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A MECHANISM FOR EVALUATING AND FORECASTING THE FINANCIAL STABILITY OF AN ENTERPRISE

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During of the study, a mechanism for evaluating and forecasting the financial stability of an enterprise based on a process approach has been proposed. The created mechanism provides for modeling the financial sustainability of enterprise using an integrated model of the functional and structural organization of enterprise, which allows to establish the necessary relationships between the structural units of enterprise in the course of production cycles. It has been proposed to consider the financial stability of an enterprise in a broad and narrow sense for each production cycle during of its implementation. In the narrow sense, the financial stability of an enterprise has been considered as the ability to ensure solvency for current obligations at the expense of own and borrowed funds. In the broad sense, it has been proposed to consider financial stability as a process of repeatability of production cycles with control over the ratio of positive and negative cash flows in the dynamics. In the whole enterprise, financial stability has been proposed to be defined as the weighted average ratio of positive and negative cash flows. The use of this mechanism involves selecting the optimal number and value of factors that affect the planned financial result in the future by the method of successive approximations. The process approach involves the use of a model of the functional-structural organization of the enterprise to obtain the distribution of production cycles according to its optimal structure. The optimal structure is the functional-necessary structure, which contains the minimum set of elements of the production structure that ensures the execution of all production cycles with the duration determined in the mono-mode. The preparatory stage for building the functional-necessary structure is the normalization procedure, which ensures the determination of the conditions of connection between individual elements of the production cycle. For each production cycle, a set of absolute and relative financial indicators is established that have optimal values and determine the type of financial stability of the enterprise as a whole. It has been proposed to determine the type of financial stability of an enterprise as a whole by obtaining probabilities of financial stability for each production cycle, taking into account the share of the enterprise’s resources that is directed to the implementation of a specified production cycle.

Keywords: financial stability, financial indicators, financial forecasting, financial state, production cycle, process approach, functional-necessary structure, normalization procedure, evaluation.

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A mechanism for evaluating and forecasting the financial stability of an enterprise

Introduction and problem statement

The financial stability of an enterprise reflects the results of its production, investment and financial activities. To achieve high efficiency of the company's operations, the management is interested in creating an efficient system for strengthening the company's financial stability and solvency. A financially stable company has advantages in obtaining loans, attracting investments, selecting suppliers, and recruiting qualified personnel. In addition, high financial stability serves as a tool for crisis management, as it contributes to the development of the enterprise in the face of external uncertainty and increasing competition. Therefore, the study of factors and reserves to improve financial stability, as well as the justification for creating a mechanism for an effective system to evaluate and forecast financial stability at an enterprise, are relevant.

Analysis and research of publications

Theoretical and practical aspects of analysis, evaluation, control and forecasting of financial stability of enterprises have been studied by such scientists as Bazilinska O.Ya., Panchenko O.I. [1], Dombrowska S.O., Gorbachenko M.D. [2], Vasechko L.I. [3], Kravchenko M.O., Leontovska M.A. [4], Nikolchuk Yu., Nebzhytskyi B., Savchuk O. [5], Partyn H.O., Papirnyk S.Ye. [6] Sak T.V., Shepeliuk N.P. [7] and others. However, the current trends associated with the war, extremely high turbulence, and the emergence of new challenges, risks, and threats to the financial stability and solvency of the enterprises (and, therefore, their financial and economic security) require new research in this area.

Purpose of the article

The article aims to develop a mechanism for evaluating and forecasting an enterprise's financial stability through the use of modern financial management tools at various management time intervals.

Presentation of main material

The financial stability of an enterprise is crucial in determining its effective financial management and stable and profitable operation. The financial stability of an enterprise is a complex, multifactorial, static and dynamic economic category that reflects the achievement of a stable financial equilibrium and the ability not only to maintain it at the appropriate level for some time but also to change in the future. On this basis, financial stability should be considered as a process of managing cash flows determined at the current moment in time and forecasted for the future.

