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METHODS OF EVALUATING INVESTMENT RISKS

The approaches to the formation of the investment risks essence, their classifying features and the methods of their assessment are summarized. The basic constituents of the investment risk nature as an economic category are substantiated. The main methods of evaluating investment risks are analyzed. Particular attention is paid to the intuitive part of the process of making investment decisions. The major factors affecting the choice of the investment risks analyzing methods are singled out. The main indicators used to assess the potential value of financial losses from investment activities are generalized.

Key words: investment risks, diversified risks, undiversified risks, formalized methods for assessing investment risks, non-formalized methods of evaluating investment risks, risk tolerance, variance, coefficient of variation, beta-coefficient.

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МЕТОДИ ОЦІНЮВАННЯ ІНВЕСТИЦІЙНИХ РИЗИКІВ

Узагальнено підходи щодо формування сутності, класифікаційних ознак інвестиційних ризиків та методів їх оцінювання. Обґрунтовано основні складові сутності інвестиційного ризику як економічної категорії. Проаналізовано основні методи оцінювання інвестиційних ризиків. Особливу увагу приділено інтуїтивній складовій процесу прийняття інвестиційних рішень. Виокремлено основні чинники, що впливають на вибір методів аналізування інвестиційних ризиків. Узагальнено основні показники, що використовуються для оцінювання можливого розміру фінансових втрат від інвестиційної діяльності.

Ключові слова: інвестиційні ризики, диверсифіковані ризики, недиверсифіковані ризики, формалізовані методи оцінювання інвестиційних ризиків, неформалізовані методи оцінювання інвестиційних ризиків, схильність до ризику, дисперсія, коефіцієнт варіації, бета-коефіцієнт.

Formulation of the problem

Implementing the investment activity, the investor does not have full confidence in obtaining the result, which he expects. Investors should be aware of the presence of risk factors associated with possible reduction or inability amounts of investment income, as well as partial or total loss of the capital invested. Research of investment risks, identifing the factors that causing them, and calculating potential losses are important issues that are needed to be taken into account by the modern investor, deciding on investment in any investment project. Therefore, the ability to assess investment risk and develop a system of measures that minimize their negative financial impact is an integral feature of modern investment manager.

Analysis of the recent studies and publications

Analysis methods for assessing investment risks are in the focus of many scientific papers. In particular, I. Blanc, I. Boyarko, B Vitlinsky, V. Hridasova, I. Dashko, L. Dokiyenko, T. Mayorova, A. Mertens, D Northcott, A. Peresada, W. Polshakova, V. Savchuk, I. Skvortsov, V. Fedorenko, William

Sharpe deal with the problem. However, it should be noted that there are differences in the classification of both investment risks and methods of evaluation. In addition, some elements of the management of investment risk require more detailed study.

Uncertainty factor and as well as, the risk are characteristic features of being objective economy as a complex system. The person making decisions constantly face the risk. E.g. people agree to take risks in exchange for an additional fee. It is one of the defining principles of financial theory. What determines the choice of an investor who faces the risk? That is the main issue, which provides a basis for further consideration of the problems of modern finance.

In economic theory, it is assumed that the so-called homo economicus, i.e. person being able to make rational decisions on the principle of the greatest benefits, always has an idea of the degree of riskiness of an alternative based on various considerations. These ideas are the result of the individual degree of confidence (subjective probability) of occurrence of the various consequences of decisions [1, p.70].

In dictionaries of different nations the word "risk" exists in similar forms and definitions of content, for example, in English "risk", in French "risqué", the Italian "rischio", in German "risiko", in Spanish "riesgo" etc. According to linguists, they originated from the Latin term "resecum", which means "rock" or "danger" and was used by ancient navigators to denote danger of collision with coastal cliffs. So, etymologically, the word "risk" is always associated, primarily, with the advent of danger or uncertainty in various fields of economic activity and socio-economic life. For instance, Adam Smith and other English-speaking scholars to refer to risky actions often practiced word "hazard" (danger). During a long period of time the notion of risk is was not only associated with some negative situations in life, but often was used as their synonym.

In modern risk theory the two opposing views on the interpretation of the categories are clearly distinguished, namely classical, represented by J. Miles and J. Senior, and neoclassical, offered by L. Marshall, L. Pigou, J. Keynes. The fundamental oposition comes from different perceptions of the nature of the relation between uncertainty and risk (table) [2, p.200].

