearly connected indicators). Discovery of multicollinearity of incoming group of coefficients. 2. Development of connections hierarchy for the selected indicators system, that will be used in quantitative assessment of financial risk, assumes the assessment by a set of indicators that reflect any given element of financial conditions.
	Determination of reference values of indicators selected for quantitative financial risk assessment	Reference values are selected by condition of the enterprise and obligingness of tasks solving (average, target, provided by normative and instructional documents, competitors' indicators, industry average level etc.)
	Development of financial risk scale and determining boundaries of its zones.	Interconnection between value of risk (P), zones of risk and qualitative assessment of financial risk was discovered: P = (0,75 – 1) – catastrophic level of financial risk; P = (0,5–0,74) – critical financial risk; P = (0,25–0,49) – allowable financial risk; P = (0– 0,24) – risk free activity.
Development of algorithm of integral (quantitative) assessment of financial risk	An investigated object is described by a system of indicators $x_1, x_2, x_3, \dots, x_n$, in dynamics for period t_1, t_2, \dots, t_N , that is presented by "time-feature" matrix. Elements X_{ij} characterize values of j -th feature in the moment t_i united to groups (y_k) that fragmentarily define the level of the financial potential. The three stages of integral indicator calculation were distinguished: 1) A complex assessment is performed in context of the groups. 2) Evaluation of financial potential (potential of financial stability). 3) Assessment of the total level of financial risk of an enterprise	
Interpretation of results of the integral assessment of financial risk	Using the scale the qualitative assessment of riskiness and crisis levels for enterprise activity is performed. The scale that is used to mark values of the potential has an origin that reflects 0 of system conditions, and value of 1 is for target system conditions. Accordingly, the values of a risk scale will have the value of 1 as a 0 level of potential. Achieving of target potential level will have value of 0.	
Defining priorities in management considering risks and crisis levels	Phased analysis of potential function for creation of priorities scheme and development of managerial measures to minimize level of the financial risk.	

Table 2 – The developed system of financial coefficients for quantitative risk assessment (developed by the author)

Group title	Indicators	Notation convention*
Group of liquidity	Quick ratio (Acid test ratio)	X ₁₂
	Current ratio	X ₁₃
Group of financial structure	Equity to total assets ratio (coefficient of autonomy)	X ₂₁
	Current assets to equity ratio (equity maneuverability coefficient)	X ₂₃
Group of business activity	Stocks turnover coefficient	X ₃₂
	Accounts receivable turnover	X ₃₃
	Accounts payable turnover	X ₃₄
Group of profitability	Return on sales	X ₄₁
	Coefficient of cash flow adequacy for debt redemption	X ₄₂
	Return on assets (by net income)	X ₄₄

* - formulae of the indicators calculation are based on [10]

The one enterprise from the sample collection of small enterprises of retailing that are functioning in Kharkov region was selected. The methodological approach that is proposed to be used for the risk assessment during diagnostical support of anti-crisis financial management was tested and evaluated on this selected enterprise.

The first stage of calculation of the integral assessment of enterprise risk assumes calculation of complex estimate in the context of each group. For the compactness of the information materials the indicators notation convention was introduced: the first index shows number of group and the second is for number in the indicators system. Values of the indicators and their fluctuations are presented in table 3.

Table 3 – Indicators by groups for 2013-2015 period

Years	Indicators									
	Indicators of liquidity group		Indicators of financial structure group		Indicators of business activity group			Indicators of profitability group		
	X ₁₂	X ₁₃	X ₂₁	X ₂₃	X ₃₂	X ₃₃	X ₃₄	X ₄₁	X ₄₂	X ₄₄
2013	0,07	0,92	0,24	-0,26	13,31	197,21	11,25	0,011	0,21	0,09
2014	0,25	1,17	0,34	0,34	11,95	46,68	11,07	0,024	0,37	0,17
2015	0,8	1,44	0,43	0,59	13,43	11,04	8,66	0,016	0,21	0,08
Average value \bar{x}_{1j}	0,37	1,18	0,34	0,22	12,90	84,97	10,33	0,0169	0,26	0,12
σ_{1j}	0,38	0,263	0,078	0,437	0,819	98,83	1,44	0,0064	0,09	0,05

