DETERMINATION OF THE LEVEL OF RISKS IN INVESTMENT PROJECTS USING ECONOMETRIC MODEL

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ABSTRACT
Particular study of the effective use of investments, including foreign investments, on technical and technological modernization of enterprises and diversification of products in the conditions of modernization of the economy, ensuring the competitiveness of manufactured products and services in the world market is one of the most important tasks of today.
Today, further reforming and liberalizing the Uzbek economy should accelerate the improvement of the investment climate in the industrial sector, especially with the development of the private sector.

KEYWORDS: investment, investment project, degree of uncertainty, risk Analysis of Topical Literatures

INTRODUCTION
In the investment process, investors try to anticipate the returns on their investment and create the necessary methods. The emphasis is on the impact of internal and external risks. Because there is a big risk in the face of big profits. Therefore, a number of mathematical expressions are used in the assessment and prevention of potential risk factors. Dispersion and mean squared deviation values are an important factor in risk assessment.
When calculating the risks of investing in the selected project, the dispersion and standard deviation formula for each production can be written as follows:

$$\sigma_i^2 = \sum_{i=1}^{m} (q_{ij} - q_i)^2 \cdot P_j, \tag{1}$$

$$\sigma_i = \sqrt{\sum_{i=1}^{m} (q_{ij} - q_i)^2 \cdot P_j}, \tag{2}$$

in this σ_i^2 - risk levels or dispersion of the investment efficiency of each production, σ_i - i the level of risk or the standard deviation of the future efficiency of investments in the production, P_j - in the future j - likelihood. q_i and From the found values, only one type of production investment plan can be substantiated.
The efficiency dispersion of the total investment fund can be found in the following relation:

$$\sigma_p = \sqrt{\sum_{j=1}^{m} P_j (q_{pj} - q_p)^2}, \tag{3}$$

In addition, the investor will invest his or her own costs, either at higher risk, or at less risky production. In this regard, let us consider the terms of the relationship between dispersion, half-dispersion and expected income.
If the dispersion is equal to half the dispersion and the condition <q is met, the income distribution is symmetric and the gain is () less than the expected return (). This is half the total risk. At the same time, the dispersion and the mean squared deviation allow estimation of the degree of risk. If the dispersion is greater

than half the dispersion, the distribution of income is left asymmetric if the condition is met, and its dispersion risk is reduced.

If the dispersion is less than half the dispersion and the condition is met, then the income distribution is asymmetric to the right, and the risk of dispersion increases.

Generally, as an investor prepares to quit a particular type of production or replenish his investment fund, he or she can use the risk selection function to justify spending on its most productive option. In addition, although the above formulas allow for the prediction of the effect of the risk on the basis of the data, they are not sufficient to accurately estimate the risk. In order to be more precise, we need to find the mathematical expression-variance coefficient. The variance coefficient is expressed by the ratio of the mean squared deviation to the expected return value: $\omega = \frac{X_i}{q}$

Under this formula, the investor will have a clear idea of which financial transaction is less risky.

It should be noted that if a total investment fund invested in an enterprise has two or more productions, a standard deviation of its future effectiveness is used to estimate the total investment fund's risk. In this $q_{ij} = \left(\frac{Y_{ij}}{P_{ij}} - 1 \right) \cdot 100$ The formula for taking into account the formula is the risk of a common investment fund with n type of production, which can be calculated as follows:

$$\sigma_p = \sqrt{\sum_{j=1}^{m} P_j (q_{pj} - q_p)^2} \quad (4)$$

Suppose there are two types and productions in the general investment fund of a selected project. Then, using the above formula, one can estimate the total investment fund risk as follows:

$$\sigma_p = \sqrt{\sum_{j=1}^{m} P_j [\ (\upsilon_1 q_{1j} + \upsilon_2 q_{2j}) - (\upsilon_1 q_1 + \upsilon_2 q_2)\ ]^2}$$

By changing the expression below the root, we get: $\sigma_p = \sum_j P_j [(\upsilon_1 q_{1j} + \upsilon_2 q_{2j}) - (\upsilon_1 q_1 + \upsilon_2 q_2)\ ]^2 =$

$$= \upsilon_1^2 \sum_j P_j (q_{1j} - q_1)^2 + \upsilon^2 \sum_j (q_{2j} - q_2)^2 P_j + 2\upsilon_1 \upsilon_2 \sum_j P_j (q_{1j} - q_1)(q_{2j} - q_2) \quad (5)$$

It can be seen that the dispersions of productive capacities of 1, -2,-type:

$$\sigma_1^2 = \sum_j P_j (q_{1j} - q_1)^2 ; \qquad \sigma_2^2 = \sum_j P_j (q_{2j} - q_2)^2 \quad (6)$$

appears.

