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#### **FINANCIAL AND ECONOMIC INNOVATIONS AS A TOOL FOR ANTI-CRISIS FINANCIAL MANAGEMENT AT AN ENTERPRISE**

**Abstract.** In the conditions of the transformational processes of the national economy, the problem of ensuring innovation activity is a special place in the issues of ensuring socio-economic development of society. Financial and economic innovations are an effective tool for managing socio-economic processes in the context of the crisis phenomena of economic systems. The article is devoted to the actual problem of finding ways to provide innovative activity in the formation of mechanisms of anti-crisis financial management by subjects of economic activity. The purpose of the article is to improve the economic mechanism of crisis management, in particular, the diagnosis of insolvency of enterprises, which has a preventive nature, the implementation of which provides solvency of domestic business entities. In the article a retrospective analysis of insolvency manifestations of metallurgical enterprises was carried out on the basis of the analysis of theoretical and methodological approaches of foreign and domestic scientists to issues of innovative activity in the conditions of crisis phenomena of national economies and analysis of their influence on financial and economic indicators of activity of business entities. The possibility of introducing financial and economic innovations for improving the mechanism of crisis financial management at the enterprise through the use of the proposed methodical approach to the definition of the threshold values of structural indicators of the balance sheet and the report on financial results, compliance with which will ensure the solvency of metallurgical enterprises. Implementation of the developed methodological approach to the definition of threshold values of structural indicators of the balance sheet and the report on financial results of enterprises, which is an element of financial and economic innovations, can increase the efficiency of crisis management financial management. provide financial stability, liquidity, efficiency of business entities, and opportunities for their economic development. Prospects for further research in this area are improving crisis management financial management at enterprises based on the development of forecast scenarios for the development of industrial enterprises.

**Keywords:** financial and economic innovations, anti-crisis financial management, insolvency, financial stability, liquidity, turnover, profitability.

**JEL Classification** G30

Formulas: 1; fig.: 5; tabl.: 1; bibl.: 14.

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## **ФІНАНСОВО-ЕКОНОМІЧНІ ІННОВАЦІЇ ЯК ІНСТРУМЕНТ АНТИКРИЗОВОГО ФІНАНСОВОГО УПРАВЛІННЯ НА ПІДПРИЄМСТВІ**

**Анотація.** В умовах трансформаційних процесів національної економіки особливе місце в питаннях забезпечення соціально-економічного розвитку суспільства посідають проблеми забезпечення інноваційної активності. Фінансово-економічні інновації є ефективним інструментом управління соціально-економічними процесами в умовах кризових явищ економічних систем. Присвячено актуальній проблемі пошуку шляхів забезпечення інноваційної активності при формуванні механізмів антикризового фінансового управління суб'єктами господарської діяльності. Мета статті — вдосконалення економічного механізму антикризового управління, зокрема діагностики неплатоспроможності підприємств, що має профілактичний характер, реалізація яких забезпечує платоспроможність вітчизняних суб'єктів господарювання. Проведено ретроспективний аналіз проявів неплатоспроможності металургійних підприємств на основі аналізу теоретико-методичних підходів зарубіжних і вітчизняних науковців до питань інноваційної активності в умовах кризових явищ національних економік та аналіз їхнього впливу на фінансово-економічні показники діяльності суб'єктів господарювання. Визначено можливість упровадження фінансово-економічних інновацій для вдосконалення механізму антикризового фінансового управління на підприємстві шляхом використання запропонованого методичного підходу до визначення порогових значень структурних показників балансу та звіту про фінансові результати, дотримання яких забезпечить платоспроможність металургійних підприємств. Упровадження розробленого методичного підходу до визначення порогових значень структурних показників балансу та звіту про фінансові результати підприємств, що є елементом фінансово-економічних інновацій, дозволяє підвищити ефективність антикризового фінансового менеджменту, забезпечити фінансову стійкість, ліквідність, ефективність діяльності суб'єктів господарювання та можливості їхнього економічного розвитку. Перспективами подальших досліджень у цій сфері є вдосконалення антикризового фінансового менеджменту на підприємствах на основі

розроблення прогнозних сценаріїв розвитку промислових підприємств.

**Ключові слова:** фінансово-економічні інновації, антикризове фінансове управління, неплатоспроможність, фінансова стійкість, ліквідність, оборотність, рентабельність.

Формул: 1; рис.: 5; табл.: 1; бібл.: 14.