Table 1

Comparative analysis of classical and neoclassical views on the nature of the category of "risk"

Component of risk theory	Classical Risk Theory	Neoclassical Risk Theory
The etymological source of risk	Uncertainty	Danger
The ontological essence of risk	The probability of losses and expenses from the decision and business strategy	The probability of a deviation from the intended targets
Correlation of concepts of "risk" and "uncertainty"	Are identical	Differentiated

Comparing classical and neoclassical approaches it should be noted that the views of Neoclassicists are only a logical development of the Classicists. Thus, Neoclassical theory predicts that the genetic roots of risk arising primarily in the uncertainty being the objective condition that eventually causes the subjective perception of risk i.e. uncertainty. This approach allows us to understand the etymology of risk as economic historical and logical category in which uncertainty and ignorance cause the appearance of objective uncertainty perceived by the subjects of activity as insecurity. Hence, this subjectively perceived hazard is the risk.

Prerequisite of risk is the availability of alternative scenarios, which leads to different results: in a situation where there is only one possible outcome, whether it is about the loss or acquisition, the risk does not exist, because there is no alternative [2, p. 201].

The formation of profitability level of investment operations of the enterprise mostly depends on the investment risk (the higher the risk, the greater must be the return on investment) [3, p. 66].

The review of literature on investment, reveals differences in the interpretation of the term "investment risk".

Investment risk is the probability of unforeseen financial loss in terms of uncertainty of investments [3, p. 66].

The risk in investing is quantitatively calculated taking into consideration a particular entity investment uncertainty associated with the possibility of occurrence in the implementation of the project of adverse events and their effects in the form of certain financial loss (loss of income, increased costs, loss of profits, etc.) [2, p. 202]. Thus, the key elements of the nature of investment risk as an economic category are the following: the uncertainty of market factors in the present and in the future; the existence of several alternative scenarios; the possibility of adverse events, the probability of loss of assets, failure to obtain the expected profit or other deviations from the planned, predictable performance; objective need for management measures to reduce the potential negative or adverse effects and subjective perception of events.

To analyze the impact of risk on investment performance is to develop possible measures to prevent the occurrence of the expected financial losses. Achieving of this goal greatly depends on the quality of investment risk identification, namely the combination of the adverse factors that can lead to a decline in revenues, an increase in capital investment requirements and the corresponding decrease in investment income. In connection with this investment analysis involves compiling an exhaustive list of risks for each of the project and evaluate appropriate structure of expected financial losses. The efficiency of this process is based primarily on a clear classification of risks, their grouping and aggregation potential impact on investment performance.

Investment risks are mainly classified according to three criteria [3, p. 66, 5, p.101]:

– Areas manifestations: political risks; economic risk; social risk; environmental risk.

– Forms of investment: real risk investment; risk of a financial investment.

– Source of formation and opportunity of the elimination of Systematic (market) risk; specific risk associated with the implementation of the terms of these investments only. The systematic risk accounts for about 25–50 % of the risk of any investment project [3, 2].

According to their nature the risks are divided into simple and complex [2, p. 202]. Sophisticated risk is a combination of simple risk characterized by a common negative consequence of their formation. Simple risk is determined by the action of a set of independent events, and the consequences of their occurrence are evaluated individually. Traditionally, investment analysis distinguishes such aggregated risk types as [2, p. 204]:

– Political, legal and general economic risks, as opposed to other forms of risk relate to external terms of investments; technical risks due to flaws and errors in the technical analysis of design decisions.

– The financial risk associated with the fact that certain parameters of financial plan are not achieved developed by the project.

– Marketing risk arises from errors in assessing the market conditions of the project, namely the capacity of market opportunities and resource markets to implement the project supplies, organization of advertising and marketing network, time-to-market of the chosen pricing policy, etc.

– The environmental risks associated with a lack of development on the environmental impact.

– The risk of project participants related to possible adverse developments in the management and financial condition of the project participants.

Since the implementation of investment projects through several stages of the project cycle, the risk analysis should be carried out in the context of the respective phases. Thus the analysis of risk for each stage of the investment project is carried out, and then the total risk of the project and the total amount of possible financial losses are determined [2, p.203].

The types of investment risk depending on the subjects and financial and investment decisions that are adopted are classified in [8, p.34].

