UDC 338.27

**Solovyova N.I.**
*Doctor of Economics,*
*Professor of Management and Administration*
*Kherson State University*

**Shymchenko N.O.**
*Lecturer, Department of Economics*
*Kherson State University*

# FEATURES OF PREDICTED ASSESSMENT OF INVESTMENT RISKS IN THE AGRICULTURAL SECTOR

**Statement of the problem.** The problem of predicting the investment at the macroeconomic level accepted viewed from the perspective of research investment climate, ie set of political, economic, legal, social, housing, and other factors to determine the degree of risk capital and the ability to use them effectively.

Among the conditions which prevent the increase of the investment potential of agricultural businesses in Ukraine are defined: an outdated system of technical regulation and certification, and extent of government control, excessive bureaucratic interference in economic activities, a high proportion of informal sector (40-70 %).

But in our opinion, is accompanied by a numbered extended transition process, carried out at the first wave of foreign direct investment, encouraged privatization of state assets and the infusion of foreign capital into the financial sector. Thus, according to statistics, the agricultural sector in 2012 compared to previous years, the share of domestic investment grew by only 0.5 %, while foreign direct investment at the end of 2012 accounted for about 1.7% of total foreign direct investment in Ukraine.

In addition, there are a number of factors, which reduces the flow of investment in agricultural sector, among which is one of the biggest risk. Therefore, the research priorities include the analysis and comprehensive evaluation of investment risk in the agricultural sector.

**Analysis of recent research and publications.** Scientific and practical problems were predicting investment in terms of attention of scholars such as I. Lukin, I.A. Blank, V. Geets, V.I. Golikov, T. Matsybora, T. Lunin, V. Alexandrov, I.T. Balabanov, P.D. Polovinkin, M.F. Kropyvko [1,3,4,5,6,8 ]. Although in recent years, domestic and foreign researchers examined issues of the evaluation of risks and the effectiveness of investments N.B. Savina (economic evaluation and prediction efficiency investments) [9], O. Nedosekin (methodological foundations of financial modeling) [7], A. K. Kamalyan (decision making under risk) [2] and others, however, were scarcely explored issues multivariate prognostic assessment of investment risk agricultural sector based on methods of simulation, expert studies, clearly set-descriptions and more. Require new solutions to analyze informal settings state control of the economy, the introduction of methods of system analysis and design process in an integrated investment forecasting.

**Problem.** The objective of this study is the need to justify the specific methods of multivariate prognostic assessment of investment risk in the agricultural sector.

**The main material of the study.** Inability, the inability or unwillingness of new businesses make the right decisions under risk and uncertainty to a large extent affected the efficiency of their operations, but also by the instability of companies, one of the barriers to investment flows.

Scientific analysis of the behavior of systems and methods of decision making under risk ensures the creation of progressive and flexible economic structures, determines the stability of their operations and improves the efficiency of management. In this regard, it is necessary not to avoid risky situations and refuse to accept risky decisions, but rather to examine and analyze the risk factors and seek to manage them.

Analysis and prediction of risk will be more accurate if sufficient input data. However, in many cases, forecasting centers or actual investors do not have such amount of information in order to objectively assess the probability of risk, and this is especially true for the agricultural sector. In such a situation will be given a particular variant, based on judgments about the possibility of alternatives with varying subjective probability [2].

The problem of deciding on the choice of the best alternative considerably complicated by the presence of a large number of factors influence, most of which are described by qualitative parameters. Therefore, the most effective in identifying alternative scenarios is the use of making decisions based on expert assessments and fuzzy logic. Model structure of choice alternatives based on the criteria of the advantages and limitations is done by constructing a multilevel hierarchy, where the top element is the objective of the decision (target program), and other factors present level of achievement. The set of criteria $\tilde{N}_i = \{x, \mu_{C_i}(x) \| i = \overline{1,m}, x \in X$ and the set of constraints $Y_\alpha = \{x, \mu_{Y_\alpha}(x) \| \alpha = \overline{1,n}, x \in X$ alternative form X and intersect forming a set of alternatives $V$: $V = (\bigcap_{i=1}^{m} C_i) \bigcap (\bigcap_{\alpha=1}^{n} Y_\alpha)$, with membership function sets: $\mu_V = \{\mu_{C_1} \in \mu_{C_m} \wedge \mu_{Y_1} \in \mu_{Y_n}\}$.