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## **ФИНАНСОВО-ЭКОНОМИЧЕСКИЕ ИННОВАЦИИ КАК ИНСТРУМЕНТ АНТИКРИЗИСНОГО ФИНАНСОВОГО УПРАВЛЕНИЯ НА ПРЕДПРИЯТИИ**

**Аннотация.** Проведен ретроспективный анализ проявлений неплатежеспособности металлургических предприятий. Определена возможность внедрения финансово-экономических инноваций для совершенствования механизма антикризисного финансового управления на предприятии путем использования предложенного методического подхода к определению пороговых значений структурных показателей баланса и отчета о финансовых результатах, соблюдение которых обеспечит платежеспособность металлургических предприятий.

**Ключевые слова:** финансово-экономические инновации, антикризисное финансовое управление, неплатежеспособность, финансовая устойчивость, ликвидность, оборачиваемость, рентабельность.

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**Problem statement.** Under conditions of unstable economic development, economic entities including enterprises become bankrupt or are in a crisis situation in Ukraine and in the world. Thus, the share of such enterprises in comparison with the total number of registered enterprises in Ukraine fluctuates within 2—3.5%. The dynamics of losses of enterprises is also negative: for 2014, the amount of net losses of enterprises increased in 26 times compared to the same period of the previous year, reaching a record level of 583785.9 million UAH since 2001. In 2015, the share of unprofitable enterprises also decreased (by 10.5 pp. compared to 2014) as well as

the amount of net losses – up to UAH 373516 million UAH. In 2016, according to the statistical data, the activity of enterprises became profitable: the amount of net profit for the year was 29705 million UAH, the share of unprofitable enterprises amounted to 27%. Despite the increase in the profit of enterprises, this dynamics cannot be considered as positive, because it is due to the bankruptcy of a significant number of enterprises (9.5% of large and 2.4% of medium enterprises) [1]. In view of the statistical data, the problem of the anti-crisis financial management at the enterprise aimed at identifying signs of a crisis situation and timely response to the threats of insolvency in order to ensure financially stable functioning of the enterprise and its economic development is relevant.

**Analysis of recent studies and publications.** A contribution of the following scholars to the development of theoretical and methodical provisions on the anti-crisis financial management is significant: Ye. Andrushchak [2], Y. Blahun [3], M. Kyzym [3], T. Klebanova [4], Yu. Kopchak [3], H. Liashenko [5], A. Matviychuk [6], S. Pavlovskiy [7], O. Panasenko [4], O. Plastun [8], N. Poida-Nosyk [9], O. Tereshchenko [7], and others. However, given the adverse impact of the external environment and the instability of the internal one, there is an objective need to develop a methodical provision for insolvency diagnostics and justification of the normative values of financial indicators to ensure the solvency of enterprises on the basis of the financial and economic innovations implementation.

**The purpose of the article.** The purpose of the article is to improve the economic mechanism of anti-crisis management, in particular, enterprises' insolvency diagnostics, which has a preventive character and implementation of which ensures the solvency of domestic enterprises.

**Main results.** Among enterprises, those which are engaged in metallurgical production and finished metal products production have the largest amount of net losses for 2009—2016. It is these enterprises that include the main destructive factor in the functioning of the economy: the losses of these enterprises in 2009 amounted to 70.4% of the total losses of industrial enterprises; in 2010-2012, against the background of the industrial enterprises profitability, metallurgical enterprises were unprofitable; in 2013, the amount of losses of metallurgical enterprises exceeded the losses of industrial enterprises in 2.8 times; in 2014, the share of losses of metallurgical enterprises amounted to 21.14% of net losses of industrial enterprises; in 2015 – 23.56%; in 2016 – 33.73% [1]. Thus, the improvement of the anti-crisis management mechanism is based on the financial statement of metallurgical enterprises and aimed at restoring their solvency.

The financial condition of the enterprise and the threat of its insolvency are described by indicators of liquidity, financial stability, turnover and profitability. Let's analyze the financial condition of metallurgical enterprises by mentioned directions from the standpoint of the threat of insolvency on the basis of financial statement and defined industry average levels of financial indicators [10].

An indicator of the equity capital adequacy, which characterizes the solvency of enterprises, is the net assets to registered capital ratio. The basis of the calculation of the indicator is the ratio of the amount of assets of the enterprise minus long-term and current liabilities and provisions to the value of registered capital [11]. This indicator is informative when assessing the enterprise's solvency is due to the fact that according to the Civil Code of Ukraine [11], this indicator is a legally valid reason for the decision to liquidate the enterprise due to its insolvency in the event if the value of net assets is less than the legislatively determined minimum size of the registered capital. Such situation arises due to inefficient functioning of the enterprises in the industry, resulting in uncovered losses, which reduces the amount of equity capital to a size lower than the registered capital. The dynamics of the net assets to the registered capital ratio of metallurgical enterprises is shown in fig. 1.