The stock market and the banking sector of economically developed countries are widely used compliance Risk Management [9, p.34]. Compliance – risk is the risk of sanctions application of legal or regulatory authorities, significant financial loss or loss of reputation of the company as a result of its failure to comply with laws, regulations, rules, standards, self-regulatory organizations, or codes of conduct.

Consequently, the investment risk is an integral part of investment. Typically, the higher the profit expected from the investment project, the greater the risk associated with its implementation. Therefore, the investment manager should be able to objectively evaluate them.

A wide range of techniques and approaches that allow to analyze the risks of the project is used at present. Own risk in the investment management can be analyzed using qualitative (informal) and quantitative (formal) techniques that complement each other.

Qualitative analysis methods are relatively simple, their main tasks – to identify potential areas and the risk factors and stages of the project and the land on which they occur. Quantitative analysis methods include determination of the specific risks and risk of the project as a whole. Qualitative methods of evaluating investment risks include methods of peer review, analogy, feasibility costs and others. Their common feature is that they are based on practical experience, accumulated knowledge, and often on the intuition of experts in relevant fields. Thus, the estimates obtained are subjective. However, involvement in the evaluation of experienced professionals enables to take into account different aspects of an issue, identify the most important factors and possible solutions, prepare information for further formalization and construction of a mathematical model [3, p. 68].

Application of qualitative methods in investment analysis is due to the following reasons: the subjectivity of the studied phenomena or characteristics; absence or lack of necessary information; impossibility of analyzing objective and acceptable methods; absence of the object of study (which should be established during the implementation of the project).

Expert risk analysis is usually used in the initial stages of the project (in the pre investment phase), when the amount of initial information is insufficient for quantitative evaluation.

The advantages of expert risk analysis is a requirement of accurate initial data and specialized software tools to assess the possibility to calculate the efficiency of the project and the relative ease of calculation. The main disadvantages are difficulties in engaging independent experts and subjectivity of estimation.

In developed countries the information published by insurance is used for companies obtained accounting potential risk, including regular comment on trends in key areas of risk (changes in demand for specific products, the prices of raw materials, fuel and land reliability rating of project, contract, investment and other companies).

Database and knowledge of risk factors. These materials are are used dealing with analogues compiled on the basis of literature, studies, and by interviewing experts (project managers) and others. The data obtained are working using the appropriate mathematical tools, identify interdependencies, causal relationships in order to take into account the potential risks involved in new projects.

Analysis of feasibility expenditure is focused on identifying potential areas of risk and is based on the assumption that the cost overruns can be caused by: 1) the initial undervaluation of the project as a whole or its individual phases and components; 2) changing the boundaries of design, due to unforeseen circumstances; 3) differences in the performance of machines and mechanisms on the performance in the project; 4) increase project costs compared to the original value due to inflation or changes in tax laws. These factors can be regarded closer.

In each case, a list of the possible increase of costs under each option for the project or its elements is made. The process of allocation is divided into stages that should be associated with the phases of the project. Then further information about costs becomes available. The phased funding allows investors having the first signs of investment risk either to stop funding a project or to having continue it.

Quantitative methods of evaluating investment risks include the methods of probability theory and mathematical statistics, and economic and statistical methods [2, p. 209, 3, p. 73, 5, p.103].

According to the methods of probability theory and mathematical statistics following characteristics can be calculated: dispersion, which characterizes the degree of fluctuation of the studied parameters (expected return on the investment operations) compared to the average; standard deviation, which characterizes the degree of fluctuations in expected income from various investments and used in the evaluation of individual investment risk; coefficient of variation, which makes it possible to determine the level of risk if the average expected income from investment transactions are different; sensitivity coefficient (beta coefficient), which assesses an individual or portfolio systematic investment risk relative to the risk level of the investment market in general. This parameter is usually used to assess the risks of investing in certain securities (compared to the systematic risk of the stock market). Along with the increasing value of beta coefficient increases and the level of systematic risk investments.

As any smart investor can eliminate a diversified risk, secure a diversification portfolio of securities, the only risk that is worth taking into account is non-diversified risk [6, p. 110].

Studies have shown that carefully selected 8–15 securities for the portfolio of assets can eliminate or nearly eliminate the diversified risk. Non-diversified risk identical to the market one is inevitable. Each security level has its own non-diversified risk, which can be changed by a "beta" factor.