The mathematical expectation of the expected increase in expected return on investment in two types of production, along with the expected future return on investment, is

$$\sigma_{12} = \sum_j P_j (q_{1j} - q_1)(q_{2j} - q_2) \quad (7)$$

can be found in the formula. This magnitude represents the closeness of the links between the efficiency of investment in both types of production. In terms of (6) - (7), the risk of a common investment fund in which there are two types of investment is:

$$\sigma_p = \sqrt{\upsilon_1^2 \sigma_1^2 + \upsilon_2^2 \sigma_2^2 + 2\upsilon_1 \upsilon_2 \sigma_{12}} \quad (8)$$

This formula not only identifies the risks of investing in two types of industries, but also determines the effectiveness and covariance of each type of production. Because the covariance assumes both negative and positive values, it is more convenient to use correlation coefficients to estimate the intensity of productive relationships. By definition, the correlation coefficients of the two random magnitudes are expressed as the ratio of the standard deviation of these magnitudes,

$$\rho = \frac{\sigma_{12}}{\sigma_1 \sigma_2} \quad \text{бунда} \ -1 \leq \rho \leq 1 \tag{9}$$

The closer the correlation coefficient is, the more efficiently the two industries are connected, and the closer the value is to zero, the less the bond. If the correlation coefficient is negative, the increase in the efficiency of the first product results in the reduction of the efficiency of the latter. Taking into account the correlation coefficient, the risk of investment in two types of production is as follows.

$$\sigma_P^2 = \upsilon_1^2 \sigma_1^2 + \upsilon_2^2 \sigma_2^2 + 2\upsilon_1 \upsilon_2 \sigma_1 \sigma_2 \rho_{12} \tag{10}$$

For example, it is possible to show that the risk of type 1 production is less than the risk of type 2 production, that is, <, in this case the investment risk is not less than the risk of each type of production. We check this conclusion for the 1st production. Using the correlation coefficient not more than 1, based on formula (9):

$$\sigma_{\text{P}}^2 = \upsilon_1^2 \sigma_1^2 + \upsilon_2^2 \sigma_2^2 + 2\upsilon_1 \upsilon_2 \sigma_1 \sigma_2 \rho_{12} \upsilon_1^2 \sigma_1^2 + \upsilon_2^2 \sigma_2^2 + 2\upsilon_1 \upsilon_2 \sigma_1 \sigma_2 \langle$$

$$\langle \upsilon_1^2 \sigma_1^2 + \upsilon_2^2 \sigma_2^2 + 2\upsilon_1 \upsilon_2 \sigma_1^2 = (\upsilon_1 + \upsilon_2)^2 \cdot \sigma_1^2 = \sigma_1^2$$

from this $\sigma_p < \sigma_1$ The ($\upsilon_1 \neq 1$ or $\upsilon_2 \neq 1$)

Therefore, the investment risk for two types of productions is smaller than the investment risk for large-scale production for profit.

Based on the above results, there is such orderly investment that its risk may be smaller than that of type 2 production. $\upsilon_2 = 1 - \upsilon_1$

(10) The investment risk to production from the relation given in the expression may be as follows:

$$\sigma_P^2 = \upsilon_1^2 \sigma_1^2 + (1-\upsilon_1)^2 \sigma_2^2 + 2\upsilon_1 (1-\upsilon_1) \sigma_{12} \tag{11}$$

Using this expression, we find that there is an investment that is less than the risk of type 2 production:

$\sigma_P^2 = \upsilon_1^2 \sigma_1^2 + (1-\upsilon_1)^2 \sigma_2^2 + 2\upsilon_1 (1-\upsilon_1) \sigma_{12} < \sigma_2^2$ from this

$$\upsilon_1^2 \sigma_1^2 + \sigma_2^2 - 2\upsilon_1 \sigma_2^2 + \upsilon_1^2 \sigma_2^2 + 2\upsilon_1 \sigma_{12} - 2\upsilon_1^2 < \sigma_2^2 \tag{12}$$

From both sides of the inequality X_2^2 Drop off and υ_1 <0 As for

$$\upsilon_1 (\sigma_1^2 + \sigma_2^2 - 2\sigma_{12}) < \mathbf{2}\, \sigma_2^2 - 2\sigma_{12} \ \textbf{from this} \ \upsilon_1 < \frac{2\sigma_2^2 - 2\sigma_{12}}{\sigma_1^2 + \sigma_2^2 - 2\sigma_{12}} \tag{13}$$

$$\textbf{As a result} \ \upsilon_2 = 1 - \upsilon_1 > 1 - \frac{2\sigma_2^2 - 2\sigma_{12}}{\sigma_1^2 + \sigma_2^2 - 2\sigma_{12}} = \frac{\sigma_1^2 - \sigma_2^2}{\sigma_1^2 + \sigma_2^2 - 2\sigma_{12}} > \mathbf{0} \tag{14}$$

The formulas (13) and (14) show that there are areas for changes in the investment structure, which may be smaller than the risks of each producer.

