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Urgent problems of present-day economics' development, different ownership enterprises operation and development, investment and innovative activity, increasing national economy's competitiveness, regional development are reported.

It is intended for scientists, lecturers, postgraduate students, students and practitioners.

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6.1. ANTI-CRISIS MANAGEMENT IN THE ENVIRONMENT OF MULTIFACTORIAL RISK FOR FINANCIAL SYSTEM OF AGRIBUSINESS ENTERPRISES

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In the conditions of the formation of the new financial system, most of the subjects of economic activity revealed the inability to change systematically the development of future events in relation to financial activity. A deep understanding of risk as an element of anti-crisis management in agribusiness has an effective component-financial losses that endanger the financial system of agrarian enterprises with corresponding consequences for the economy. The most common positions associate risk with the possibility of danger or loss, lack of profits, the probability of occurrence of an adverse event, uncertainty of financial results, overcoming the uncertainty of situational choice of events. At the same time, the optimistic expectation is inherent in the very definition of the phenomenon of threat in the environment of probable risk, taking into account the possible positive result for covering financial expenses and limiting the parameters of the formation of financial resources [15, p. 220].

High dynamic changes of causal relationships between factors and financial performance in the financial system of agribusiness enterprises complicate the use of formal methods of risk assessment based on the extrapolation of past and traditional methods of statistical modeling. The process of making financial decisions leads to a situation of information that characterizes the respective risk parameters in determining the future of the financial system [16, pp. 50]. From the standpoint of evaluating multifactorial events, classical probabilistic descriptions, except for concentration in typical and recurring situations, imply an unacceptable limit to the number of possible outcomes [9].

For example, we consider the possibility of using the most widespread method for assessing the risk situation based on the theory of games. We are talking about methods for determining the optimal behavior in the management of systems, which is characterized by the presence of a conflict situation. The formalization of the content description of the conflict is a

mathematical model that includes two sides with opposing interests. The most common are games of two players; games of three or more participants are less explored due to difficulties in obtaining a decision.

The most common case of calculations involves a finite number of options for choosing solutions $C_1,...,C_m$ (each variant corresponds to the result $r_i, i=1,...,m$), one has to find the variant with the highest value of the result $-\max r_i$. As r_i is accepted as profit, net income, profitability, another integral indicator of financial efficiency of management it is expedient to apply the criterion:

$$C_0 = \{C_{io} | C_{io} \in C \wedge r_{io} = \max_i r_i\}, \quad (1)$$

The multiplicity of possible solutions is described by a matrix:

$$R = \left| r_{iy} \right|_{\substack{i=1,...,m \\ j=1,...,n}}, \quad (2)$$

Next, in search of the most optimal solution, target functions are introduced according to the following criteria, for example:

1. Minimax criterion: $C_0 = \{C_{io} | C_{io} \in C \wedge r_{io} = \max_i \min_j r_{ij}\}$, (3);

2. Gambling: $C_0 = \{C_{io} | C_{io} \in C \wedge r_{io} = \max_i \min_j r_{ij}\}$, (4);

3. Sevige criterion: $C_0 = \left\{C_{io} | C_{io} \in C \wedge r_{io} = \min_i r_{io}\right\}$, (5);

4. Neutral player criterion: $C_0 = \left\{C_{io} | C_{io} \in C \wedge r_{io} = \max_i \frac{1}{n}\sum_{j=1}^{n} r_{ij}\right\}$, (6)

and other criteria (Bayes-Laplace, Hodge-Lehman, Germier, etc. [13]).

However, the financial system of agribusiness enterprises is represented by a set of reciprocal financial ties in the aggregate of its elements, the behavior of which depends on the random deviation of a number of factors. Thus, the game as a simplified formalized model of the real situation can describe only the problem of business choice ($r_{io} = \min_j r_{ij}$, or $r_{io} = \max_j r_{ij}$, or $r_{io} = \min_i \left[\max_j (\max_i r_{ij} - r_{ij})\right]$, or $r_{ir} = \frac{1}{n}\sum_{j=1}^{n} r_{ij}$). In addition, the theory of games does not address the question of methods for assessing and measuring the value of alternatives. The consequence of this is the unreliability of most assumptions in describing the game, the presence of several principles of optimality in solving the same problem.

Figure 1 depicts a composition of methods for estimating the environment of multifactorial risk in the financial system of agribusiness enterprises.

