

Analysis and Improvement of Methods of Management by Investment Risks

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Abstract: In the course of research the analysis which showed was carried out that each method of calculation of efficiency of investment projects in the conditions of risk, has the shortcomings. Therefore, the method of calculation of risks based on improvement of method of expert evaluations as it is one of the techniques most adapted for modern economic conditions was offered. The carried-out work will allow to make some specification of a method of calculation of risks at a stage of investment design.

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1. Introduction

In conditions of market relations problem of analysis and evaluation at the stage of investment planning is becoming increasingly independent significance as an important part of management theory and practice. Requirement for research in this area is not only actual, but also significantly increases during dynamic changes in the economic and social development of the country. Problem of measuring investment risk acquires emphasis in the industrial sector.

It should be noted that in the literature there are ambiguities in the interpretation of features, properties, and risk elements in the understanding of its content, the ratio of the objective and subjective sides. Diversity of opinion about the nature of the risk is explained by multidimensionality of this phenomenon. The best known are the following definition of risk:

1. Mazur I.I.: «Risk - potential numerically measurable possibility of adverse situations and their consequences in the form of losses, damages, scathe, for example - the expected profit, income or property, monies due to the uncertainty, that is a random change conditions of economic activity, adverse, including force majeure, the general decline in market prices, the ability to produce unpredictable results depending on the economic decision-making, action»[1];

2. Grabovyi P.G. and others: «The risk - the probability of losing part of company resources, shortfall revenue, or appearance of additional consumption as a result of the implementation of certain productional and financial activities»[2];

3. Stoyanova E.S.: «Risk - is the ability of adverse outcome, i.e. failure in obtaining expected profit of the investor»[3].

In contrast to the uncertainty the concept of

risk is subjective. Indeed, if the project can be realized in different circumstances, any participant evaluate how these conditions are different, so if there is uncertainty in the project, it is for all. At the same time, the same change in conditions of realization is one participant can assessed as significant and negative, and the other - as an insignificant and positive.

Thus, the risk is an event that may occur in conditions of uncertainty with a certain probability, with three possible economic results (as measured in economic, financial performance often):

- negative, i.e. damage, loss, concede;
- positive, i.e. profit, benefit, gain;
- zero (no damage, no benefits).

In this research, we comprehend a risk as «activities related to overcoming the uncertainty in the situation unavoidable choice, during which it is possible to quantitatively and qualitatively assess the probability of achieving the intended results, failures and deviations from the goal».

2. Methods.

Theoretical and methodological basis of the research were conceptual provisions set forth in the scientific works of Kazakh and foreign scientists by analyze the assessment of investment risks.

In the process of studying the problems of investment and risk assessment applied methods of dialectics and systematic approach, expert assessment, generalization, prediction, comparative, abstract logical, Economical and Mathematical, graphic and other methods of economic research.

Enough attention to the problem of risk analysis and assessment of the investment design was given in the works of foreign scientists economists, such as F.Dzh.Fabotstsi, T.D.Koggin, B.Kollinz, R. Kogler, U.F.Sharp, G.Dzh.Aleksander, D.V.Beyli,

D.P. Endryu, G.L.Sirkin, L.Krushvits, D.Sheffer, M.Shvake and others.

Significant contribution to the research of the risks of industrial sphere was made by Russian and Kazakh researchers, such as V.V.Sheremet, V.M. Pavlyuchenko, VD Shapiro, V.V.Mischenko, V.V. Kovalev, V.V.Ivanov, V.A.Lyalin, P.L.Vilensky, V.N. Livshits, S.A.Smolyak, A.A.Peresada, A.A.Smirnova, S.V. Onikienko, A.S.Shapkin, V.M.Anshin, U. Baymuratov, B.Sadvokasova, D.Zh.Rahmatullaev, A.M. Rahmetova and others.

The aim of the research is study the strengths and weaknesses of individual methods of investment analysis, identification of accounting problems of risk and uncertainty in decision-making on financing and implementation of investment projects, improving methods of evaluating the effectiveness of the investment processes of the enterprises of the production sphere considering risk.