The implementation of a complex of measures to ensure the solvency of the enterprise in the current period and financial stability in the short term involves the use of a set of methods, levers and techniques for

managing the cash flows of business entities. The overall objective of management is to ensure that positive and negative cash flows are balanced and synchronized. If the balance and synchronization are not maintained, there will be a deficit or excess cash flow, which will both have a negative impact on the company's activities.

O.M. Tyshchenko [8] distinguishes the following types of financial stability of an enterprise: current (at the time of analysis) and potential (the prospect of increasing the volume of activities over a certain period of time and reaching a new level of financial equilibrium). That is, the financial stability of an enterprise in the short term means achieving a state of equilibrium, and in the long term – transforming stabilization factors into factors of enterprise development.

The current financial state of the enterprise shall be considered as:

- absolutely stable, arising from the excess or equality of own working capital to the amount of inventories;

- normal – in case of lack of own working capital for the formation of reserves and excess or equality of own working capital and permanent capital to the amount of reserves;

- unstable, when it is possible to restore the balance between income and expenses by replenishing equity capital and additionally attracting loans and borrowings;

- crisis, in which the company is on the verge of bankruptcy when inventories are not covered even by total sources of financing. This situation indicates the inability of the company to pay off its obligations. It causes an unstable financial state in the current period, which leads to a loss of financial balance in the long run.

The current value of financial stability makes it possible to evaluate the results of the enterprise's work to date and compare them with the previous period. At the same time, increasing the profitability of activities affects the financial stability and sustainability of the enterprise, however, attracting additional borrowed funds in significant amounts to increase the profitability of the enterprise may lead to the risk of losing financial stability and increasing the risk of bankruptcy.

Profit, which affects the financial stability and sustainability of an enterprise, is formed through the production and sale of various types of products and the provision of certain services [9]. Meanwhile, an important element of the effective functioning of an enterprise is detailed financial planning for each production cycle, which allows considering many

options for using the enterprise's production capacity, taking into account the impact of both internal and external factors. The current solvency of an enterprise is affected by the availability of receivables and payables, the amount of income from securities, current volumes of inventories, the level of prices for raw materials and finished products, the amount of attracted investments, etc.

In view of the above, it is advisable to consider financial stability in a broad and narrow sense for each production cycle during its execution. In the narrow sense, it is proposed to consider financial stability as ensuring solvency for current obligations at the expense of own and borrowed funds. In a broad sense, financial stability is considered to be a process of changing the ratio of positive and negative cash flows during production cycles. In general, it is proposed to define financial stability as the weighted average ratio of positive and negative cash flows. Thus, financial stability can be monitored at any time by the current ratio of cash flows.

Given the different lengths of production cycles, the amount of cash flows in the current period is determined as the sum of the cash flow for the previous period at the end of the production cycle and the expected cash flows in the current period, taking into account the dynamics of their change in the previous period.

During the modeling financial stability processes, the financial stability indicator is formed according to specific values of cash flow ratios for each production cycle, taking into account the share of enterprise resources allocated to the production of each type of product. For instance, the amount of working capital required for each production cycle can be chosen as a share of the resource.

The indicator reflecting the current value of the financial stability of the enterprise at any time is determined by the formula

$$F_{S_c} = \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \dots + \alpha_n X_n, \quad (1)$$

where α_n – weighting coefficients showing the share of enterprise resource used for each production cycle; X_n – the type of enterprise resources used in the corresponding production cycle; 1,2,3...n – number of production cycles.

The indicator of financial stability of the enterprise at the time of its control is determined by the formula

$$F_{S_m} = F_{S_c} + \Delta F_s = F_{S_c} + \alpha_1 \Delta X_1 + \alpha_2 \Delta X_2 + \alpha_3 \Delta X_3 + \dots + \alpha_n \Delta X_n, \quad (2)$$

where F_{S_c} – initial value of the financial stability indicator, determined by formula (1); ΔF_s – the

amount of change in indicator of financial stability of the enterprise at the time of control.

Using the formula (2), the degree of influence of various production cycles on the financial stability indicator is estimated.

This indicator reflects the dynamics of the enterprise's transition to a new static state. Herewith, a specific value reflects a new level of financial equilibrium of the enterprise. With a positive value of ΔF_s , financial stability increases, with a negative value – decreases, and with a zero value – remains at the same level.

