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# COMPREHENSIVE SYSTEM OF FINANCIAL AND ECONOMIC SECURITY OF THE ENTERPRISE

**Olena Stashchuk**

Department of Finance and Credit,  
Lesya Ukrainka Eastern European National University, Lutsk, Ukraine

**Andrii Vitrenko**

Department of Macro- and Microeconomics,  
Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

**Oksana Kuzmenko**

Department of Entrepreneurship, Trade and Exchange Activities,  
Alfred Nobel University, Dnipro, Ukraine

**Hanna Koptieva**

Department of Management and Taxation,  
National Technical University “Kharkiv Polytechnic Institute”, Kharkiv, Ukraine

**Olena Tarasova**

Department of Accounting and Auditing,  
Odessa National Academy of Food Technologies, Odessa, Ukraine

**Liudmyla Dovgan**

Department of Finance, University of the State Fiscal Service of Ukraine,  
Ukraine, Kyiv region, Irpin, Ukraine

## ABSTRACT

*The article considers the main aspects of the formation of a comprehensive system of financial and economic security of the enterprise. It is revealed that the financial and economic security of the enterprise is its ability to ensure stability in both current and future periods, to minimize and neutralize the impact of risks, threats and dangers. It is established that the basis of a comprehensive approach is to achieve financial stability of the enterprise, its protection from the negative effects of internal and external threats. That is, the complexity of the system of financial and economic security of the enterprise is realized through the integration of a set of measures, the mechanism of their generation and provision. The article describes the method of*

*building a system of the comprehensive evaluation of the system of financial and economic security of the enterprise, using the tree of goals and the tree of assessments. It is shown the ability to relate specifically defined values and explore the nature of their interdependence to be able to choose the best option to achieve the expected result.*

**Key words:** Enterprise, Financial and Economic Security, System

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## 1. INTRODUCTION

For an enterprise that operates in conditions of high competition and unstable environment, the urgent problem is to provide appropriate conditions for safe operation and dynamic development. For this purpose, it is necessary to consider all factors of influence on the enterprise, which are threats real or potential [1-3]. Timely response to possible threats is important to prevent violations of the strategic stability and financial capacity of the enterprise. The high probability of influence of dangerous factors both external and internal environment demands from subjects of management of the enterprise formation of the complex system of maintenance of financial and economic safety directed on timely detection and operative elimination of threats to the stable functioning of the enterprise. Crisis forecasting and comprehensive tools for overcoming the threatening situation, as well as ways to increase the level of financial and economic security of enterprises are especially relevant in a crisis economy. The complexity of production technologies, the active introduction of cyber-physical systems in production processes requires the transition to the use of appropriate information, software, technical tools [4-6]. This requires the introduction of information and communication technologies and the creation of a single information space, which introduces the need to find additional opportunities for the comprehensive financial and economic security of the enterprise.