A negative phenomenon for enterprises is the downward dynamics of the researched indicator during 2003—2016, which is due to a decrease in the value of net assets because of a decrease in the efficiency of enterprises' activity.

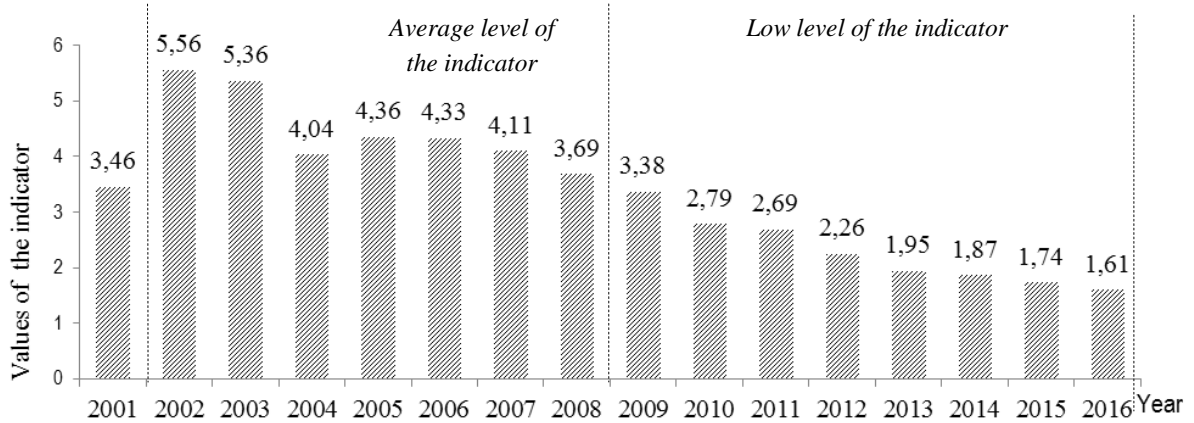


Fig. 1. The dynamics of the average industry net assets to the registered capital ratio of metallurgical enterprises for 2001-2016

In the studied sample, according to the results of 2001, for 22.45% of enterprises, the value of the net assets to registered capital ratio does not exceed 1, and by the results of 2016 – 37.23%, which indicates the regularity of reducing the amount of registered capital of enterprises and decrease of the financial potential in terms of the availability and possibility of attracting financial resources. The share of enterprises with a negative value in 2001 was 5.88%, in 2016 – 29.37%. The negative value of the indicator, due to the lack of equity capital in the structure of sources of financing of enterprises, indicates a low financial stability, full dependence on external creditors and ineffective activity. Among the profitability indicators the net return on sales is analyzed. The importance of this indicator in assessing the financial condition of enterprises is due to the fact that it characterizes the overall efficiency of the enterprise’s activity, since its calculation is based on the net financial result, and the effectiveness of the sales policy [12]. The dynamics of the net return on sales of enterprises is presented in fig. 2.