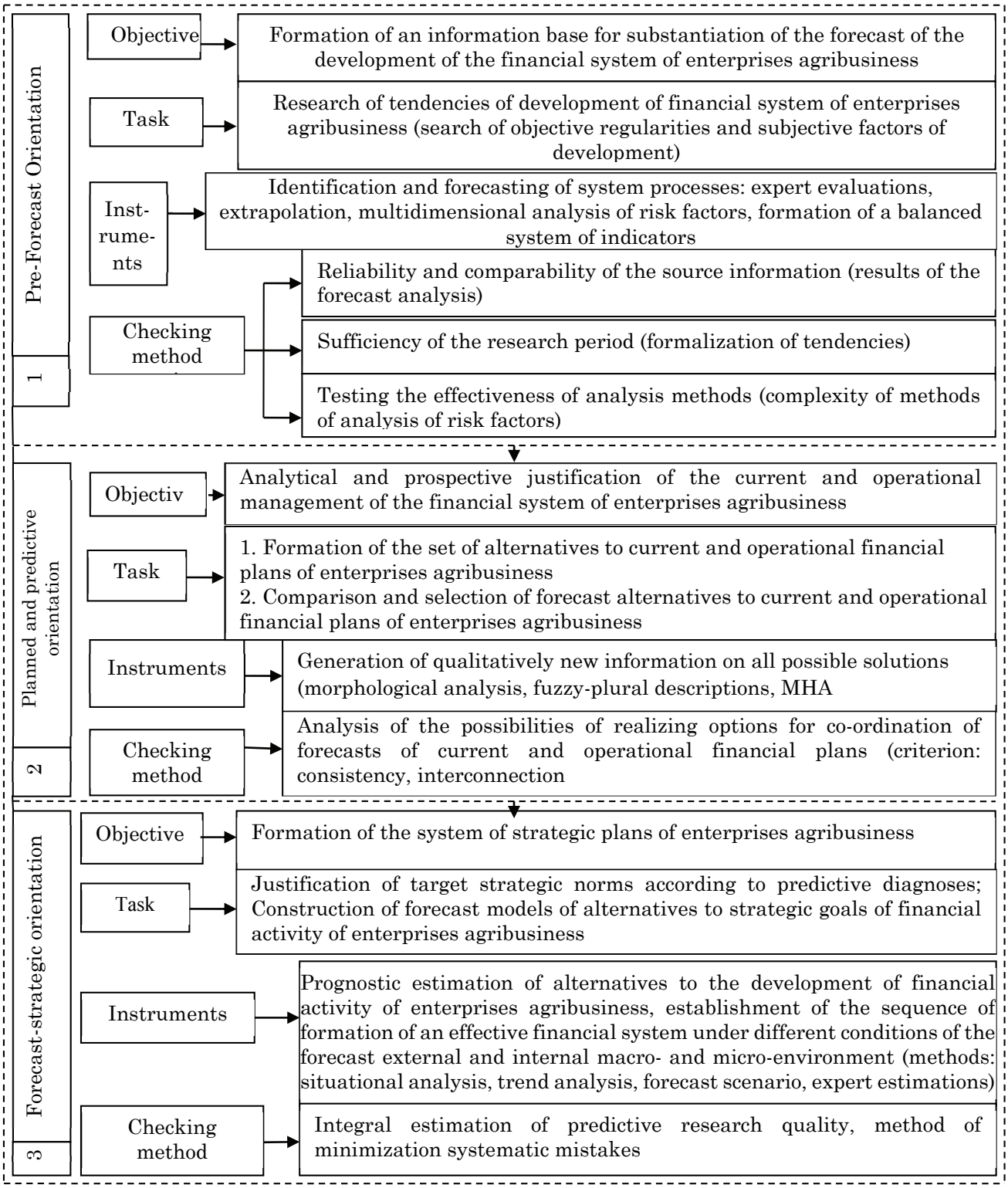

Fig.1. Composition of methods for estimating the environment of multifactorial risk in the financial system of agribusiness enterprises