## 2. OBJECTIVES OF THE STUDY

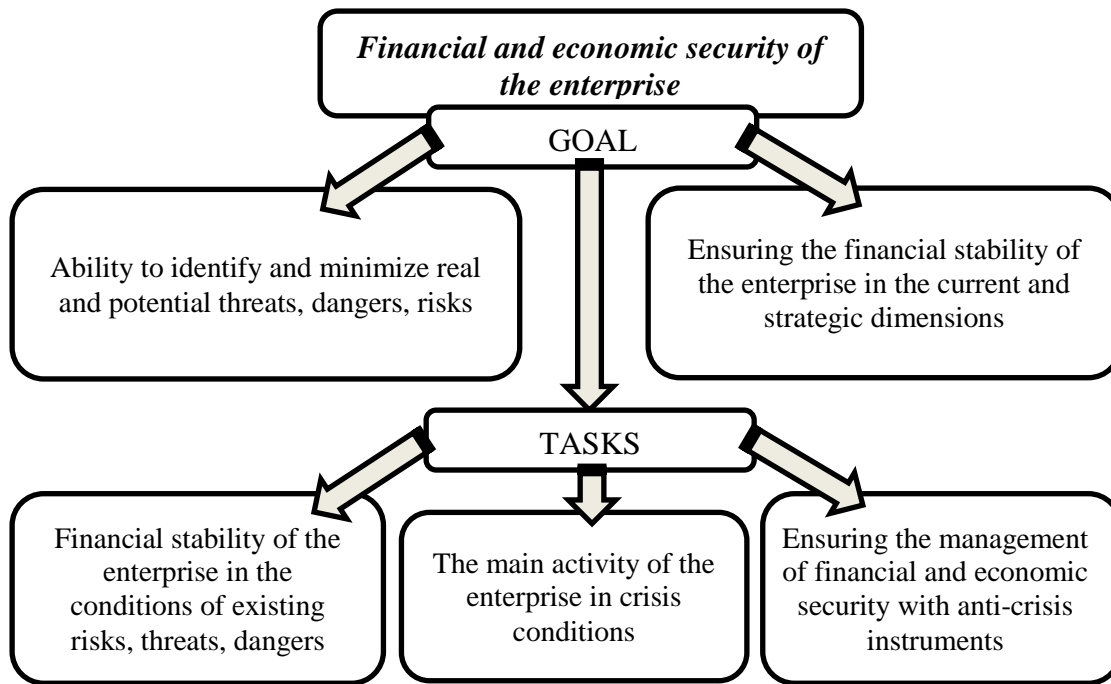
In the framework of this study, the following problematic issues are identified:

- to define the conceptual model of the complex system of maintenance of financial and economic safety of the enterprise;
- to develop mechanisms for the functioning of a comprehensive system of financial and economic security of the enterprise.

## 3. THEORETICAL SECTION

### 3.1. The Essence of Financial and Economic Security of the Enterprise

The safe existence and functioning (activity) of the enterprise as a socio-economic system ensures the stability of the system and the ability to develop dynamically. Financial and economic security of the enterprise is its ability to ensure stability in both current and future periods, to minimize and neutralize the impact of risks, threats and dangers (Fig. 1).



**Figure 1** The essence, purpose and objectives of financial and economic security of the enterprise

Financial and economic security characterizes the company as internally balanced, resistant to risks and threats, with high adaptability to changing environmental conditions and the ability to provide financial and economic activities based on the interests of owners, investors through the optimal combination available tools of diagnostic and controlling financial nature [7-8]. The financial and economic security of the enterprise requires managerial influence not only from the standpoint of the need to respond to alarming signals of possible bankruptcy. This is an important indicator for strategic planning because its consideration avoids the negative consequences of possible risks and threats. That is, financial and economic security is part of the management system of the enterprise. The following approaches are known for revealing the economic essence of this concept: resource, financial and complex [9-10]. The main task of management is the rational distribution of available resources and management decisions, according to the goals of development and safe operation of the enterprise. Financial and economic security is the ability of an economic entity to ensure the efficient operation and use of resources to perform current tasks for stable development and regular profit. The level of financial and economic security of the enterprise is assessed, according to its ability, with available resources, to ensure the process of sustainable development in the long run. Thus, safe in terms of financial and economic security for the company is a state in which it can successfully carry out its activities, while being economically and financially stable, as well as constantly evolving to improve its position in the future.

From the standpoint of the financial approach, the system of financial and economic security of the enterprise must meet the following criteria: timely response and minimization or elimination of financial and economic threats, both internal and external; ensuring the financial stability of the enterprise; the ability to meet financial obligations; ability to apply appropriate financial mechanisms, financial levers, incentives for the realization of financial goals.

The integrated approach is based on achieving the financial stability of the enterprise, its protection from the negative effects of internal and external threats. Both financial and resource approaches are implemented at the same time. That is, the complexity of the system

of financial and economic security of the enterprise is realized through the integration of a set of measures, the mechanism of their generation and provision. The state of financial and economic security shows the level of protection from the negative effects of the environment, which is achieved through the compliance of financial, personnel, technical, technological and economic potential to the strategic goals and objectives of the enterprise.