Calculation of root-mean-square deviation of j -th indicator of k -th group is performed by the following formula:

$$\sigma_{jk} = \sqrt{\frac{\sum (x_{ijk} - \bar{x}_{jk})^2}{N}} \quad (1)$$

$$\bar{x}_j = \frac{\sum_{i=1}^N x_{ij}}{N} \quad (2)$$

where N – number of periods, \bar{x}_j - average value of the feature.

Standardization of the actual value of indicators is exhibited in table 4. Table 5 shows calculated normative values of the indicators and their weights according to standardized reference data for the groups.

Table 4 – Standardized values of the indicators

Year	Standardized values of the actual indicators: $Z_{1ij} = \frac{x_{1ij}}{\sigma_{1j}}$									
	Indicators of liquidity group		Indicators of financial structure group		Indicators of business activity group			Indicators of profitability group		
	Z ₁₂	Z ₁₃	Z ₂₁	Z ₂₃	Z ₃₂	Z ₃₃	Z ₃₄	Z ₄₁	Z ₄₂	Z ₄₄
2013	0,18	3,50	3,08	-0,59	16,25	2,00	7,79	1,70	2,37	1,85
2014	0,65	4,46	4,35	0,78	16,25	0,47	7,67	3,69	4,11	3,34
2015	2,10	5,50	5,53	1,35	16,39	0,11	6,00	2,54	2,39	1,59

Table 5 – Parameters of calculation of the complex estimate in the framework of indicators groups

Parameters of calculation	Z ₁₂	Z ₁₃	Σ of liquidity group	Z ₂₁	Z ₂₃	Σ of financial structure group	Z ₃₂	Z ₃₃	Z ₃₄	Σ of business activity group	Z ₄₁	Z ₄₂	Z ₄₄	Σ of profitability group
Reference value X_{1j}^*	0,8	2		0,5	0,6		14	198	15		0,04	0,4	0,18	
Standardized value of the reference $Z_{1j}^* = \frac{x_{1j}^*}{\sigma_{1j}}$	2,1	7,61		6,44	1,37		17,09	2,0	10,39		5,6	4,48	3,55	
$(Z_{1j}^*)^2$	4,42	57,88	62,3	41,49	1,89	43,37	292,2	4,01	107,9	404,1	31,35	20,1	12,63	64,09
Defining of indicators weight $\alpha_{1j} = \frac{Z_{1j}^*}{\sqrt{\sum_{j=1}^n (Z_{1j}^*)^2}}$	0,267	0,963		0,98	0,209		0,85	0,099	0,517		0,699	0,56	0,44	
Reference value of potential function: $\alpha_{1j} Z_{1j}^*$	0,56	7,33	7,89	6,3	0,286	6,586	14,52	0,199	5,37	20,09	3,92	2,51	1,58	8,01

The table 6 shows the complex assessment of financial potential by the groups and calculations for the level of achievement of reference values of potential.

Table 6 – Calculations for complex assessment of financial potential by the groups

Years	Indicators of liquidity group		Σ=y ₁	C ₁	Indicators of financial structure group		Σ=y ₂	C ₂	Indicators of business activity group			Σ=y ₃	C ₃	Indicators of profitability group			Σ=y ₄	C ₄
	α ₁₂ Z ₁₂	α ₁₃ Z ₁₃			α ₂₁ Z ₂₁	α ₂₃ Z ₂₃			α ₃₂ Z ₃₂	α ₃₃ Z ₃₃	α ₃₄ Z ₃₄			α ₄₁ Z ₄₁	α ₄₂ Z ₄₂	α ₄₄ Z ₄₄		
2013	0,049	3,369	3,418	0,43	3,009	-0,12	2,886	0,44	13,82	0,199	4,03	18,044	0,9	1,19	1,33	0,821	3,338	0,42
2014	0,173	4,303	4,4767	0,57	4,25	0,163	4,412	0,67	13,82	0,047	3,96	17,827	0,89	2,58	2,302	1,526	6,412	0,80
2015	0,56	5,296	5,8565	0,74	5,404	0,282	5,689	0,86	13,94	0,011	3,1	17,052	0,85	1,77	1,336	0,707	3,817	0,48