The said purpose is concretized in the following major tasks:

1. Study of risk factors and uncertainties in the investment planning;
2. Examination of the evaluation methods of investment risks;
3. Analysis and identification of the main advantages and disadvantages of the individual methods of investment analysis;
4. Development of methodology for calculating the investment risk on the example of the production sector.
5. Improvement of management methods by investment risks.

3. Main part.

Evaluating the effectiveness of investment is the most important stage of making investment decision, the results of which depends largely on the degree of realization of investment objectives. In turn, the objectivity and reliability of the results are basically due to the methods used to analyze.

The basis of evaluation of the effectiveness of the investment project (IP) is a system of indicators and commensurate obtained effect from its implementation with investment costs. A key issue in this context is to compare cash flows (inflows and outflows), which is caused by factors such as time value of money, the instability of the economic situation (risks, uncertainties and crises), etc.

Searching for the optimal combination of risk and return of investment activity suggests the need to consider the action of many different circumstances that makes this task very difficult. Search for the optimal combination of risk and return of investment activity suggests the need to consider the action of many different circumstances that makes this task difficult enough.

In international standards of risk management [4] content management process is considered in several stages (Table 1).

Table 1. Approaches of international organizations to the content of the risk management process.

Content of the risk management process	Source
<ul style="list-style-type: none"> - determination of the internal environment; - appointment of goals; - definition of risk events; - risk assessment; - risk response; - controls; - information and communication; - monitoring. 	Integrated model of the Committee of Sponsoring Organizations of the Treadway Commission (Committee of Sponsoring Organization of the Treadway Commission, COSO)
<ul style="list-style-type: none"> - the strategic objectives of the organization; - risk assessment; - risk Report; - threats and opportunities; - decision-making; - risk management activities; - repeated reports about the risks; - monitoring. 	Risk Management Standard of Associations of European Federation risk managers, which is a joint research institute of risk management (IRM), Association of Insurance and Risk Managers in Industry and Commerce (AIRMIC) and the National Forum for Risk Management in the Public Sector (ALARM, 2002).
<ul style="list-style-type: none"> - definition of the environment; - identification of risks; - risk analysis; - risk assessment; - processing risks. 	Standard on Risk Management of Australia and New Zealand. standard AS/NZS 4360.
<ul style="list-style-type: none"> - setting the context; - definition of risk events; - risk analysis; - risk assessment; - processing risks. 	ISO/IEC 31010 Risk Management – Risk assessment guidelines

Identification, analysis and assessment of risks are one of the most important stages of the management process and serve as a basis for the development of management methods. In the world of investment management practice there are various methods of evaluation of investment projects in the conditions of risk and uncertainty, the most common methods should include the following:

- method of adjusting the discount rate (risk premium);
- method of certainty equivalents (veracity coefficients);
- break-even point;
- sensitivity analysis of performance indicators (NPV, IRR , etc.);
- method of scenarios;
- «Methods of game theory» (criterion MAXIMIN, criterion MINIMAX, etc.);
- construction of the «decision tree»;
- imitation modeling on Monte Carlo method[5].

Among the most extended methods to analysis and risk assessment are the following:

- methods of expert evaluations;
- methods of the rating assessment;
- checklists of risk sources;
- SWOT-analysis[6].

Detailed description of these methods is given in various books, so let's just more detail on the features and shortcomings of their practical application.