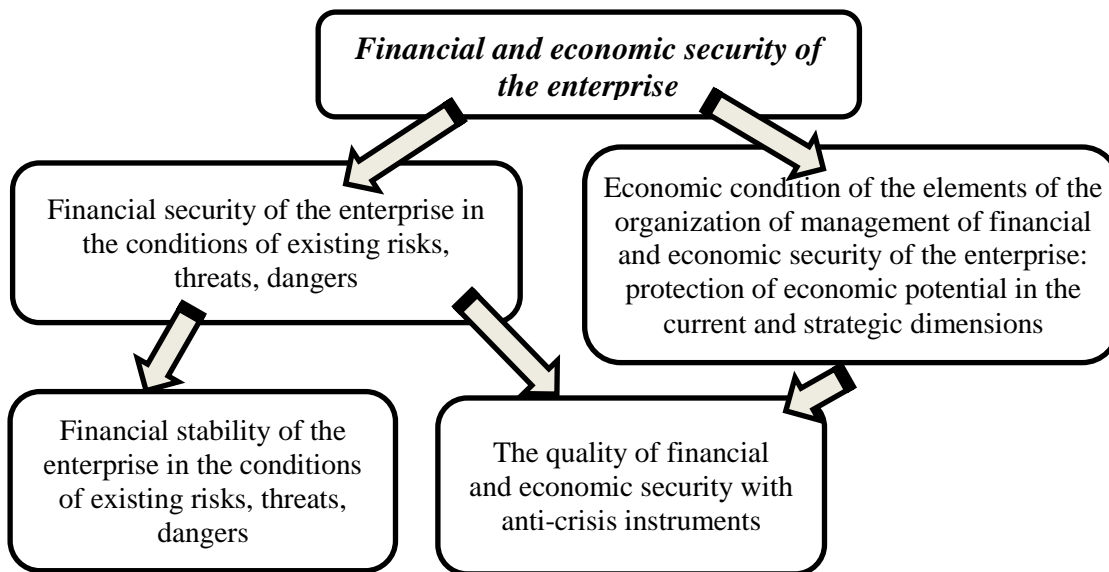
Thus, the system of financial and economic security of the enterprise depends on the peculiarities of entrepreneurial activity, production potential, the efficiency of its use and direction of production activity, human resources of the enterprise, its production relations, competitive environment, the riskiness of production, etc. [11-14]. That is, for the safe operation of the enterprise, it is important to take into account the nature of the impact of the main elements of the external and internal environment.

To develop effective management influences, starting from the stage of goal-setting and ending with the stage of operational management, the governing body must have sufficient information about the behaviour of managed entities, in particular - the results of their activities. Therefore, the system of financial and economic security of the enterprise should be formed from the standpoint of complexity, efficiency and systematization, taking into account both stable and crisis operating conditions. Thus, a comprehensive system of financial and economic security of the enterprise is a set of interrelated organizational and legal measures and actions carried out by special services of the enterprise aimed at protecting the vital interests of the enterprise and all stakeholders from real or potential threats to ensure successful financial and economic development.

#### **4. METHODOLOGY**

The system of financial and economic security of the enterprise is a complex multi-element and multilevel, the activities of which are described by many criteria. Therefore, it is advisable to use the mechanisms of a comprehensive evaluation, which allow for the convolution of indicators, i.e. to aggregate information on the performance of individual elements of the system. Consistently detailing the structure of the system tasks, we obtain a tree, which is called the goal tree. Its main peak will be an aggregate indicator of the quality of the functioning of the system of financial and economic security in general, hanging peaks – performance indicators of individual components of the system, structural units. The degree of achievement of each of the goals (the top of the constructed tree) will be assessed on some discrete scale. Fig. 2 presents a tree of goals to ensure the financial and economic security of the enterprise.

A comprehensive indicator here is the "level of financial and economic security of the enterprise", which is determined by the "financial security of the enterprise in the face of existing risks, threats, dangers" and the economic condition of the elements of financial and economic security: protection of economic potential in the current and strategic dimensions ". The latter can be, for example, indicators of financial and economic efficiency of the main activity of the enterprise. Assume that the financial stability of the enterprise in the conditions of existing risks, threats, dangers are determined by the criteria "financial stability of the enterprise in the conditions of existing risks, threats, dangers" and "quality of financial and economic security with anti-crisis instruments".