Source: author's research

In the tasks of assessing the risk situation, the Analytic Hierarchy Process [3] is also successfully used, which is a «systematic mathematical procedure for hierarchical representation of elements that determine the essence of a particular economic problem» [17, p. 280]. The hierarchy analysis method (MHA) is based on the principle of identity and includes the synthesis procedures for obtaining priority criteria and finding alternate solutions. The method differs by the possibility of representing a complex problem in the form of a tree of alternatives; prioritization by expert survey; calculation of priorities relative to an arbitrary top of a decomposition tree. The main method of describing an area and its structure is the decision tree method. It is for normative forecasting, which allows considering any investigated system as a complex one that consists of individual interconnected elements and assess the relative importance of these elements. Based on the decision tree method, we will map the structure of the financial forecast. As a general goal (tree top) we accept the possibility of introducing risk forecast of the financial system of agribusiness enterprises of Steppe zone of Ukraine.

Methodology of assessment of multifactorial risk is based on the initial value-financial losses which are presented as a function of a combination of factors that affect prognosis indicator parameters through the financial system. With expert research variable risk factors are generated and a new database is formed to assess the overall value of variables. The logic of forming a coherent system of macro and microeconomic assessment is embodied in the results of this research, which is environment of multifactorial risky in the financial system by quality criteria of agribusiness enterprises expert assessments that are based on the method of multivariate smooth, harmonic instruments of Theil-Veyge and Holt-Winters [14, p. 125].

In order to determine the set of variants of the system combination, a discriminant function is introduced:

$$\lambda_1 = f_1 Y_1 + ... + f_k Y_k, \tag{7}$$

Each combination group was evaluated in two ways, the first one showed affiliation $Y_k[\lambda_i(a_i, b_i, c_i, d_i)]$ to $Q_n \in A$, and the other $Y_k[\lambda_i(a_i, b_i, c_i, d_i)]$ to $R_n \in B$. The first method was evaluated on the total cumulative interest, that is, which total percentage is given by the factors of the variables, and the second method shows the distribution of the coefficient of consistency of the answers of experts ($K_{узг} = 1 - \mu_i$) calculated on the basis of the coefficient of qualitative variation μ_i:

$$\mu_i = \frac{k}{k-1} \cdot \frac{(\sum_j f_{ij})^2 - \sum_j f_{ij}^2}{(\sum_j f_{ij})^2}, i = \overline{1, m}; j = \overline{1, N}, \tag{8}$$

where, k – number of places occupied by *i-a* sign; f_{ij} – number of experts who assigned *j-th* place to the *i-th* criterion; m – number of ranked attributes; N – number of interviewed experts.

Variants of evaluation of multifactorial risky in the financial system of agribusiness enterprises are carried out on the basis of the results of expert evaluation on the criterion of similarity, the risk zone, coefficient of coherence, origin of influence, cross-activation of basic and superstructural factors. Interpretations of the position of specialists of the investigated enterprises were preceded by the estimation of their relative homogeneity by the *k-medium* method, designed to distribute observation to a given number *k(k<n).*

The concept of homogeneity is formed by the distribution of the type of observation:

$$Q(S) = \sum_{j=1}^{k} \sum_{X_i \in S(j)} d^2(X_i; \overline{X}(j)), \tag{9}$$

where, $S = (S^{(1)}, S^{(2)}, ..., S^{(k)})$ it defines the distribution of observations $X_1, X_2, ..., X_n$ on *k-classes*; $\overline{X}(j) = \frac{1}{n_j} \sum_{X_i \in S(j)} X_i$ – this is the destination center of the j-class, n_j – the number of elements in j-class; $d^2(X_i; \overline{X}(j)$ – is the square of the Euclidean distance X_i from the observation to the destination center $\overline{X}(j)$.

Thus, (9) will correspond to the average level of intra-group observation of distribution, which characterizes S.

The procedure for distributing the type of observation includes several stages of multidimensional smoothing of data. Using the software «Data Mining», the final distribution S of the studied set of observations for *k-classes* is carried out in accordance with the rule of minimum distance with respect to the destination centers $X = X^{(n-k)}$ (observation X_i belongs to the class j_0 if $d(X_i; \overline{X}(j_0)) = \min_{1 \le j \le k} d(X_i, \overline{X}(j))$.

The studied agribusiness enterprises, based on the indicators of the state of financial system (its signals), were divided into four groups (Tab. 1).