If there is a correlation coefficient, the investment risk is zero. Investments made by the investor will definitely work. To find the condition of such an effective investment, we equate the risk of expression (14) with: $\sigma_P^2 = \upsilon_1^2 \sigma_1^2 + (1-\upsilon_1)^2 \sigma_2^2 - 2\upsilon_1 (1-\upsilon_1) \sigma_1 \sigma_2 = 0$

From this, the form is replaced by:

$$\upsilon_1^2 (\sigma_1^2 + \sigma_2^2 + 2\sigma_1 \sigma_2) - 2\upsilon_1 (\sigma_2^2 + \sigma_1 \sigma_2) + \sigma_2^2 = 0 \tag{15}$$

This equation has only one solution.

$$\upsilon_1 = \frac{\sigma_2^2 + \sigma_1 \sigma_2}{\sigma_1^2 + \sigma_2^2 + 2\sigma_1 \sigma_2} \tag{16}$$

Now the structure of investments in the second production can be found as follows:

$$\upsilon_2 = 1 - \upsilon_1 = 1 - \frac{\sigma_2^2 + \sigma_1 \sigma_2}{\sigma_1^2 + \sigma_2^2 + 2\sigma_1 \sigma_2} \cdot = \frac{\sigma_1^2 + \sigma_1 \sigma_2}{\sigma_1^2 + \sigma_2^2 + 2\sigma_1 \sigma_2} \cdot \tag{17}$$

The investment risk of a particular project depends on the correlation of the efficiency of each type of production, which is expressed in (6.12) the value of the correlation coefficient and the diversification of the investor capital, taking into account the various investment opportunities that are expressed. The same conclusion applies to investment in n-type production.

Generally, the effect of diversification is a measure of the diversification of investments. Risk reduction through the choice of investment direction, that is, justification of the effect of diversification, is a classic summary of the theory of finding the most favorable investment climate, both scientific and practical.

RESULTS

Thus, in summarizing the above considerations, it is best to describe "Risk is a subjective assessment of objective uncertainty" and, if uncertainty is an irreversible quality of the market environment, "Risk is a quantitative characteristic of the possibility of loss."

In this case, the investment project risk is a possible deviation of future cash flows from the project, mainly due to external (legislation, market reaction to the product, competitors' behavior) and internal factors (competence of the enterprise employees, errors in determining the project characteristics). as a result of lack of information and asymmetry of information. Using these definitions, it is possible to list a number of ways to take risks in the analysis of investment projects (Figure 1).

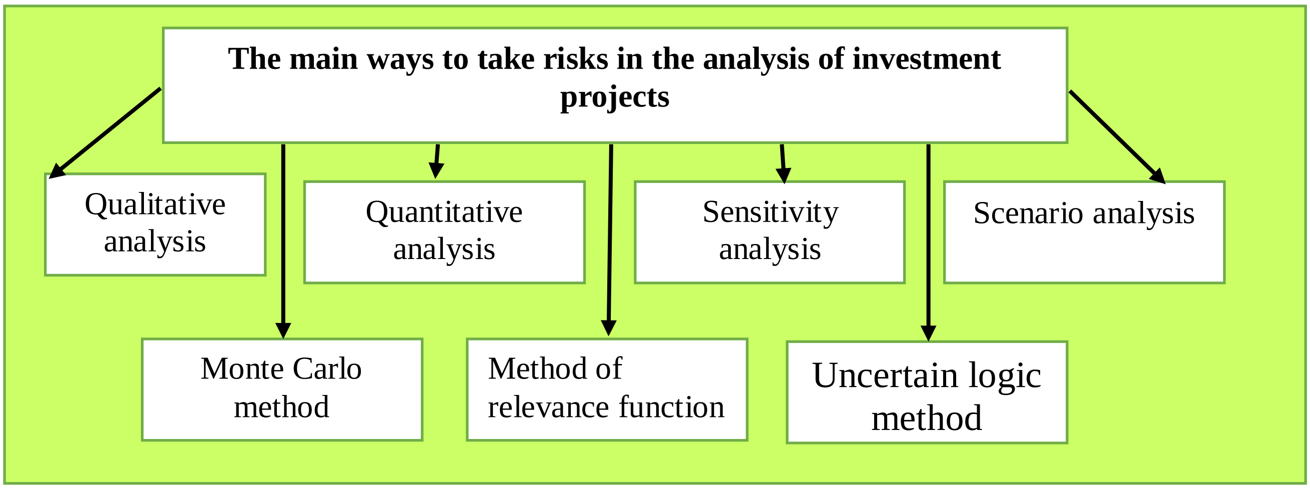

Fig 1. The main ways to take risks in the analysis of investment projects

According to the data presented in Figure 1, it is advisable to comment on each of the methods used to take risks in the analysis of investment projects.