Depending on the ability of the enterprise to adapt to new conditions under the influence of internal and external destabilizing factors, the financial stability of the enterprise may change in the following ways:

- in a certain period of time, there is an fluctuating nature of the values of the financial stability indicator, with the subsequent establishment of a stable value;
- the financial stability indicator decreases to a certain level and then remains unchanged under the influence of a destabilizing factor;
- there is a monotonous decline in the financial stability indicator under the influence of a destabilizing factor;
- the appearance of a destabilizing factor leads to a crisis condition of the enterprise.

It is advisable to pay attention to the need to forecast the financial stability indicator when drawing up financial plans of an enterprise, as well as when developing a new financial strategy. Such an important issue as financial stability forecasting can be considered using the process approach to assessing the performance of an enterprise. The process approach involves the use of a model of the functional-structural organization of the enterprise to obtain the distribution of production cycles and create an optimized structure [10]. The optimized functional-necessary structure makes it possible to complete all production cycles in full and the time of each cycle in multimode corresponds to their execution in mono-mode.

The functional-necessary structure is the minimum set of elements of the production structure that ensures the execution of all currently available production cycles with a minimum duration, i.e. without the occurrence of service queues for each element of the production system. The resulting functional-necessary structure establishes the optimal match to the production cycles. The development of such a structure begins with the analysis of all production cycles in order to determine the degree of their priority for the enterprise. To determine the priority of production cycles, a number of evaluation

criteria are selected, such as the profit received from the sale of products for each cycle, the duration of the production cycle, the supply rhythmic of production stocks, the minimum need for working capital, and others. The number of criteria is set for each company based on the specifics of its operations.

All production cycles should be represented using network models as well as in tabular form. The tabular form is necessary to normalize the production cycle, and the graphical form is necessary to build a graphical model of the functional-necessary structure and develop operational calendar plans for each production area.

The creation of the functional-necessary structure begins with the formation of the initial generalized structure of the enterprise, which includes one production area each existing at the enterprise. The preparatory procedure for building the functional-necessary structure is the normalization procedure. It is intended to determine the conditions of connection between individual elements of the production cycle. These conditions are determined for each production cycle by means of linkage coefficients. The coefficients reflect the ratio of the time of execution of individual stages of production cycles to the mode time of each element of the production system. The operating time depends on the organization of the enterprise: single-shift, two-shift or continuous.

Using the linkage coefficients, generalized utilization rates for each element of the production system are calculated. As a result, a table is drawn up for the conditional load of each element of the production system. To do this, the conditional load for each element is summed up. For example, the conditional load of the first element of the first cycle is summed up with the conditional loads of all production cycles of the first elements. Similarly, the load of each subsequent element of the production cycles is calculated. As a result, we get the estimated conditional load of the entire organizational structure of the enterprise for the selected set of production cycles.

The resulting estimated workload for each element is compared with the capabilities of the production areas. After a detailed analysis of the time standards and work schedules of the areas, the required number of equipment units for each production area is specified.

It is necessary to take into account the possibility of reducing the number of equipment units in work areas due to the operating modes of the areas, the level of professionalism of the personnel, as well as the permissible increase in the duration of production

cycles. Using an integrated structural-functional model, the organizational structure is refined by the method of successive approximations and its optimal correspondence to the set of production cycles is achieved.

The resulting division of production cycles into functionally necessary structures allows to control the dynamics of all processes and evaluate the performance of the enterprise. This can be done both for the enterprise as a whole and separately for each production cycle. By evaluating and comparing the results obtained by production cycles based on an integrated approach, the most prospective ones can be identified. The results of a comprehensive analysis of the values and dynamics of indicators can be used as a basis for developing a strategy and organizing planning at the enterprise.

When an enterprise produces social goods sold at low prices, the process approach allows to assess the degree of impact of such production cycles on the economic performance of the entire enterprise. The volume of production and costs for each production cycle are among the main indicators when developing a plan for the production of social group goods.