The first group (cluster 2) included six companies with an equal level of risk and the best signals of the financial system. These are enterprises with significant investment potential, high profitability and other indicators with positive growth dynamics during 2016-2017. The second group formed a cluster 4, which has six stable companies. The indicators of the state of financial system of agribusiness enterprises show relatively acceptable dynamics of financial development, but unbalanced production activities for two years. Signals of the financial system on cost recovery,

lack of reserve capital indicate a threat of loss of financial stability in the event of the emergence of risk factors of financing.

Tab.1.

Distribution of agribusiness enterprises according to the indicators of the state of financial system

Group of enterprises with equal level of risk (1)	Group of enterprises with a stable level of risk (2)
$x_1^{\downarrow}, x_2^{\uparrow}, x_3^{\uparrow}, x_4^{\uparrow}, x_5^{\downarrow}, x_6^{\downarrow}, x_7^{\uparrow}, x_8^{\uparrow},$ $x_9^{\uparrow}, x_{10}^{\uparrow}, x_{11}^{\uparrow}, x_{12}^{\uparrow}, x_{13}^{\downarrow}, x_{14}^{\uparrow}, x_{15}^{\uparrow}, x_{16}^{\uparrow}$	$x_1^{\uparrow}, x_2^{\uparrow}, x_3^{\uparrow}, x_4^{\uparrow}, x_5^{\downarrow}, x_6^{\downarrow}, x_7^{\downarrow}, x_8^{\downarrow},$ $x_9^{\uparrow}, x_{10}^{\downarrow}, x_{11}^{\uparrow}, x_{12}^{\downarrow}, x_{13}^{\uparrow}, x_{14}^{\downarrow}, x_{15}^{\uparrow}, x_{16}^{\downarrow}$
Group of enterprises with a shaky risk (3)	Group of enterprises with high risk (4)
$x_1^{\uparrow}, x_2^{\downarrow}, x_3^{\uparrow}, x_4^{\uparrow}, x_5^{\uparrow}, x_6^{\downarrow}, x_7^{\downarrow}, x_8^{\downarrow},$ $x_9^{\downarrow}, x_{10}^{\uparrow}, x_{11}^{\uparrow}, x_{12}^{\downarrow}, x_{13}^{\uparrow}, x_{14}^{\downarrow}, x_{15}^{\downarrow}, x_{16}^{\downarrow}$	$x_1^{\uparrow}, x_2^{\downarrow}, x_3^{\downarrow}, x_4^{\downarrow}, x_5^{\uparrow}, x_6^{\uparrow}, x_7^{\downarrow}, x_8^{\downarrow},$ $x_9^{\downarrow}, x_{10}^{\downarrow}, x_{11}^{\downarrow}, x_{12}^{\downarrow}, x_{13}^{\uparrow}, x_{14}^{\downarrow}, x_{15}^{\downarrow}, x_{16}^{\downarrow}$

Source: author's research

Cluster 3, which brings together ten companies and characterizes the decline in the stability of their financial development, forms a vulnerable group.

In addition, these enterprises with existing production facilities have a high degree of concentration of attracted financial resources, including the share of long-term loans. In the context of the financial crisis, these signals correspond to the unstable state of solvency of agribusiness enterprises, due to the high sensitivity to the influence of external macro- and micro-exposures. However, for the relative profitability of enterprises there is an opportunity to cover operating expenses. The last group (cluster 1) (a high risk or lost stability) has three enterprises which activities are characterized by significantly weakened indicators of the state of financial system (indicators below the limit or regulatory, which tend to decline over two years), the high degree of wear of the main means and operating profitability. This grouping provided the search for causes of destabilization of the financial system in the investigated enterprises. The study of the influence of each risk factor relative to the level of the state of financial system of a certain group of enterprises is presented in Tab. 2.

The risks associated with changing the external macro-profile are combined factors that demonstrate the lack of a systemic link between government agricultural financing programs and the majority of enterprises agribusiness.

Tab.2.