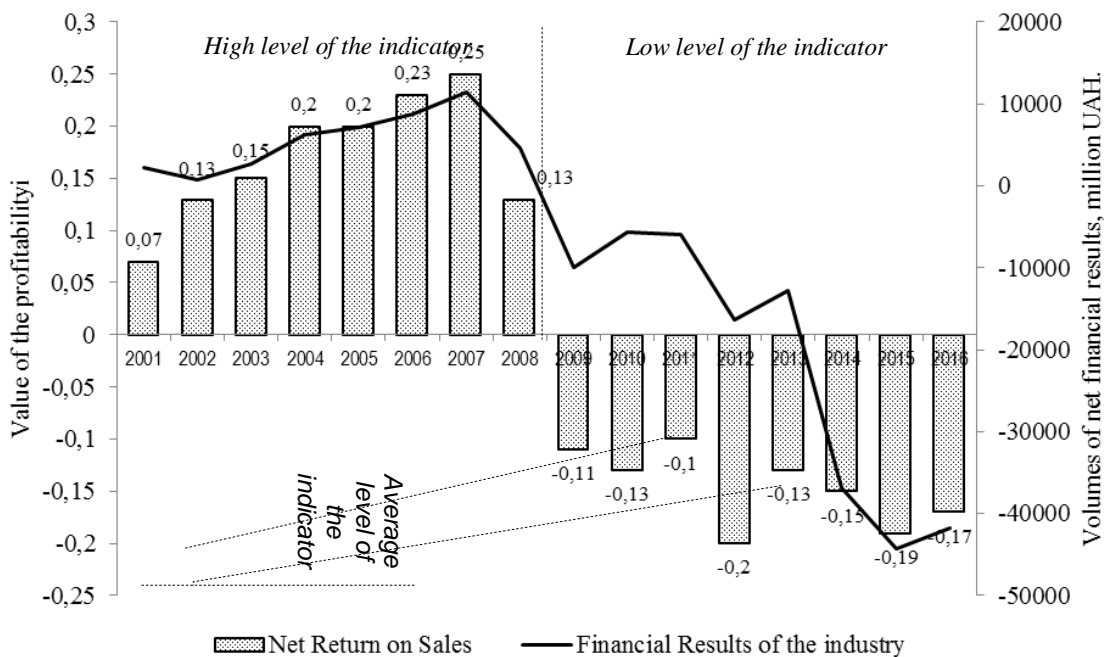


Fig. 2. The dynamics of the net return on sales of metallurgical enterprises for 2001-2016

The dynamics of the ratio indicate a decrease in the efficiency of the metallurgical enterprises' activity since 2008. Such a dynamics is by 97% due to a change in the net financial result as a component of this indicator calculation, which is confirmed by the value of the correlation coefficient of these indicators.

Since 2009, the net return on sales is negative, indicating the inefficient, unprofitable activity of enterprises of the industry, and, consequently, the high risk of insolvency.

The analysis of the asset utilization efficiency is carried out on the basis of the values of the assets turnover ratio of metallurgical enterprises whose dynamics is shown in fig. 3.

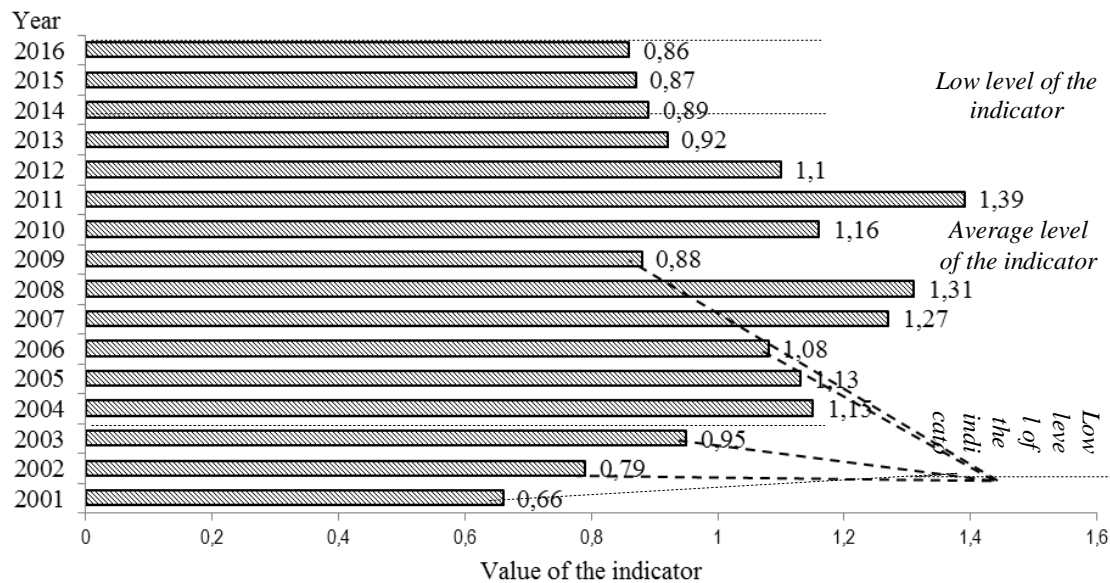


Fig. 3. The dynamics of the assets turnover ratio of metallurgical enterprises for 2001—2016

According to fig. 3, a growth of the assets turnover ratio of enterprises of the industry is observed up to 2008, a sharp decline — in 2009, further growth during 2010—2011, and a decrease from 2012 are observed.

Since the value of the assets turnover ratio over the studied period has insignificant correlation with the value of the assets of the metallurgical enterprises, as evidenced by the correlation coefficient at the level of  $|0.25|$ , the net income has the decisive influence on the dynamics of the assets turnover ratio of enterprises (the correlation coefficient is 0.83).

In view of this, the growth of the indicator by 2009 is due to the growth of net income of enterprises in the industry and, conversely, the decline in 2012—2016 years – the decrease in income. This indicates deterioration in the financial state of metallurgical enterprises, reduction of their activity's efficiency and reduction of their solvency.