"Beta" factor is also called a market one because its rate of return is calculated using the so-called market portfolio. "Beta" factor shows the influence of the market on some securities: the more responsive rate securities market changes, the higher the "beta" factor for this security. "Beta" factor is calculated using the relationship of actual yield securities and the actual market returns. The market yield is usually measured as the average yield of all (or a large sample of stocks) [6, p. 111].

According to economic and statistical methods, the level of investment risk is determined as follows (equation 1):

$$P_{ip} = \alpha \times B_{fin}, \tag{1}$$

where P_{ip} is the level of investment risk; α is the likelihood of risk (coefficient of variation, the beta coefficient, etc.); *Bfin* is possible financial losses during the implementation of the project.

The evaluation of risks for individual investment projects allow to determine quantitatively their level. The criteria of evaluation of probability of an event (equation 2) is applied in this case:

$$1{,}0 = P_1 + P_2, \tag{2}$$

where 1,0 is total probability of an event; P_1 is the likelihood of a favorable outcome; P_2 is the likelihood of an unfavorable outcome.

In case of substantiated approach to the evaluation of the event, investors are hoping for a better result and perform their activities on the basis of a favorable prognosis, trying to avoid the chance and risk as possible. Therefore, in practice, the most interest is the alternative – the probability of an adverse event.

Minimum and low risk (0.25) are considered as acceptable for investment. Medium to high risk (0,26–0,55) – valid for small and medium capital investments. Extremely high risk (0,56–0,70) is characterized as critical or warning to investors about the possible financial losses. Maximum Risk (0.71–1.00) leads to losses and investors closer to financial disaster.

Absolute and relative performance indexes are used to assess the possible amount of financial losses from investment activities indexes. The absolute amount of financial loss is the amount of damage caused to the investor for the onset of adverse conditions characteristic of this risk. The relative size of the financial loss is the ratio of the resulting damage to the amount of capital invested.

Financial losses from the risks compared to the total amount of capital and the level of responses are following:

– small (with a ratio of < 5 %);
– significant (at a ratio of 6 + 10 %);
– high enough (at a ratio of 11 + 20 %);
– extremely high (at a ratio of > 20 %).

According the risk of investing they are:

– risk-free investments (short-term government bonds, deposits in the Savings Bank);

– investment with acceptable level of risk (as may be the possibility of losing profits on this investment project);

– critical level of investment risk (as may be the possibility of losing not only income, but also the estimated gross income for this investment project);

– investment to the level of catastrophic risk (as may be the possibility of losing all the assets of the investor as a result of bankruptcy).

In order to evaluate the stability and effectiveness of the project in the case of uncertainty is recommended to use the following methods of evaluating investment risks (in the order of accuracy assessments) [2, p. 205]: enlarged stability assessment; calculating the break-even levels; variation of parameters; assessment of the expected effect of the project on the basis of quantitative characteristics of uncertainty.

All the methods except the first one, predict the development of scenarios of the project in the most likely and most dangerous conditions for any participants under evaluation and financial implications of such scenarios. This makes it possible to provide, if necessary, draft measures to prevent or redistribution

occurring losses. Approximate measure of risk is the payback period. However, the focus in assessing the uncertainty of projects just to pay back period often leads to the selection of short-term projects with high incomes, while ignoring the more cost-effective, but long-term projects.

The method of interest rate adjusted for risk by allowing an increase in interest rates on the value of the risk premium takes into account the risk factors in the calculation of the efficiency of the project.

The method of cash flow change use reduction factors that are actually analyzed the probability of cash receipts. The project, in which the revised cash flow has the highest NPV, is considered the least risky.

The method of critical values (method of variation of parameters) is based on the finding of variables or parameters of the project that bring value corresponding efficiency criterion to limit its value. Other methods are also used, such as: sensitivity analysis, break-even analysis, scenario analysis of the project etc. The combined method is a combination of several methods or elements.

The following methods of evaluating investment risks: a method of determining the likelihood of results; modeling method; sensitivity analysis; game theory are distinguished in [7, p.99].