**Figure 2** Tree of objectives for the financial and economic security of the enterprise

Thus, we have described the functioning of the system of financial and economic security of the enterprise in the form of a tree of goals, the degree of achievement of which is assessed on some discrete scale. To determine an assessment at a certain level is necessary to know the rules for obtaining it from lower-level assessments; the lowest level estimates are determined expertly or following some pre-established procedure for "translating" available quantitative or qualitative information into a discrete scale. Thus, the first task is to determine the rule of aggregation of estimates. To achieve certain values of the elements of the system, its management must allocate them appropriate financial and other resources. Thus, there is a task - to determine how the costs of a reorganization of the financial and economic security of the enterprise as a whole depend on the costs of the elements of the management system in terms of appropriate estimates. To do this, use a comprehensive evaluation system for each criterion (the top of the goal tree) on the selected discrete scale. Next, a rating tree is formed. Based on the goal tree and the combination of logical matrices, for each of the possible final scores, we define sets of scores for the lower-level elements. To do this, going down the tree of goals from top to bottom, we determine at each level, what combinations of lower-level assessments can be obtained this assessment. A set of lower-level assessments that lead to the achievement of the required final comprehensive assessment is a development option.

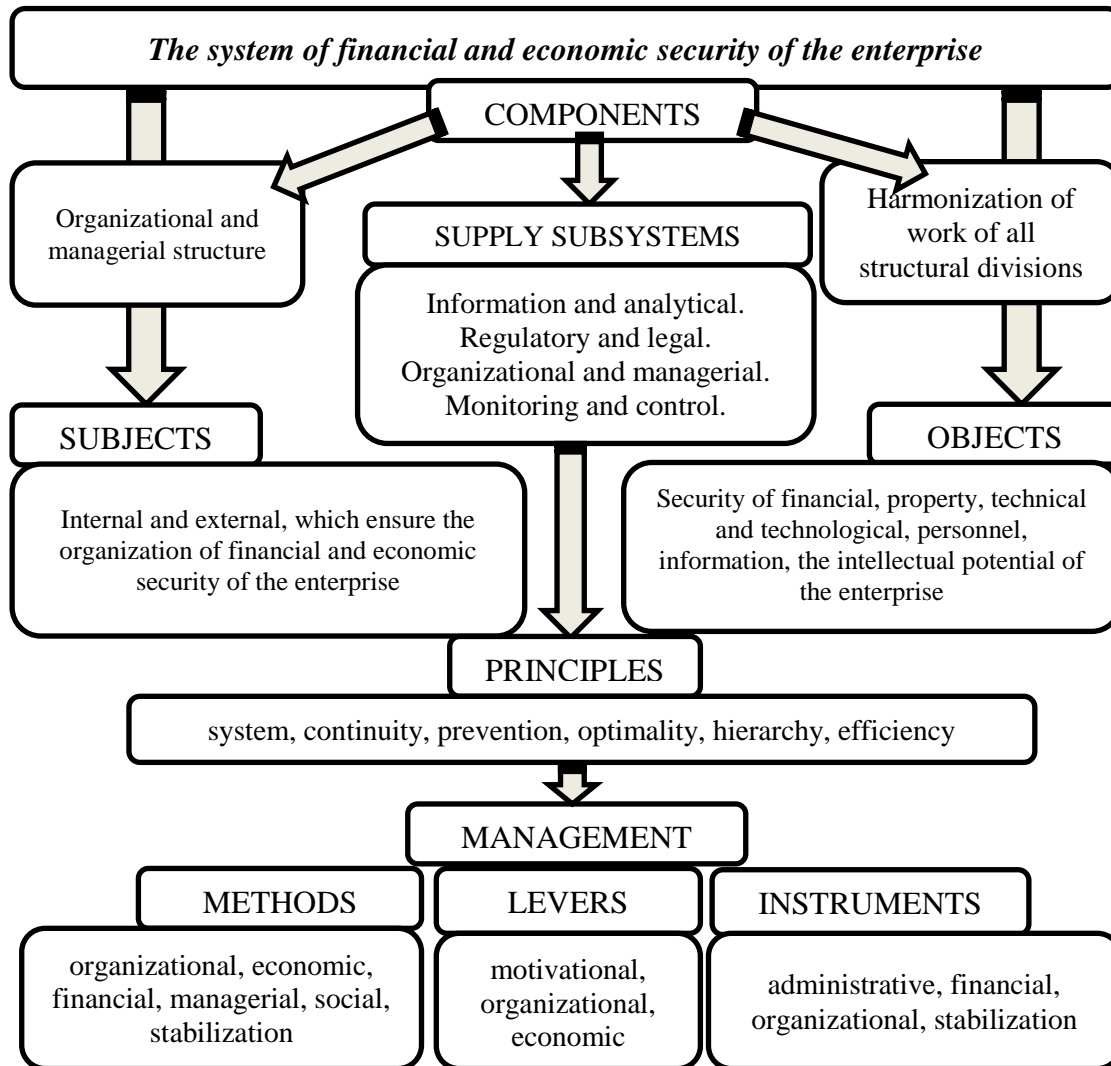
## 5. EVALUATION AND ANALYSIS OF RESULTS