Important indicators of the solvency level of an enterprise are liquidity indicators – quick liquidity ratio and current liquidity ratio, which characterize the ability of the enterprise to timely settle up their liabilities [12]. The dynamics of the average industry values of these indicators is shown in fig. 4.

Since the normative values of the current liquidity ratio are at the level of 1.5—2.0 [12], the results of the analysis (fig. 4) indicate the excessive level of current liquidity of metallurgical enterprises during 2001—2008, which is due to the surplus of liquid assets of enterprises. However, the values of the current liquidity indicators, the higher than normative, reduce the efficiency of economic activity, because it leads to "depletion" of current assets of enterprises [12].

Starting from 2009, there is a decrease in the value of the indicator of current liquidity of metallurgical enterprises to 1.01 by the end of 2016. In 2016, 63% of investigated metallurgical enterprises has the value of the investigated indicator below the normative, indicating insufficient level of liquidity and solvency of enterprises.

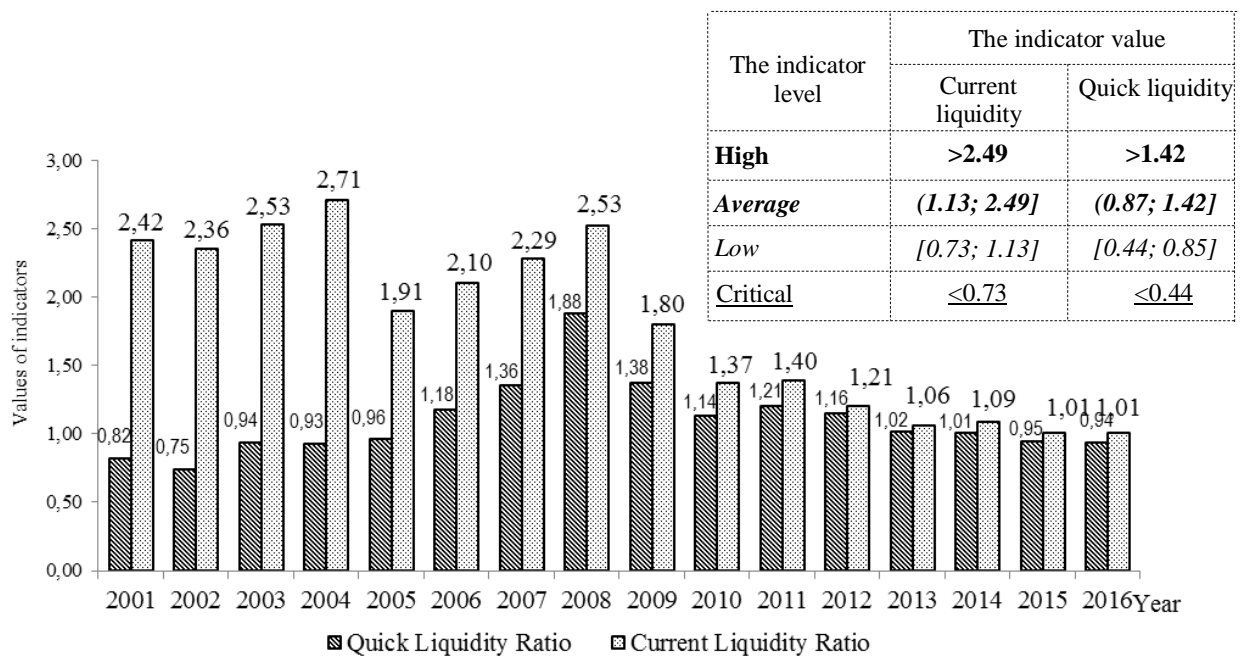


Fig. 4. The dynamics of the liquidity ratios of metallurgical enterprises for 2001—2016