The process approach allows to control economic activity for each individual production cycle, as well as for the enterprise as a whole, at any stage of production. The range of manufactured products may change under the influence of various factors, such as seasonality of demand, changes in market demand with the emergence of more competitive substitute products, increased costs for a particular type of product, and other factors. In this case, the use of the process approach allows for a detailed factor analysis of all production cycles using the model of the functional-structural organization of the enterprise and identifying reserves that have appeared at all stages of the production cycles. Partial compliance of the enterprise structure with the production cycles can be achieved by changing the operating modes of individual production areas of the enterprise.

In this way, a functional-necessary structure is formed for which economic indicators will have optimal values. Based on the modeling results, financial stability is evaluated in a broad and narrow sense. For each financial state, the intensity of transitions to adjacent financial states with higher or lower solvency is determined. Each production cycle and its financial state is characterized by a set of absolute and relative financial indicators. The set of financial indicators used to evaluate the financial stability of an enterprise according to the proposed model is demonstrated in Table 1.

Table 1

Indicators for evaluating and controlling the financial stability of an enterprise

Title of an indicator	Content
Profitability of the enterprise	Shows the ratio of gross profit to the average annual value of the company's property
Profitability of production assets	Shows the ratio of gross profit to the average annual value of fixed production assets and tangible current assets
Return on equity	Shows the ratio of net profit to equity of the company
Return on investment of production assets	Shows the ratio of the value of output to the average annual value of fixed assets
Turnover of current assets	Indicates the ratio of the value of products sold to the average annual value of current assets
Financial independence (autonomy) ratio	Shows the share of equity in the total amount of sources of funds (balance sheet)
Loan capital concentration ratio	Indicates the share of borrowed capital in the total amount of sources of funds (balance sheet)
Financial dependency ratio	Shows the ratio of total sources of funds (balance sheet) to equity
Current debt concentration ratio	Shows what part of assets is formed by current liabilities
Financial stability ratio	Shows the ratio of equity and raised capital
Financial leverage ratio	Shows the ratio of raised and equity capital
Inventory to current assets ratio	Indicates the level of sufficiency of own working capital for inventory formation
Current asset maneuverability ratio	Shows the share of cash in the total amount of own working capital
Equity maneuverability ratio	Shows the ratio of own working capital to equity

Source: compiled by authors

To assess the financial stability of the enterprise according to this model, the indicators presented in Table 2, were additionally introduced.

All indicators are calculated based on the resulting distribution of production cycles by the functional-necessary structure of the enterprise.

Table 2

Additional indicators for evaluating and controlling the financial stability of the enterprise

Title of an indicator	Content
Return on investment of production assets of the production cycle	Indicates the ratio of the value of output to the average annual value of fixed assets used in the production cycle
Gross profit of the production cycle	Shows the difference between net sales revenue and cost of goods sold per production cycle
Average daily profit for each production cycle	Shows the ratio of gross profit of the production cycle to the duration of the production cycle
Turnover of current assets per production cycle	Shows the ratio of the cost of products sold to the average annual cost of current assets for each production cycle

Source: offered by authors

The analysis of financial stability as an object of assessment of solvency dynamics is based on the repeatability of production cycles. The evaluation of the financial stability of the enterprise is based on a set of financial states by production cycles, which correspond to a certain level of solvency. In the process of assessing solvency by production cycles, it is necessary to take into account possible changes in the need for funds to support production with raw materials, purchased components, energy resources,

etc. Thus, the need for working capital may vary depending on production conditions.

To forecast solvency by production cycles, it is necessary to control own funds, to have information on the availability of sources from which the enterprise can attract borrowed funds, in what amounts and on what terms, while ensuring financial stability at a certain level. The enterprise should take into account the magnitude of possible deviations in cash flows, which can ensure current solvency and maintain

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financial stability of the company. By ensuring financial stability in individual production cycles, the company will be solvent for a long time.