### 5.1. Model of the System of Financial and Economic Security of the Enterprise

The system of financial and economic security of the enterprise is a set of interconnected elements and mechanisms that can ensure the stability of the enterprise, taking into account the impact of existing and potential risks, threats and dangers. In this sense, the system and security-oriented management provide the opportunity to achieve the main goals of the enterprise in the current and strategic dimensions. The purpose of forming a comprehensive system of financial and economic security is to achieve financial stability of the enterprise and the ability to respond in a timely and adequate manner to real and potential risks, threats, dangers. The tasks of a comprehensive system of financial and economic security of the enterprise are the financial stability of the enterprise and management in the face of potential

and real crisis phenomena, with the introduction, according to the situation - preventive or reactive crisis management.

Construction and operation of the financial and economic security of the enterprise should take into account several fundamental components: the principles of enterprise construction, its organizational and management structure, the effective functioning of departments and services, including financial and economic security management. Fig. 3 shows a comprehensive system of financial and economic security of the enterprise.



**Figure 3** Model of a comprehensive system of financial and economic security of the enterprise

The object of the system of financial and economic security are assets of the enterprise, information, staff, a set of non-property rights and economic interests, changes in financial and economic performance indicators that indicate changes in the level of financial and economic security of the enterprise. That is, the object of management is the security of financial, property, technical and technological, personnel, information, the intellectual potential of the enterprise. The subjects of financial and economic security are responsible persons, structural units, services, bodies, institutions, ministries and departments that directly ensure the financial and economic security of the enterprise. That is, the subjects of financial and economic security of the enterprise are both internal and external agents. They are authorized to form, organize, control and monitor the level of financial and economic security

of the enterprise in the current and strategic periods. The effective functioning of the system of financial and economic security of the enterprise must be based on and adhere to the following principles: system, continuity, prevention, optimality, hierarchy, efficiency. The system of financial and economic security of the enterprise should be based on the effective functioning of subsystems: organizational and managerial, information and analytical, regulatory and legal, monitoring and control.

The basis of the functioning and effectiveness of the system of financial and economic security of the enterprise is a mechanism that is a set of methods, levers and tools that can ensure security within the subject-object relations, with minimization or complete elimination of the effects risks, threats and dangers. Methods of financial and economic security: organizational, economic, financial, managerial and social, the complex of which is specified, depending on the stable or crisis conditions of the enterprise. Levers of influence are a structural element of the mechanism - they are methods of action and implementation of methods. Levers are offered: motivational, organizational, economic. Tools that are a means of ensuring financial and economic security to achieve goals and objectives: administrative, financial, organizational, stabilization, depending on the stability or crisis of the enterprise - taking into account real and potential crises and threats. The combination of all elements of the system of financial and economic security of the enterprise will help minimize external and internal threats, dangers and associated risks.