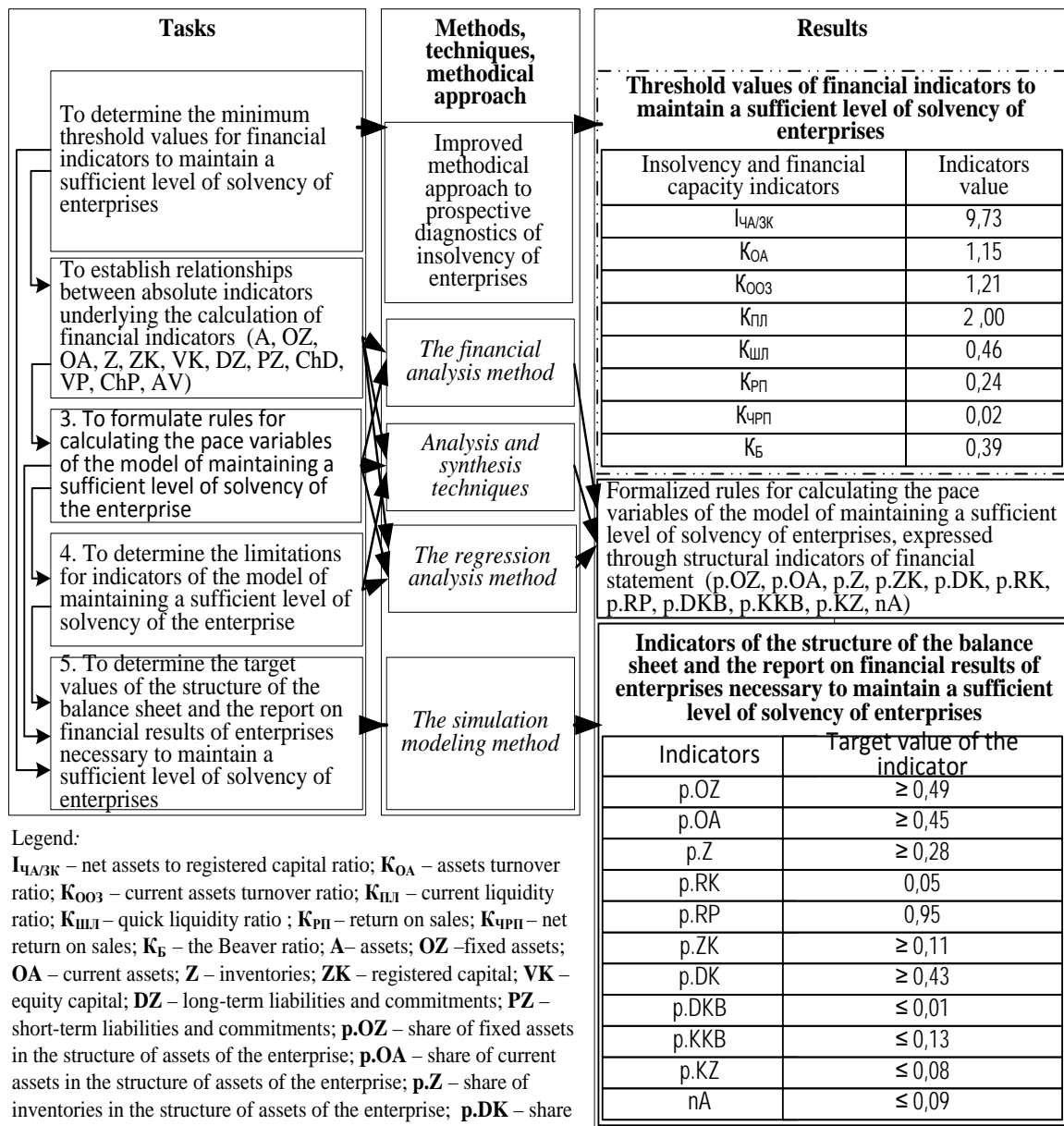
The quick liquidity ratio increased till 2008, reaching its maximum value for the period under study – 1.88, after which it began to decrease. The actual values of the indicator during 2001—2005 are in the normative framework, which demonstrates a sufficient level of liquidity of metallurgical enterprises. Exceeding the normative value of the indicator for the period of 2006—2016 was due to the growth of accounts receivable, the share of which in the structure of assets of metallurgical enterprises at the end of 2016 amounted to 33.1%, which, coupled by a low share of cash — 13.1%, testifies the inefficient sales policy that negatively affect the solvency of enterprises [12].

Under such conditions: a steady decline in the financial performance of metallurgical enterprises, indicating a steady decline in liquidity, financial sustainability and efficiency of activity, unprofitable activity of the vast majority of enterprises in the industry, it is expedient to develop and implement financial and economic innovations to provide an effective anti-crisis management aimed at restoring solvency of metallurgical enterprises.

The scientific and practical significance of the constructed model (fig. 5) lies in the improvement of the methodical approach to defining the threshold values for structural indicators of the balance sheet and the report on financial results, compliance with which ensures the solvency of metallurgical enterprises.

The first stage in implementing the proposed methodical approach to determining the threshold values for structural indicators of the balance sheet and the statement of financial results necessary to ensure a sufficient level of solvency of enterprises is to define the minimum threshold values for financial indicators to maintain a sufficient level of solvency of enterprises developed in the paper [13].