The financial state of individual production cycles is considered similarly to the financial state of the enterprise as a whole, but taking into account the peculiarities of evaluating the probability of maintaining the financial stability of the enterprise at certain time intervals:

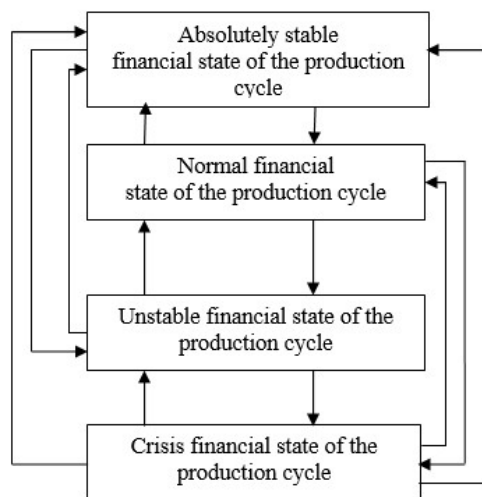
– in case of absolutely stable financial state of the production cycle, the minimum probability of its preservation is determined on the basis of the optimal amount of inventories;

– in the normal financial state of the production cycle, the probability of its preservation is determined by the optimal amount of inventories and the possibility of attracting additional borrowed funds;

– in the unstable financial state of the production cycle, the probability of financial stability maintaining is determined by the ability to restore the balance between income and expenses by replenishing equity and attracting additional loans and borrowings;

– in the crisis state of the production cycle, the enterprise is unable to fulfill its obligations and the restoration of financial stability is unlikely.

The relationship between the financial state of an enterprise and its possible changes during the production cycle is demonstrated in Figure.



The relationship between the financial state of the enterprise and its possible changes

Source: compiled by the authors on the basis of the proposed mechanism

The probability of changes in financial state is determined by the ratio of positive and negative cash flows for a certain time interval. The rate of change of the probability depends on the intensity of changes in the ratio of cash flows.

Under the influence of internal and external factors, the financial state of production cycles and the enterprise as a whole may change over time, as shown in Fig. by the transitions between absolutely stable and normal, unstable and crisis states. The probability of transitions from one financial state of production cycles to another and of the enterprise as a whole may differ significantly. To calculate the probability of a particular type of financial stability for a particular production cycle, the intensity of possible transitions to other financial states is first determined based on changes in the cash flow ratio over a certain time interval. The analysis of the type of financial stability of the enterprise as a whole, taking into account the financial stability of production cycles, is based on the indicators presented in Tables 1 and 2.

Determination of the financial stability of the enterprise as a whole is carried out on the basis of the obtained probabilities of financial stability for each production cycle, taking into account the share of the enterprise's resources that is directed to the implementation of a specified production cycle. In this case, the integral indicator of financial stability of the enterprise will be determined by the formula:

$$FS_i = \alpha_1 V_1 + \alpha_2 V_2 + \alpha_3 V_3 + \dots + \alpha_n V_n, \quad (3)$$

where α_n – weighting coefficients showing the share of enterprise resource used for each production cycle; V_n – probability of the type of financial stability for each production cycle.

Comparison of the obtained indicator of financial stability with the probability values obtained as a result of modeling makes it possible to determine the level of financial stability of the enterprise in accordance with the classification demonstrated in Figure.

Conclusions

To sum up the above, it can be concluded that as a result of the study, a mechanism for evaluating and forecasting the financial stability of an enterprise based on a process approach has been developed. It has been proposed to consider the financial stability of an enterprise in a broad and narrow sense, which makes it possible to determine the level of financial stability in static and dynamic modes. An approach to evaluating and forecasting the financial stability of enterprise on the basis of an integral indicator has been developed. It has been proposed to determine the type of financial stability of the enterprise as a whole on the basis of the financial stability of individual production cycles of the enterprise.

Prospective areas for further research are the analysis of the impact of a combination of external and internal factors on the dynamics of financial stability of an enterprise.