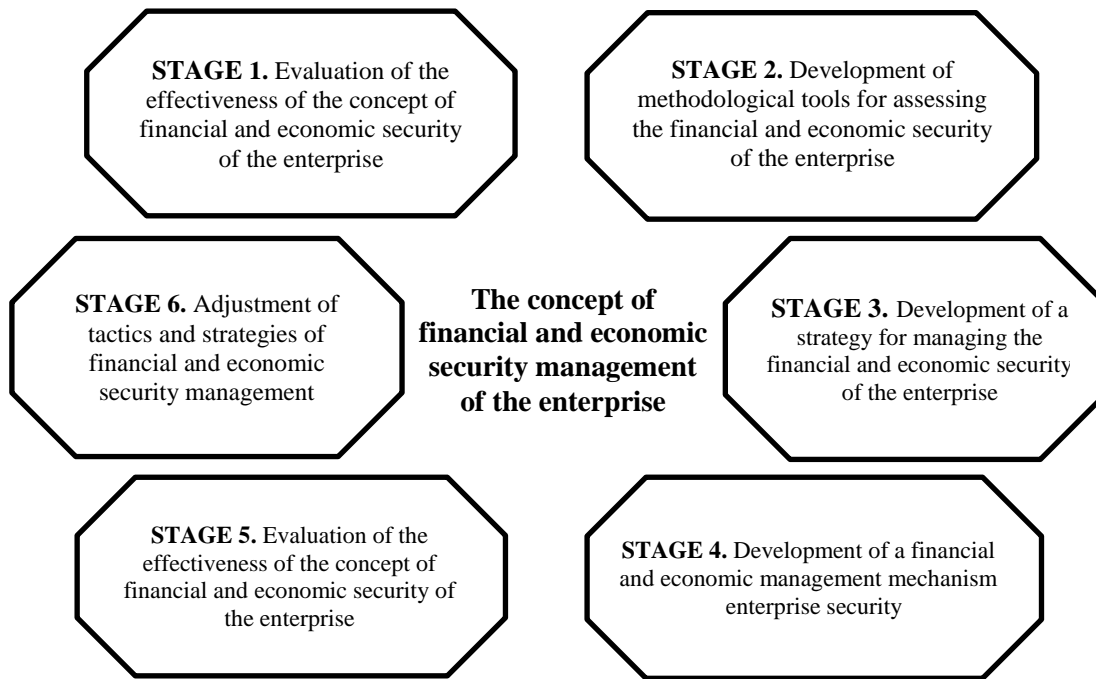
## **5.2. The Concept of Financial and Economic Security Management of the Enterprise**

The concept of financial and economic security management of the enterprise is a holistic and systematic understanding, vision and presentation of ways to eliminate hazards using management decisions, to minimize the impact of real or potential threats, dangers and risks that may threaten the company from inside and outside, and ways to minimize possible harmful consequences.

Indicators of financial condition reflect the availability, location and use of financial resources, the competitiveness of the enterprise, its potential in the business environment, the degree of economic interests of the enterprise and its partners in financial and other economic relations.

Any concept must be constructive and flexible enough to respond to changing conditions of the internal and external environment. The constructiveness of the concept is that it should reflect the initial state of the object, the transformation of which is aimed at the concept; the state of the object, the result achieved in the implementation of the concept; measures to achieve the goals formulated in the concept; mechanisms for implementing the concept, ways (methods) of using the allocated funds and resources.

In Fig. 4 schematically presents the concept of financial and economic security of the enterprise.



**Figure 4** The concept of financial and economic security of the enterprise

Based on these requirements, the concept of financial security management of the enterprise should contain the following sequence of stages:

- analysis of risks and threats to the financial and economic security of the enterprise;
- development of methodological tools for assessing the state of financial and economic security of the enterprise;
- development of a strategy for managing the financial and economic security of the enterprise;
- development of a mechanism for managing the financial and economic security of the enterprise;
- assessment of the effectiveness of the concept of financial and economic security management of the enterprise;
- adjustment of tactics and strategy of management of financial and economic safety, according to the change of conditions of functioning of the enterprise.