Name of methods	Advantages	Disadvantages
Method of correcting the discount rate	Simplicity of calculations that may be performed using Excel, as well as clarity and accessibility	1. Unable to get information about the degree of risk (possible deviations of results); 2. Dependence of the obtained results from the value of risk premium; 3. Increased risk in time with a constant coefficient that can hardly be considered correct, as many projects are characterized by risk in the early periods with a gradual decline to the end of their implementation
Sensitivity analysis	This method allows you to set answers to questions like: what will happen to the resulting value, if you change the value of some of the initial values. Hence its second name - analysis of "what-if" (what if analysis)	Sensitivity analysis procedure involves the simultaneous change of only one baseline, while the remaining values are considered as constants, so the main disadvantage of this method is the assumption that a change in one factor considered in isolation, whereas in practice all economic factors in various degrees correlated
Scenario method	In general, the method allows to obtain sufficient visual picture for different projects, and also provides information about the sensitivity and possible deviations	The disadvantage of this method is that it is limited to the consideration of multiple discrete outcomes, as well as the assumption that the deviation probability of each scenario are known in advance to the project managers. Actually evaluate these probabilities with sufficient reliability is difficult enough
Decision Trees	The method is applicable in the circumstances to make decisions based on available statistics	The disadvantage of this method is that the probability of a favorable implementation of each stage of the calendar are set by the project manager without risk-innovative project factors
Imitation modeling	Using a numerical risk assessment	The main problem of imitation modeling - is that this method even after the computational procedures do not provide a clear criterion for decision-making efficiency of the innovative project risk. Impossible to give answer the question about the sufficiency of project profitability for risk compensation.
Monte Carlo's method	This method can easily be implemented in an Excel. The significance of this method is due to the complexity of the design decisions, high volatility and uncertainty information in investment planning	The main difficulty when using the Monte Carlo method is the selection of an appropriate distribution for each market factor and estimation of its parameters. Another problem is the large investment of time and technical resources. In addition, hypothetical probability distributions may not match reality [7].
Abstraction pricing method	Abstraction pricing method assumes that the relationship between risk and return is multifunctional, and this is the main theoretical advantage of this method	In the framework of the method is not justified list of risk factors of the innovation project
Methods of rating evaluation	Risk measure according to this method is the production value of the probability of each factor on the losses value. Alleged versatility of this method for all types of innovative projects at least is doubtful. There are no restrictions on this method scale, project domain	Lack of a mechanism for determining the probabilities of adverse events for each risk factor [8].
Checklists of risks	Emphasis on the checklist, the savings in the risk assessment	This method will help us analyze the mistakes of the past and not to repeat them more. However, this method can only be used as a complement to the other method. The difficulty of this method lies in the formation of such a list and its correct interpretation [9].

Table 2. Advantages and disadvantages of risk assessment methods.

The analysis showed that each method of calculating the efficiency of investment project at risk condition, has its own drawbacks. Therefore, we want to offer a methodology for calculating risk, based on improving the method of expert estimations, since, in our opinion, it is one of the most adapted to the current economic conditions of methodologies. And complex risks are combining simple risks identified by complete list of disjoint events, each of them, in turn, is explored separately.

Set the notations: S_i - simple risk, $i = 1, \dots, n$; n - total number of investment project risks; Q_j - group of priority, $j = 1, k, k < n$; W_j - Simple risk weight on priority groups Q_j , $W_j > 0$, $\sum W_j = 1.0$; M_j - number of risks, included in the priority group Q_j ; Steps of calculation sequence:

1. Principle for the calculation is the assumption that the number of times the first priority outweighed the latter, ie:

$$\frac{W_1}{W_k} = f, \quad (1)$$

2. Weight of the lowest priority group is determined by the formula:

$$W_k = \frac{2}{[k(f + 1)]}. \quad (2)$$

3. Weight determination of other priority groups:

$$W_j = \frac{W_k [(k - 1)f + 1]}{k - 1}. \quad (3)$$

4. Weight determination of ordinary factors:

$$W_i = \frac{W_j}{M_j}. \quad (4)$$

for each prime risk entering the appropriate priority group. It means that all simple risks contended within one priority group have the same weight. If priorities of simple risks are not set, they all have equal weight: $W_j = 1/n$. The results of calculations presented in form of the table (Table 3).

Risks, $S_i, i=1, n$	Negative impact on profits	Group of priority, $Q_j, j=1, k$
S_1 -Rising fuel prices S_2 - Depreciation of fleet S_3 - Lack of working capital S_4 - Unforeseen costs due to inflation	The decline in profits due to higher prices Increased cost of repair The decline in profits due to working capital The increase o borrowings	Q_1
S_5 - The attitude of local authorities S_6 - Inadequate wages S_7 - Personnel Qualification S_8 - Solvency of consumers S_9 - tax increase	Costs of requirement performance staff turnover Reduction of rhythm, increased accidents decrease in profits decrease in clear profit	Q_2
S_{10} - Late delivery of components S_{11} - Dishonesty of contractor S_{12} - Depending on suppliers S_{13} -Disadvantages of design and survey works	Term increasing of input capacity, the payment of fines to the contractor The decline in profits due to higher prices The rising cost of construction, delay input capacity	Q_3