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**МЕХАНІЗМ ОЦІНЮВАННЯ ТА ПРОГНОЗУВАННЯ
ФІНАНСОВОЇ СТІЙКОСТІ ПІДПРИЄМСТВА****П'ятак Т.В., Федоренко І.А.**

В ході здійсненого дослідження запропоновано механізм оцінювання та прогнозування фінансової стійкості підприємства на основі процесного підходу. Створений механізм передбачає проведення моделювання фінансової стійкості підприємства з використанням інтегральної моделі функціонально-структурної організації підприємства, яка дозволяє встановити необхідні взаємозв'язки між структурними підрозділами підприємства в ході виконання виробничих циклів. Пропонується фінансову стійкість підприємства розглядати в широкому і вузькому сенсі для кожного виробничого циклу в ході його виконання. У вузькому сенсі, фінансова стійкість підприємства розглядається як можливість забезпечення платоспроможності з поточних зобов'язань за рахунок власних і позикових коштів. У широкому сенсі, розглядати фінансову стійкість пропонується, як процес повторюваності виробничих циклів з контролем співвідношення обсягів позитивних і негативних грошових потоків у динаміці. У цілому по підприємству фінансову стійкість пропонується визначати як середньозважене співвідношення позитивних і негативних грошових потоків. Використання такого механізму передбачає вибір оптимальної кількості та величини чинників, що впливають на запланований фінансовий результат у майбутньому, методом послідовних наближень. Процесний підхід передбачає використання моделі функціонально-структурної організації підприємства для отримання розподілу виробничих циклів по його оптимальній структурі. Оптимальною є функціонально-необхідна структура, яка містить мінімальну сукупність елементів виробничої структури, що забезпечує виконання всіх виробничих циклів з тривалістю, визначеною в монорежимі. Підготовчим етапом для побудови функціонально-необхідної структури є процедура нормалізації, що забезпечує визначення умов сполучення між окремими елементами виробничого циклу. Для кожного виробничого циклу встановлюється сукупність абсолютних і відносних фінансових показників, які мають оптимальні значення та визначають тип фінансової стійкості підприємства в цілому. Визначення типу фінансової стійкості підприємства в цілому пропонується здійснювати шляхом отримання вірогідностей фінансової стійкості по кожному виробничому циклу, враховуючи частку ресурсів підприємства, яка направляється на реалізацію заданого виробничого циклу.

Ключові слова: фінансова стійкість, фінансові показники, фінансове прогнозування, фінансовий стан, виробничий цикл, процесний підхід, функціонально-необхідна структура, процедура нормалізації, оцінювання.

**A MECHANISM FOR EVALUATING AND
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During of the study, a mechanism for evaluating and forecasting the financial stability of an enterprise based on a process approach has been proposed. The created mechanism provides for modeling the financial sustainability of enterprise using an integrated model of the functional and structural organization of enterprise, which allows to establish the necessary relationships between the structural units of enterprise in the course of production cycles. It has been proposed to consider the financial stability of an enterprise in a broad and narrow sense for each production cycle during of its implementation. In the narrow sense, the financial stability of an enterprise has been considered as the ability to ensure solvency for current obligations at the expense of own and borrowed funds. In the broad sense, it has been proposed to consider financial stability as a process of repeatability of production cycles with control over the ratio of positive and negative cash flows in the dynamics. In the whole enterprise, financial stability has been proposed to be defined as the weighted average ratio of positive and negative cash flows. The use of this mechanism involves selecting the optimal number and value of factors that affect the planned financial result in the future by the method of successive approximations. The process approach involves the use of a model of the functional-structural organization of the enterprise to obtain the distribution of production cycles according to its optimal structure. The optimal structure is the functional-necessary structure, which contains the minimum set of elements of the production structure that ensures the execution of all production cycles with the duration determined in the mono-mode. The preparatory stage for building the functional-necessary structure is the normalization procedure, which ensures the determination of the conditions of connection between individual elements of the production cycle. For each production cycle, a set of absolute and relative financial indicators is established that have optimal values and determine the type of financial stability of the enterprise as a whole. It has been proposed to determine the type of financial stability of an enterprise as a whole by obtaining probabilities of financial stability for each production cycle, taking into account the share of the enterprise's resources that is directed to the implementation of a specified production cycle.

Keywords: financial stability, financial indicators, financial forecasting, financial state, production cycle, process approach, functional-necessary structure, normalization procedure, evaluation.

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