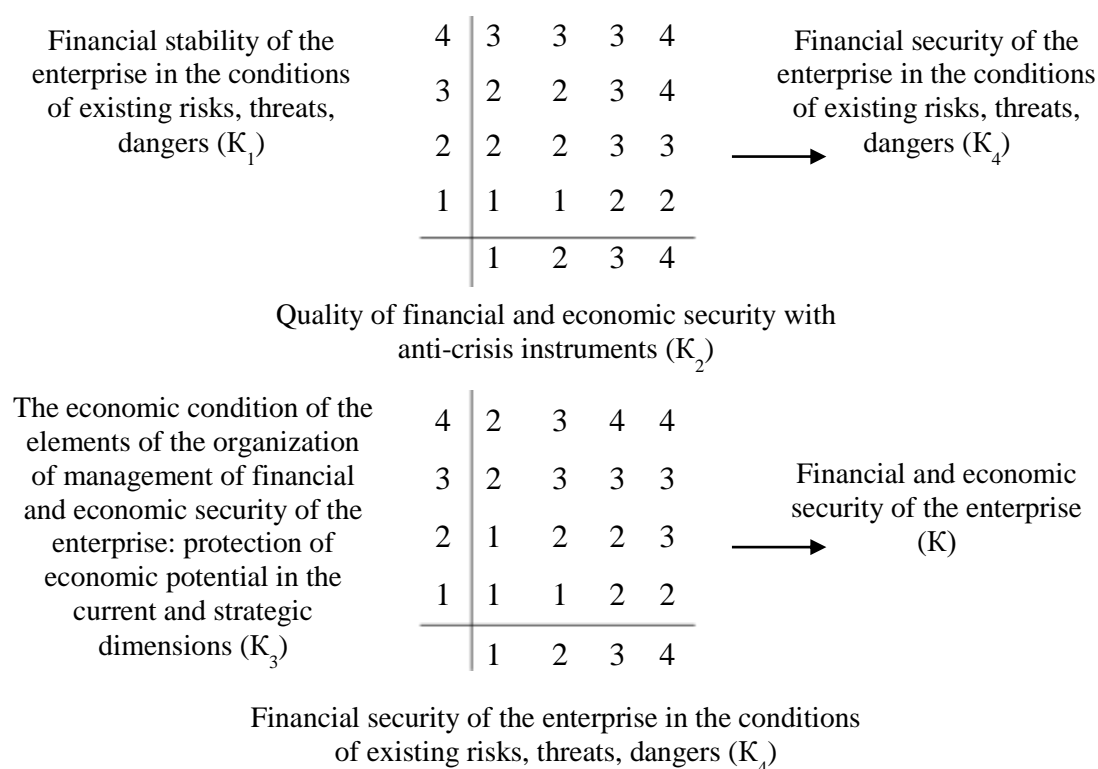
Thus, the main stage of ensuring the financial and economic security of the enterprise is to form a concept and build an effective mechanism for managing the financial and economic security of the enterprise, which would be focused on timely detection and prevention of external and internal threats and protection of financial interests.

### **5.3. Comprehensive Assessment of the System of Financial and Economic Security of the Enterprise**

To achieve certain values of assessments of the elements of the system of financial and economic security of the enterprise, its management must allocate appropriate financial and other resources to achieve the desired level of security and quality of the security system. Thus, the task arises - to determine how the cost of the reorganization of the system of financial and economic security, in general, depends on the cost of elements of the system in terms of appropriate estimates.

We introduce a discrete scale for each of the criteria (for each of the vertices of the goal tree). Each of the values of this ordinal scale is set in accordance with the number 1, 2, ... The capacity of the scale is not limited, and the number of different grades-gradations can be selected, firstly, taking into account the specifics of the system and indicator, and secondly, taking into account that with the increasing capacity of the scale increases the computational complexity of optimization problems. For the presented example (Fig. 2) we take a scale consisting of four possible values of assessments - bad (1), satisfactory (2), good (3) and excellent (4). Now define the procedure for aggregating estimates. Let the score on some generalized (aggregate) criterion depend on the scores on the two (aggregate) lower-level criteria. We introduce the matrix

$A = \|a(i, j)\|$ , where  $a(i, j)$  is the estimate by the aggregate criterion in the estimates  $i$  and  $j$  by the aggregate criteria. The dimension of the matrix and the number of its pairs of different elements is determined by the appropriate scales. For this example, the convolution matrices are shown in Fig. 5.