Table 3. Risks of implementing investment

Estimate of the probability of the risk investments are made by expert estimates method. For this work it is desirable to have at least three experts who are familiar with the problem. Experts may be the head of the organization, employee administration of the territory who have deal with economic issues, and other qualified specialists. Each expert which working separately, provided by a list of the project risks and is asked to estimate the probability of risk occurrence on the rating system: 0 - risk is considered as insignificant; 25 - the risk is

likely not implemented; 50 - the occurrence of events of a certain conclusion can be drawn; 75 - Risk is likely to manifest itself; 100-risk certainly realized. Expert assessment are analyzed for their consistency, which is performed by the following rules[10].

Rule 1: $\max |A_i - B_i| \leq 50$; $i=1, \dots, n$ (where A_i and B_i - estimation of two experts of i -the risk) - means that the maximum difference between the estimates of experts on any factor must be less than 50. Comparisons are made in module («plus» or «minus» is not considered). This rule is intended to eliminate the unacceptable differences in the assessment of the probability of an individual risk.

$$\sum \frac{|A_i - B_i|}{n} \leq 25$$

Rule 2: — directed to estimation agreement of experts on the average. It is used after the rule 1. For calculations of divergence estimates are summed in module and the result is divided by the number of ordinary risks of the investment project. Expert estimations are not recognized conflicting if it is obtained value which not exceed 25.

Total must be done three (with three experts) pairwise comparisons of opinions for the 1st and 2nd , 1st and 3rd , 2nd and 3rd of experts. If between the views of experts found contradictions (default rules 1 and 2), they are discussed at meetings for build consensus position on a particular issue.

Grade determination of all project risks by the

$$R = \sum W_i P_i$$

formula: where P_i - average probability of the i -th risk . Payment is represented graphically. Thus, the results of quantitative analysis carried out by this method, in our view, allow to identify the most significant risks of simple invested funds, as well as give them a generalized assessment.

4. Conclusion. Thus, the analysis of the traditional methods of evaluating the effectiveness of the investment project under risk and uncertainty indicates their theoretical significance, but limited by practical applicability in analyze the effectiveness and risks of the investment project because of the large number of simplifying modeling assumptions distort the real impacts on the project. Analyzing the situation made following conclusions:

1. Most methods only formalizes the uncertainty as probability distributions that are based on subjective expert estimates that a very large number of cases is clearly idealized. Thus, the uncertainty in these methods, regardless of its nature, is identified with the accident, and therefore they do

not allow to take into account all the possible variety of uncertainties that affect on the investment project.

2. Using a probabilistic approach to investment analysis is hampered reasons related to the lack of statistical information or small (inadequate) sample size for some of the parameters of the project, which is due to the uniqueness of each investment project. Accuracy of the estimation of probability (objective and subjective) depends on many factors, from the quality of statistical information and finishing quality peer review and therefore the quality of the resulting efficiency and risk assessment is too dependent on them, which served to increase confidence derived from it and the forecasts decisions.

3. For the most significant risks in the investment planning should be assessed against the risk of loss: material (loss of objects in kind); labor (loss of working time), financial (through direct monetary damages: fines, payments for overdue loans, non-payment of debts); wasted time (if the process activity is measured in hours, days) special loss (tied to damage to human health and life, the environment, with a reduction in the level of business activity, payment discipline).

4. At the end of the analysis it is advisable to determine the probability of the risk, the specific weight and give an overall assessment of risk, the type of risk areas of the organization in the implementation of investment.

The work give a allowance to make a refinement methodology for calculating risks in investment planning stage, lies in the fact that the risk assessment of the investment project of the industrial enterprise is not only simple risk analysis and measurement of the overall risk of the investment, but also in the subsequent development of effective measures for its compensation and reduction.

As a result, we emphasize that in economic practice, especially in the industrial sector, the most effective result from the realization of investments are only obtained when the integrated using of different methods of risk reduction. Combining them with each other in various combinations, can be achieved even at the stage of designing the optimal investment ratio between the level of risk reduction investment project and the required level of additional investment costs.

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