It would seem logical to highlight the basic approach to predictive evaluation of investment risk application point chances and probability distribution of possible scenarios of events that will affect the outcome. The use of subjective probability implies the need axiological verifikuvaty probabilistic model proposed expert is to explore the cognitive activity and the expert himself.

Probabilities do not give any information on how they are received, unless prevented additional qualitative considerations on the principle of probabilistic assessment. One of these principles is the principle of maximum entropy, which does not ensure monotonicity criterion desired effect. The principle of conditional probability estimates Fishburn only puts forward the idea destination point estimates of probabilities that satisfy the maximum likelihood criterion, but there is no proof of completeness chosen field scenarios. Everything leads to that of scenario - probabilistic methods of analysis of risk factors, including investment, starting to play out.

In their place come clearly set-probabilistic approaches are free from problems and axiomatic justification of the choice probability scales, as well as containing all possible scenarios. For example, the triangular fuzzy number embraces all the numbers in a certain range, but each value in the interval characterized by a certain degree of belonging to a subset of a

triangular number. This approach allows us to generate a continuous range of scenarios for each parameter prediction. In addition, the fuzzy - set approach takes into account the qualitative aspects of the factors that have an exact numerical evaluation. It is possible to combine in assessing the quantitative and qualitative features, which dramatically increases the level of adequacy of the methods used [7].

Speaking of investments in the agricultural sector, it should be noted that planning major cash flows (payments and operating flow stream of revenues) not be accurate because it cannot be complete certainty about the future of the market: prices, output, prices of raw materials and other monetary cost parameters of the medium in the future may be very different from the present.

Investment risk in the agricultural sector is complicated by the natural biological agents that could act as force majeure and those in need of additional cash expenditures, or may disrupt the investment process. The investor will never have a completely full risk assessment, since the number of varieties of the environment has always exceeded management capabilities.

At the same time, the investor should make efforts to improve their knowledge and try to measure the riskiness of their investment decisions as the project design stage and during the investment process. If the risk will increase to unacceptable values, the investor will proceed blindly.

Assessment of investment risk is directly related to the way information describing uncertainty of input project. If the input data are probabilistic description, the investment risk indicators also appear as random variables with their implicative probability distributions. But the less statistically valid one or more options than less informational context of evidence about the state of the described market conditions and lower activity levels of intuitive expert, the less can be justified using any types of probability in investment analysis.

An alternative way to account for uncertainty - minimal approach, where the expected effect is estimated by the formula of Hurwitz option agreement λ:

$Eav=(1- \lambda)E_{min}+ \lambda E_{max}$,

where $E_{av}, E_{min}, E_{max}$ – expected, the minimum and maximum efficiency factor.

When λ=0 as a basis when deciding chosen the most pessimistic assessment factor to minimize the resulting damage [7].

Using the theory of fuzzy sets, provided that all the parameters of the investment risk «blurred», their exact value is unknown, then as a rising data should be used triangular fuzzy numbers which model expressions of the type «parameter A is approximately equal to Ā and is uniquely in the range [Āmin, Āmax]» [7]. Here is an example using the above stated theory and the known formulas of pure modern investment value (NPV), internal rate of return (IRR), Profitability Index (PI): The results of the financial analysis of the obtained triangular, symmetric interval estimate NPV = (-40, 40, 120) or NPV = 40 ± 80 thousand USD. Determine the risk of the project: λ = NPV / Δ, λ = 40 / (120-40) = 0.5. The value of the parameter λ falls in the interval (0.44, 1], which is defined as the amount of acceptable risk and is less than 10 % (7.7%), while the interval (0.25, 0.44] - marginal risk (0, 0.25] - unacceptable risk to the project.