Qualitative analysis.

The aim of the methods:

Topish Identifying specific types of project risks that affect the cash flow and possible causes of their occurrence.

These include expert evaluation and analogy techniques.

The advantages of these methods are:

♦ obvious results;

Langan identified risks can be used to develop recommendations to minimize them;

The downside of these methods is:

Miqd There is no quantitative assessment of risk.

Quantitative analysis.

The aim of the methods:

Belgilash Define a quantitative characteristic of the risks, and show the consequences for any investment project.

Risk scale:

♦ Dispersion, standard deviation, coefficient of variation in annual cash flow of the investment project, etc.

Sensitivity analysis.

The purpose is to determine the sensitivity of the criteria to the “consecutive - single” change of each variable.
Pros:
Sod ease of use;
♦ Visibility of results.
Disadvantages:
the hypothesis that one factor may be altered, while other factors are considered invariant.
Scenario analysis.
Objective: To assess the ineffectiveness of the project as a sum of negative NPV probabilities.
Pros:
Sod ease of use;
♦ Visibility of results.
Disadvantages:
Sub subjectiveism in determining probability for each scenario under consideration;
♦ Does not cover all possible development scenarios and scenarios.
Simulation Modeling (Monte Carlo Method)
Objective: Provides the distribution of project profitability using iterations, which is the average value and the amount of risk for a set of NPV values.
Pros:
♦ Conducts accurate and quantitative assessment of project risks;
Muvaffaqiyatli successfully combines other economic and mathematical methods and other methods of game theory and operation research.
The disadvantages are based on the following serious assumptions:
Bo'lmas irreplaceability of variables (their non-correlation);
♦ normal distribution.
Murakkab The complexity and the complexity of the calculations.
In the current globalization, development of the country's economy, ensuring continuity and continuity of production is the creation of competitive production. This is important in improving the quality, cost and competitiveness of the product and service industries.
According to the results of the study, increase of competitiveness of production and service is caused by its quality, high quality and low cost. In order to integrate these features into products and services, the economy must be equipped with new technology. This requires investment in economic sectors and their effective use. Effective use of investments in uncertainty conditions depends, first and foremost, on the correct allocation and direction of the economy.
Increasing the return on investment is based on probabilities. However, given that the theory of probability includes the interval [0; 1] and the coverage threshold, this reduces the degree of accuracy. In order to be clear in this regard, it would be advisable to introduce a theory of uncertain aggregation into the process, which in turn will allow us to achieve a certain reduction in inefficiency or deficit due to excessive investment in the sectors. Because the theory of indeterminate sets extends the interval (classical understanding) [0; 1] presented in the theory of probabilities. Also, intermediate values are not allowed in the normal set, except for the ambiguous set.
Since 1965, the theory of vague collections has been used in many fields and in many disciplines, including artificial intelligence, computer science, medicine, control technologies, decision-making, logic, management science, operations research, sample detection, robotics, and so on. The theory of this vague set can also be applied to the distribution and effective use of investments in economic sectors. In this regard, it is desirable to have a complete picture of the theory of vague collections. For this purpose, it is necessary to note the following as the basic concepts of the theory of vague collections.
Ноаниқ тўпламлар назариясидалингвистик кўрсаткичларни баҳолашда экспертлардан фойдаланиш тавсия этилади. “Лингвистик кўрсаткичларни биз табиий ёки сунъий тилнинг сўзлари ёки жумлаларидир”-деб атаймиз. Ушбу таърифдан келиб чиққан ҳолда, математик тил ёрдамида ифодалаб бўлмайдиган ўзгарувчилар, яъни уларга аниқ объектив миқдорий баҳо бериш мураккаб бўлган кўрсаткичлар деб ҳам айтиш мумкин

DISCUSSION & CONCLUSION

Based on the aforementioned uncertainty theory, it is necessary to distinguish between allocation of investments on the basis of specific conditions, based on the methods of intersectoral distribution of investments. It is noteworthy that expert evaluation of investment processes based on uncertain collections is recommended by experts. However, based on the results of the research, it is possible to express linguistic variables in quantitative values using statistical data on the existing sectoral distribution of investments.

To evaluate the distribution of investments in the economy, it is necessary first of all to determine the trend equation for changes in the volume of investment in the economy and GDP.

Dynamic alignment of their value is carried out in order to determine the average annual incremental increase in their value in terms of the dynamics of changes in investment and GDP. The most common methods of statistical study of trend in practice are: expansion of interval (period); sliding average; analytical smoothing.

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