Estimation of variants of multifactorial risk in the financial system of agribusiness enterprises

The risk zone	Activation, system solution	Expert assessments			Investigated enterprises		
		Criteria of similarities	*Cum.* %	$C_{coherence}$	Criteria of similarities	*Cum.* %	Average value
Exterior macroenvironment	BF1× SF1 $\lambda_1 a_1 \in R_1 \in B$	$Y_1^1(\lambda_1 a_1)$	18.2	0.44	$Y_1^1(\lambda_1 a_1)$	15.9	0.28
		$Y_2^1(\lambda_1 a_1)$	28.4	0.38	$Y_2^1(\lambda_1 a_1)$	28.6	0.25
	BF1× SF2 $\lambda_2 b_1 \in R_1 \in B$	$Y_1^1(\lambda_2 b_1)$	16.4	0.38	$Y_1^1(\lambda_2 b_1)$	15,1	0.33
		$Y_2^1(\lambda_2 b_1)$	18.6	0.35	$Y_2^1(\lambda_2 b_1)$	22.6	0.32
	BF1×SF3 $\lambda_3 c_1 \in R_1 \in B$	$Y_1^1(\lambda_3 c_1)$	14.5	0.48	$Y_1^1(\lambda_3 c_1)$	20.9	0.35
		$Y_2^1(\lambda_3 c_1)$	24.7	0.38	$Y_2^1(\lambda_3 c_1)$	33.5	0.33
	BF1× SF4 $\lambda_4 d_1 \in R_1 \in B$	$Y_1^1(\lambda_4 d_1)$	20.8	0.39	$Y_1^1(\lambda_4 d_1)$	19.7	0.33
		$Y_2^1(\lambda_4 d_1)$	30.9	0.28	$Y_2^1(\lambda_4 d_1)$	25.8	0.30
The inner environment	BF2× SF1 $\lambda_1 a_2 \in R_2 \in B$	$Y_1^2(\lambda_1 a_2)$	17.4	0.36	$Y_1^2(\lambda_1 a_2)$	11.8	0.29
		$Y_2^2(\lambda_1 a_2)$	27.9	0.33	$Y_2^2(\lambda_1 a_2)$	17.2	0.27
	BF2× SF2 $\lambda_2 b_2 \in R_2 \in B$	$Y_1^2(\lambda_2 b_2)$	14.8	0.42	$Y_1^2(\lambda_2 b_2)$	24.6	0.28
		$Y_2^2(\lambda_2 b_2)$	26.9	0.33	$Y_2^2(\lambda_2 b_2)$	35.8	0.26
	BF2× SF3 $\lambda_3 c_2 \in R_2 \in B$	$Y_1^2(\lambda_3 c_2)$	18.3	0.31	$Y_1^2(\lambda_3 c_2)$	14.1	0.28
		$Y_2^2(\lambda_3 c_2)$	28.2	0.38	$Y_2^2(\lambda_3 c_2)$	23.8	0.28
	BF2× SF4 $\lambda_4 d_2 \in R_2 \in B$	$Y_1^2(\lambda_4 d_2)$	19.6	0.42	$Y_1^2(\lambda_4 d_2)$	16.1	0.36
		$Y_2^2(\lambda_4 d_2)$	30.7	0.39	$Y_2^2(\lambda_4 d_2)$	29.5	0.34
External microenvironment	BF3× SF1 $\lambda_1 a_3 \in R_3 \in B$	$Y_1^3(\lambda_1 a_3)$	18.9	0.38	$Y_1^3(\lambda_1 a_3)$	13.7	0.30
		$Y_2^3(\lambda_1 a_3)$	26.1	0.31	$Y_2^3(\lambda_1 a_3)$	21.9	0.29
	BF3× SF2 $\lambda_2 b_3 \in R_3 \in B$	$Y_1^3(\lambda_2 b_3)$	22.3	0.37	$Y_1^3(\lambda_2 b_3)$	18.8	0.35
		$Y_2^3(\lambda_2 b_3)$	34.9	0.45	$Y_2^3(\lambda_2 b_3)$	31.1	0.32
	BF3× SF3 $\lambda_3 c_3 \in R_3 \in B$	$Y_1^3(\lambda_3 c_3)$	15.2	0.38	$Y_1^3(\lambda_3 c_3)$	16.1	0.39
		$Y_2^3(\lambda_3 c_3)$	20.9	0.35	$Y_2^3(\lambda_3 c_3)$	28.2	0.25
	BF3× SF4 $\lambda_4 d_3 \in R_3 \in B$	$Y_1^3(\lambda_4 d_3)$	11.4	0.29	$Y_1^3(\lambda_4 d_3)$	23.8	0.35
		$Y_2^3(\lambda_4 d_3)$	19.8	0.28	$Y_2^3(\lambda_4 d_3)$	37.5	0.31