It is known that the risk factors that are random set of attributes projected background that allows you to fully analyze and disclose the problem of assessing investment risk. Note that the integration of risk factors internal environment in outer space with a complex system of its own risks, which are constantly changing, suggests that the multifactorial, multivariate and dynamic risk situations to be analyzed.

Such an analysis requires the involvement, in addition to these, many other methods and their combination. Assessment of internal environment of the agricultural sector should apply a combination of techniques of data mining, fuzzy sets, mathematical programming. Connections to the external and internal environments, it makes sense to explore using the methods of extrapolation factors, the use of gaming models, etc. Only this configuration provides methods to analyze system dynamic multivariate investment risk.

**Findings from the study.** This study leads to the following conclusions:

1. Evaluation of investment risk in the agricultural sector is an estimate of the possible extent of adverse events in the investment process, which may occur at any time and foreseeability of events given by the corresponding membership function of fuzzy numbers is known or determined by special methods.

2. The approach is based on ambiguity, eliminating defects and minimax probability approaches related to the consideration of uncertainty. Thus, forming a full range of possible scenarios of the investment process, the decision is made not by two, but for all aggregate estimates of risk factors as a result of project performance is not an indicator of a point, but a pitch interval values with their distribution expectations.

3. One of the successful methods for building a complex model prediction and assessment of investment risk is the method of hierarchy, but subjective choice of parameters estimation and evaluation of advantages over this method limits the hierarchical construction of the system of risk assessment and decision making, as well as the dependence of the individual subsystems.

4. The most effective and promising approach to the treatment of information on prognostic assessment of investment risk is a combination of different methods of multivariate analysis, which is especially important for processing the results of heuristic research. These heuristic methods are used to solve the most complex problems under uncertainty arising from lack of information or instability development.

**BIBLIOGRAPHIC LIST :**


1. Економічні дослідження (методологія, інструментарій, організація, апробація) : навч. посіб. / В. М. Геєць, А. А. Мазаракі, О. П. Корольчук та ін. – К. : КНТЕУ, 2010. – 279 с.
2. Камалян А. К. Управление рисками в сельском хозяйстве// Американский опыт развития сферы агробизнеса и экономического развития: сборник научных статей участников «Программы обмела профессорско-преподавательскими составами». – Вашингтон, США, июль-декабрь 1998 г., 1999. – С. 1–14.
3. Кравченко Т. К. Инфокоммуникационные технологии управления предприятием: учеб. пособ. / Т. К. Кравченко, В. Ф. Пресняков. – М. : ГУ ВШЭ 2003. – 272 с.
4. Кропивко М. Ф. Кластерний підхід до управління сільським розвитком / М. Ф. Кропивко // Економіка АПК. – 2008. – № 5. – С. 55–58.
5. Лукінов І. І. Вибрані твори : у 2-х кн. / І. І. Лукінов. – К. : ННЦ ІАЕ, 2007. – Кн. 2. – 794 с.
6. Мацибора Т. В. Іноземні інвестиції в АПК України : моногр. / Т. В. Мацибора. – К. : ННЦ ІАЕ, 2008. – 186 с.
7. Недосекин А. О. Простейшая оценка риска инвестиционного проекта // Современные аспекты экономики. – 2002. – № 11.
8. Перехідна економіка / В. М. Геєць, Є. Г. Панченко, Е. М. Лібанова та ін. / За ред. В. М. Гейця. – К. : Вища шк., 2003. – 591 с.
9. Савіна Н. Б. Проблеми вибору інвестиційних проектів в умовах ризику // Вісник Рівненського державного технічного університету: «Сучасні проблеми обліку, аналізу та фінансів». – Рівне, 1999. – Вип. 2. – Ч. 2. – С. 214–219.