According to [13], the indicators characterizing the level of insolvency of enterprises are the net assets to registered capital ratio, the assets turnover ratio and fixed assets turnover ratio, quick liquidity ratio and current liquidity ratio, return on sales, net return on sales, the Beaver ratio. In order to ensure the solvency of metallurgical enterprises, the value of net assets to registered capital ratio should be not less than 9.73, assets turnover ratio – not less than 1.15, fixed assets turnover ratio – not less than 1.21, current liquidity ratio – not less than 2.00, quick liquidity ratio – not less than 0.46, return on sales – not less than 0.24, net return on sales – not less than 0.02, the Beaver ratio – not less than 0.39 [13].



Legend:

$I_{\text{ЧА/ЗК}}$  – net assets to registered capital ratio;  $K_{\text{ОА}}$  – assets turnover ratio;  $K_{\text{ООЗ}}$  – current assets turnover ratio;  $K_{\text{ЛЛ}}$  – current liquidity ratio;  $K_{\text{ШЛ}}$  – quick liquidity ratio;  $K_{\text{РП}}$  – return on sales;  $K_{\text{ЧРП}}$  – net return on sales;  $K_{\text{Б}}$  – the Beaver ratio; **A** – assets; **OZ** – fixed assets; **OA** – current assets; **Z** – inventories; **ZK** – registered capital; **VK** – equity capital; **DZ** – long-term liabilities and commitments; **PZ** – short-term liabilities and commitments; **p.OZ** – share of fixed assets in the structure of assets of the enterprise; **p.OA** – share of current assets in the structure of assets of the enterprise; **p.Z** – share of inventories in the structure of assets of the enterprise; **p.DK** – share of additional capital in the structure of capital of the enterprise; **p.RK** – percentage of net profit of the enterprise, directed to replenishment of the reserve capital; **p.RP** – rate of profit reinvestment; **p.DKB** – share of long-term bank loans in the structure of capital; **nA** – depreciation rate;

**p.KKB** – share of short-term bank loans in the structure of capital; **p.KZ** – share of accounts payable in the structure of capital; **p.ZK** – share of registered capital in the structure of capital of the enterprise.

Fig. 5. Methodical approach to determining threshold values for structural indicators of financial statement of enterprises necessary to ensure a sufficient level of their solvency

The next stages of the methodical approach are: establishing relationships between relative financial indicators that determine the insolvency level of enterprises, and absolute indicators that underlie the calculation of financial ones; the formation of rules for calculating the pace variables of the model of maintaining the solvency of enterprises and defining constraints for structural indicators of financial statements of enterprises. For this purpose, simulation modeling in the package of applied programs Vensim is used. This type of simulation allows, as a result of experiments with an artificial system that reflects the basic properties and characteristics of the real one, to determine the structural indicators of economic and financial resources that ensures the achievement of the target state of the system – the restoration of solvency of the enterprise [14].



Of particular importance in the system of anti-crisis management is the study of insolvency in the dynamics, because a timely detection of its threat is a prerequisite for ensuring solvency in the long run. In this regard, the concept of system dynamics is chosen from the variations of simulation modeling concepts. According to it, the set of processes to maintain a sufficient level of solvency of the enterprise is presented in the form of interconnected financial flows, reflected by the interaction of rates and levels of financial indicators. Levels of the model characterize volumetric variables of financial activity, expressed by the volumes of accumulated economic and financial resources. Interrelations of the model levels are represented by pace variables that characterize the rate of levels changes [14].

The expediency of simulation modeling in this case, determining the target values of financial indicators of enterprises, is due to the fact that a number of these indicators have an inverse relationship. A high level of one indicator leads to a low level of another, which ultimately reduces the solvency of the enterprise. These groups of reverse dependent indicators include:

- liquidity ratios – turnover ratios;
- liquidity ratios – profitability ratios;
- liquidity ratios – the Beaver ratio;
- net assets to registered capital ratio – turnover ratios, profitability ratios, the Beaver ratio [12].

In order to ensure high levels of current and quick liquidity indicators of metallurgical enterprises, there is a need for significant value of current assets, cash and cash equivalents, current financial investments, receivables and insignificant amount of current liabilities. However, such a combination of balance sheet articles reduces the effectiveness of business activity and the use of assets, since more than normal increase in the articles of current assets leads to an increase in overhead costs associated with their maintenance and servicing. Particularly negatively the efficiency of business activity of the enterprise is influenced by the growth of receivables and, as a consequence, hopeless, which is a direct loss for the enterprise.

A similar effect net asset to registered capital ratio has on profitability indicators and the Beaver ratio. The growth of the indicator is an evidence of an increase in the share of equity capital in the structure of sources of financing, which constrains the development of the enterprise. Therefore, when developing a model of maintaining the solvency of an enterprise, when reaching the appropriate levels of financial indicators, it is expedient to take into account their inversely proportional relationships.