**Figure 5** Convolution matrices in determining the financial and economic security of the enterprise in the system of integrated assessment

Thus, for example, when receiving a rating of "good" (3) by criterion  $K_1$  – "financial stability of the enterprise in terms of existing risks, threats, dangers" and a rating of "satisfactory" (2) by criterion  $K_2$  – "quality of financial and economic security anti-crisis instruments" we receive a cumulative assessment of "satisfactory" by criterion  $K_4$  – "financial security of the enterprise in terms of existing risks, threats, dangers." If the criterion  $K_3$  – "economic condition of the elements of the organization of management of financial and economic security of the enterprise: protection of economic potential in the current and strategic dimensions" was achieved "excellent", the final score of criterion  $K$  – "financial and economic security of the enterprise" will be – "good" (3).

It is assumed that these parameters (goal tree structure, rating scales, convolution matrices) are chosen by decision-makers (manager or managers of the relevant element of the system of financial and economic security of the enterprise or management body), and/or a team of experts. On the one hand, the system of matrices can be easily modified to take into account the change of priorities, and on the other hand, we must recognize that such a procedure in principle can not be freed from subjectivism.

When forming a system of convolution matrices, it is proposed to follow the rule of monotony: the aggregate estimate obtained by increasing at least one aggregate estimate must be at least the initial one. That is when moving from the lower-left corner of the matrix to the right or up, the scores should not fall.

We have described the use of two-dimensional matrices (binary convolutions) that define the procedure for aggregating estimates of two criteria into one. The use of binary convolutions allows you to most clearly reflect the structure of preferences and priorities of those who make management decisions.

An important step is the formation of an evaluation tree. Having a goal tree and a set of logical matrices, for each of the possible final evaluations, it is necessary to define evaluation sets for the lower-level elements. To do this, going down the tree of goals from top to bottom, we determine at each level, what combinations of lower-level assessments can be obtained this assessment. For this example, the value of  $K = 4$  can be obtained by the following combinations of estimates by criteria ( $K_1, K_2, K_3$ ): (4; 4; 4); (3; 4; 4); (4; 1; 4); (4; 2; 4); (4; 3; 4); (3; 3; 4); (2; 3; 4); (2; 4; 4). The same trees are constructed for all other values of estimates according to the aggregate criterion  $K$  (final estimates).

A set of lower-level assessments that lead to the achievement of the required final comprehensive assessment is called a development option. Having a tree of estimates and the cost of achieving each of the lower level assessments, you can solve the problem of minimizing the cost of implementing a final assessment. To do this, starting from the lowest level of the rating tree, considering the set costs to achieve this fixed rating, moving up, determine the option of the minimum cost. The costs at the branch point (when there are several alternatives) are determined at least among the costs of alternatives that give the required value of the assessment. The minimum cost option is determined by the reverse method (from top to bottom).

## 6. CONCLUSION

This study describes the method of building a system of the comprehensive evaluation of the system of financial and economic security of the enterprise, using the tree of goals and the tree of assessments. It is shown the ability to relate specifically defined values and explore the nature of their interdependence to be able to choose the best option to achieve the expected result. Each option is evaluated on the criteria of quality and cost, and the search for the "best option" is proposed to conduct within the proposed model. The algorithm for finding acceptable values of quality and cost for the formation of a comprehensive system of financial and economic security of the enterprise includes the following stages.

1. For each possible option to change the evaluation of the lower-level element of the goal tree, the amount of minimum costs is determined.
2. If the fund of financing of the system of maintenance of financial and economic safety of the enterprise is limited, among the received combinations, we leave those for which the budgetary restriction is executed.
3. For each of the possible combinations of funding, determine the value of the total cost of funding and comprehensive assessment. As a result, we get many points in the space "quality-

cost", which outlines the allowable area. Each of these points corresponds to an eligible funding option.

4. Within the allowable set, choose a point or set of points that are optimal in terms of, for example, the maximum quality assessment (depending on the problem).

In practice, it is advisable to use modifications of this algorithm, taking into account the specifics of a particular task.

Assessment and management of the financial component of financial and economic security of the enterprise can be the direction of further research.

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