The complex assessment of the financial potential is done by the following formula 3:

$$c_{ik} = \frac{y_{ik}}{y_k^*} \quad (3)$$

where y_{ik} – value of the potential function by periods;
 y_k^* - reference value of the potential function.

The potential function of complex assessment by groups is the following:

for the first group: $y_1 = 0,267 Z_{12} + 0,964 Z_{13}$

for the second group: $y_2 = 0,978 Z_{21} + 0,2085 Z_{23}$

for the third group: $y_3 = 0,85 Z_{32} + 0,0997 Z_{33} + 0,517 Z_{34}$

for the fourth group: $y_4 = 0,6994 Z_{41} + 0,56 Z_{42} + 0,444 Z_{44}$

The values of the complex assessment of financial stability potential are summarized in the table 7. The results of calculation of the integral estimate of financial stability of the enterprise are shown in the table 8.

Table 7 - The values of the complex estimate of financial potential level by the groups

Years	y_1	y_2	y_3	y_4
2013	3,418	2,886	18,044	3,338
2014	4,477	4,413	17,827	6,412
2015	5,856	5,6869	17,0519	3,817

Table 8 – Parameters of the calculation of the integral assessment of financial potential

Parameters of calculation	y_1	y_2	y_3	y_4	Σ
Reference value of the potential function y_k^*	7,893	6,586	20,101	8,006	
$(y_k^*)^2$	62,3	43,37	404,06	64,09	573,82
Calculation of group weights $\tilde{\alpha}_k = \frac{y_k^*}{\sqrt{\sum_{k=1}^m (y_k^*)^2}}$	0,33	0,275	0,839	0,334	
Reference value of the potential function by groups: $\tilde{\alpha}_k y_k^*$	2,601	1,811	16,868	2,675	23,955

The potential function if the integral assessment of financial potential is the following:

$$\tilde{y} = 0,33y_1 + 0,275y_2 + 0,839y_3 + 0,334y_4$$

Table 9 – Calculation of the integral estimate of financial risk

Years	$\tilde{\alpha}_1 y_1$	$\tilde{\alpha}_2 y_2$	$\tilde{\alpha}_3 y_3$	$\tilde{\alpha}_4 y_4$	\tilde{y}_i	\tilde{c}_i	p
	1	2	3	4	5	6	7
2013	1,13	0,79	15,14	1,12	18,18	0,759	0,241
2014	1,48	1,21	14,96	2,14	19,79	0,826	0,174
2015	1,93	1,56	14,31	1,28	19,08	0,796	0,204

The level of the financial risk is calculated using the formula 4:

$$p = 1 - \tilde{c} \quad (4)$$

where p – level of risk,

\tilde{c} - integral estimate of the financial potential.

The calculation discovered that the risk level of the enterprise in 2013-2015 fluctuated in the range between 0.241 and 0.174. It means that the fluctuations were not beyond the scope of acceptable risk (see table 1). However, there's a tendency for financial risk growth in 2015 in comparison with 2014 data. This requires high attention in the context of future activity planning for prevention of crisis phenomena development.