Source: author's own calculations

This factor has a high matching factor ($C_{coherence} = 0.39$, $Cum. = 20.8\%$), which is formed in the plane of separation of a significant proportion of enterprises from the implementation of the strategy and state agricultural development programs, which forms «60% of the consumption fund and

provides employment». The coefficient of coherence of external macro-risks relative to the financial system, the value of which equals 0.28, describes the parameters of the restriction on the formation of financial resources of agribusiness enterprises by attracting external borrowings in the financial market, inflation rates, and the cost of loans. It should be noted that the financial crisis of 2016-2017 has had a lesser impact on lending to large agribusiness enterprises (agroholdings), the production process of which includes the stages of harvesting, storage, processing and export of agricultural products. For example, for small and medium enterprises in 2017 in general, it became crucial in the sense of continuing existence due to reduced funding, the growth of price disparity and high taxes.

For enterprises of the first group with equal level and the best signals of the financial potential, as well as the two groups – with a stable level of risk, indicators of the state of financial system, which indicate a relatively acceptable dynamics of financial development, were more important than predictable tendencies of the domestic financial market and the inflation rate ($C_{coherence}$ = 0.43; 0.32). Concern is caused by possible decrease of market value of enterprises, loss of financial resources due to reduction of investment projects, new wave of redistribution of property in agribusiness.

Internal risks have formed the main factors – the possibility of covering production costs (compared to the amount of social expenditures) ($C_{coherence}$ = 0.42) and limiting the parameters of the formation of financial resources at the expense of domestic sources ($C_{coherence}$ = 0.39). The first factor is associated with a decrease in current costs, due to reduced salary and material consumption of products. It is believed that this can only be achieved by increasing productivity, introducing innovative technologies into production, and thus creating an effective material base for the investment attractiveness of enterprises and financing their activities. The second factor is caused by the shortage of own current assets, which, according to the expressed position of specialists-agrarians, is complicated by the achievement of break-even production ($C_{coherence}$ = 0.36), which is relevant for all groups of agribusiness enterprises. According to experts, the prospect of this factor is disappointing, as the formation of financial reserves at the expense of their own sources will depend directly on the lack of external financing.

Risk factors act as an unordered set of features that collectively reveal and formalize the financial paradigm. Moreover, the factor events of the external and internal environment in the field of managerial influence are integrated with the risk-set, and thus, the phenomenon of multivariate risk situations. The risks identified by the classification criteria are analyzed from the standpoint of information security, depth of research and

developed system of indicators of evaluation. The interaction of heuristic procedures for assessing risk factors creates a plurality of flowcharts of their combined solution in constructing predictive models [16, p. 49].

Forming lines of measuring the risk in the financial system allowed of the agribusiness enterprises to use quantitative and qualitative characteristics without limiting their possible relationships to bring alignment asymmetry of financial losses, and as a result, provide the most promising area of information processing through a combination of methods of multivariate analysis of factors. This is especially true for the system of exchange of credit information, when selecting indicators of the state of financial system of business entities in the field of agriculture. Large-scale research should become the basis for financial monitoring, development of financial forecasting systems. Participation in independent expert research and the position of agribusiness enterprises should be recognized at system of state strategic management by indicators of the sector-specific development benchmarks.

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6.2. FINANCIAL INSTRUMENTS FOR THE IMPACT ON THE DEVELOPMENT OF BUSINESS ENTITIES

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The impact on the development of the national economy and its individual entities is carried out through financial instruments based on the relevant structural elements of the financial mechanism. The combination of the elements of the financial mechanism is its "design", which is activated by setting the quantitative parameters of each element, that is, the definition of rates and rates of withdrawal of funds, the volume of funds, the level of expenditures, etc. The purpose of the financial mechanism ultimately comes down to the financial support and financial regulation of economic and social processes in the state.

Based on the systematization of different approaches to the definition of the structure of the financial mechanism, taking into account the specifics of the functioning of agrarian enterprises, in the financial mechanism of sustainable development of agrarian enterprises. Seven main elements can be distinguished: the subsystem of financial policy, financial methods, financial levers, legal, normative and informational support, financial policy, as can be seen from the structure of the financial mechanism proposed by us. In this case, the financial mechanism operates effectively if all its constituent parts function. However, the state can provide them with financial policy [1].