Some authors [10, p.44] justify the principle of combining intuitive and analytical (quantitative) methods of evaluating investment risks. Experience of successful intuition is known to many people, the only question is how to manage it. The first step in this direction is to determine the main factors of the situation, which may have different origins. The problem of the analytical approach is complete and accurate consideration of the factors. Flair defines a fundamentally different approach - a direct experience of the current situation, and intuition - that we begin to perceive the study process is more subtle, as objects with the nature of the field. Researchers and practitioners offer the concept of the field from different approaches: the semantic field Menehhetti; collective unconscious and the archetypes of Jung; the knowing field of Hellenher; morphogenetic fields of Weiss and Sheldrake; Vernadsky's biosphere; Nalimov's field of consciousness; egregors of mystics; world of ideas from Plato and others. It is important here to neutralize personal factors that distort the quality of prediction.

Differentiation of methodological tools for evaluating investment risk reflects the systematization of tasks for its consideration in the management of capital [11, p. 148]:

1. Methodological tools of financial risk assessment, covering economic and statistical, expert and analog methods of evaluating investment risks.

2. Methodological tools forming the desired level of profitability of financial operations, taking into account the risk factor are based on determining the required size of the risk premium and the overall profitability of financial transactions.

3. Methodological instruments valuation of funds with regard to risk factors.

The most famous are the following methods of reducing the investment risks [4, p. 103]: insurance (system of compensation insurers in an accident with a special source of insurance funds generated by insurance premiums); surety; collateral; risk sharing; reserve funds and others.

Goal Setting

Taxing in the account analysis of domestic and foreign sources for investment decision-making problems under uncertainty, it is offered to generalize the approach to classification of investment risks and to analyze methods of evaluation.

The main material

Risk is an objective reality of human life concerning factors both certainty, and random or uncertain. Investment activity is a sphere, where risk factor is the most noticeable. The risk arises when the results of any decision can not be predicted in advance. The economy is the result of decisions are often evaluated in terms of value. From this perspective, the risk can be seen as a random possibility of winning or losing value as a result of certain economic decisions.

The risk factor is very important in the capital markets. In fact, the absence of risk capital market as a whole financial market in all its diversity, will be reduced to the consistency of a market debts with a single interest rate.

The risks that accompany investment activity, an objective, a permanent factor in the operation of any enterprise and therefore require serious attention by the investment managers.

Analysis of risk theory in retrospect suggests that there are two approaches to the interpretation of the category of "risk". If representatives of the classical school of political economy identifies the concept

of “risk” and “uncertainty”, their followers belonging to the neoclassical school differentiate them as based on different perceptions of these concepts.

Thus, from the perspective of different points of view one and the same situation may have very different risk assessments, which are determined primarily their individual attitude to risk. Subjective perception of risk is reflected in the change in marginal utility growth anticipated investment income.

Development and application of methods of evaluating investment risks are based on the construction of quality classifications that may help identify the different types of risks. Despite the lack of a unified approach to this issue, most of the authors distinguish the investment risks by source of origin and the possibility of eliminating two major groups: systematic (market) risk; unsystematic (specific) risk associated with the implementation of the terms of these investments only.

The diversity of species of investment risks leads to a wide range of methods of assessment. All presently known methods of evaluating investment risks can be divided into qualitative (formalized) and quantitative (informalized) that are largely complementary.

The choice of methods of analysis are influenced by various factors. The main ones are: the type of investment risk; degree of completeness and reliability of information available; the ability to attract skilled experts; qualification of developers and project managers; availability and the ability to use modern information technologies. Universal method of evaluating investment risk exists. Therefore the choice of an adequate method and the effectiveness of its implementation largely depends on the characteristics of specific investment projects and expertise of specialists.

Current investment market is characterized by the increase of variability in uncertainty, strengthening the role of intuitive methods of making important investment decisions.

Conclusions

Review of the literature on the subject of the development and application of methods of evaluating investment risks suggests the lack of a single approach to the classification of these methods, uncertain distinguishing between quantitative (formalized) and non-formalized and the neglecting of the proposed methods of factor risk exposures and the specific features of the investment the project. None of the known methods of evaluating investment risks gives accurate results because they do not take into account the accumulated experience and intuition of the investment manager.

Prospects for future research

Further research should focus on the ways of combining quantitative and qualitative methods of evaluation and management of investment risk, and the development of measures to minimize their negative financial consequences. It would be advisable to analyze the methods of evaluation of investment risk of innovative projects.

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