In the process of risk minimization measures development, it is needed to pay attention on economic interpretation of features' weights in the potential function of the integral assessment of financial potential as well as in potential functions built by the relevant groups of indicators, and to explore the priorities in management. Their selection is provided step by step. At the beginning the potential function of the integral assessment of enterprise financial potential is analyzed. The higher priority group that is needed to be strengthened has the highest weight in the structure of the potential function of financial potential integral assessment. Then one analyses weights of features in the potential function that is created using indicators of current group. It means that the maximum weight indicator is selected, then the next indicator with less weight is selected and so on. After that the procedure repeats itself also starting from the potential function of financial potential level: a group of indicators next by weight comparing to previous one is selected; component indicators are ranged by groups' weights preference etc. In the result of ranking of groups and indicators inside each of them by weight, a ranking of priorities in financial risk management for its minimization, prevention of crisis phenomena and for increasing enterprise financial potential takes place. Using this algorithm, the recognition of the priorities sequence that company's managers should follow in risk minimizing activities was done (table 10).

Table 10 – Ranking of priorities in financial stability management

Integral assessment of financial potential (\tilde{y})										
Groups	Liquidity (y_1)		Capital structure (y_2)		Business activity (y_3)			Profitability (y_4)		
Weight value	0,33		0,275		0,839			0,334		
Rank	3		4		1			2		
Complex estimate										
Indicator	X_{12}	X_{13}	X_{21}	X_{23}	X_{32}	X_{33}	X_{34}	X_{41}	X_{42}	X_{44}
Weight value	0,267	0,96	0,98	0,21	0,85	0,01	0,52	0,699	0,56	0,44
Rank	2	1	1	2	1	3	2	1	2	3

It is obvious from the table 10 that for the financial risk management and for keeping it on an acceptable level the priorities were placed in the following sequence: first place is for business activity, second place – profitability, third place – liquidity, fourth – capital structure. It testifies about the need of management first to pay attention to their price policy, and balance the cash flow adequacy: strengthen a control on accounts receivable state by level and assortment of inventories and time of their sale. Also, attention must be paid to costs formation related to increasing of return on sales, resolving problems of activation of payments by accounts payable (on goods) that gives an opportunity to conduct more sustainable activity and pay to suppliers in time etc. The fourth place of indicators of capital structure group relates to absence of bank crediting of the enterprise and conducting activities using proprietary funds and commodity credits (equity to total assets ratio in 2015 became 1.8 times higher than in 2013 and almost reached the normative value).

Conclusions. The conceptual basis of financial risk management system using priorities ranking will allow managers of small enterprises (including retailing companies) to create the complex of decisions and measures, that serve as preconditions for stable development and competitiveness. It also will allow to ensure quick reacting on changes in external environment and increase effectiveness of anti-crisis enterprise management in case of occurring of negative outcomes in financial and business situations and will support enterprise financial security. For

the support of acceptable level of risk, it is worthwhile to organize monitoring of its level for shorter period (month or quarter), that allows quick reaction on risk level changes and correction of activities of the enterprise.

In conditions of dynamically changing external environment any small business including trading companies is interested in keeping stability and competitiveness, that requires investments in upgrading and technical modernization. Such policy has a pronounced risk character, but enterprises using risk-oriented management increase their chances to obtain positive results. In turn, using the proposed methodology of risk assessment and recognition of sequence of priorities an investor (loan supplier) can evaluate practicability of participation in enterprise activity financing considering some sample of enterprises.

Directions of further researches. Further research appropriate conduct in line with the practical application of the proposed approach and guide the study of foreign experience, subject to adaptation to local realities.

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Keywords: crisis management; small business; financial potential; integral indicator of risk assessment; financial management priorities.

Ключові слова: антикризове управління; малий бізнес; фінансовий потенціал; інтегральний показник оцінки ризику; пріоритети фінансового управління.

Ключевые слова: антикризисное управление; малый бизнес; финансовый потенциал; интегральный показатель оценки риска; приоритеты финансового управления.

Рецензент: Краснокутська Н. С., завідувач кафедри менеджменту та оподаткування, Національний технічний університет «Харківський політехнічний інститут», професор, д.е.н.

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