Consequently, the target parameters of the model of maintaining a sufficient level of solvency of metallurgical enterprises are the above financial indicators; the levels of the simulation model form the absolute indicators that underlie the calculation of the target ones. These indicators include: assets (A); fixed assets (OZ); current assets (OA); inventories (Z); registered capital (ZK); equity capital (VK); long-term liabilities and commitments (DZ); short-term liabilities and commitments (PZ); net revenue (ChD); gross profit (VP); net profit (ChP); depreciation deductions (AV).

The value of each of the absolute indicators, which are the basis of the calculation of insolvency indicators of metallurgical enterprises, is calculated by the formula 1 [14]:

$$X_t = X_{t-1} + \Delta t(PX_{t-1,t} - ZX_{t-1,t}), \quad (1)$$

where  $X_{t-1}$  – a value of the corresponding indicator for the previous period (year);  $PX_{t-1,t}$  – an increase in the indicator  $X$  for the year;  $ZX_{t-1,t}$  – a decrease in the indicator  $X$  for the year;  $PX, ZX$  – pace variables of the simulation model.

After establishing the functions of the dependence of model levels, pace and additional variables, controlled parameters, the implementation of simulation modeling is limited to the determination of the values of structural indicators of economic and financial resources that ensure the maintenance of a sufficient level of solvency of metallurgical enterprises.

The final stage of the proposed methodical approach is the determination of the threshold values of the indicators of the balance sheet and the report on financial results of enterprises structure necessary to maintain a sufficient level of solvency of metallurgical enterprises (tab. 1). Threshold values of indicators are determined by carrying out experiments with the constructed model.

Table 1.

Indicators of the balance sheet and the report on financial results of enterprises structure to maintain a sufficient level of solvency of metallurgical enterprises

Indicator	Target value of the indicator
The share of fixed assets in the structure of assets of the enterprise	$\geq 0.49$
The share of current assets in the structure of assets of the enterprise	$\geq 0.45$
The share of inventories in the structure of assets of the enterprise	$\geq 0.28$
The percentage of net profit of the enterprise, directed to replenishment of the reserve capital	0.05
The rate of profit reinvestment	0.95
The share of registered capital in the structure of capital of the enterprise	$\geq 0.11$
The share of additional capital in the structure of capital of the enterprise	$\geq 0.43$
The share of long-term bank loans in the structure of capital	$\leq 0.01$
The share of short-term bank loans in the structure of capital	$\leq 0.13$
The share of accounts payable in the structure of capital	$\leq 0.08$
Depreciation rate	$\leq 0.09$

As a result of simulation modeling, it has been determined that for metallurgical enterprises, from the point of view of maintaining a sufficient level of solvency, a "heavy" asset structure with a share of non-current assets of 55% is more acceptable, as shown in tab. 1. The basis of non-current assets should be formed by fixed assets – 49% of the value of assets of enterprises. In the structure of assets, inventories should prevail, with an optimal share of 28% of assets of enterprises. The dominant share of fixed assets in the structure of non-current assets of enterprises and inventories in the structure of current assets provides the enterprise with a sufficient level of production resources and funds, which increases the profitability of its activity and strengthen its financial condition.

In the structure of sources of financing, the predominance of equity capital, which should be not less than 50%, is optimal. In order to ensure the solvency of the enterprise, equity capital should be formed mainly through retained profit, which is an evidence of the effective activity and solvency of the enterprise. However, given the actual financial condition of metallurgical enterprises, this is unlikely. Therefore, as it is determined as a result of simulation modeling, to maintain the solvency of the enterprise it is sufficient to have the domination of additional capital – 43% in the structure of capital.

To ensure an expanded reproduction and increase in the efficiency of economic activity of the enterprise, the share of profit directed to replenish the reserve capital should be 5%, the reinvestment rate – 95%. The optimal depreciation rate from the standpoint of providing solvency of the enterprise is 9%.

**Conclusions and directions of further research.** Implementation of the developed methodical approach to determining the threshold values of the structural indicators of the balance sheet and the report on financial results of enterprises, which is an element of financial and economic innovations, enables to increase the effectiveness of the anti-crisis financial management mechanism at the enterprise, ensuring financial stability, liquidity, efficiency of enterprises' activity, their solvency and possibility of economic development. Prospects for further research in this area are the improvement of anti-crisis financial management at enterprises based on the development of forecast scenarios for the development of industrial enterprises.

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*Стаття рекомендована до друку 15.02.2019*

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*The article is recommended for printing 15.02.2019*

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