METHODS FOR ASSESSING THE ECONOMIC EFFICIENCY OF INVESTMENT PROJECTS

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Annotation: Our main objective is to study and analyze the successful implementation of investment projects, as well as to conduct a thorough analysis and in-depth evaluation based on various methods of assessing efficiency. The article examines the theoretical and practical significance of methods for accounting for uncertainty in assessing the economic efficiency of investment projects, the process of analyzing them, and issues related to their improvement.

Keywords: interest rate risk, investment project, economic efficiency, real estate market, cash flow movements.

Today, in the process of modernizing and developing the national economy, primary attention is being given to investments directed into the economy and their share. This is because the volume and structure of investments play a crucial role in ensuring economic growth. Taking this into account, one of the priority directions defined by our President in determining the future prospects of the country's economic policy is the broad attraction of investments, particularly the creation of more favorable conditions for foreign investors. Investments are considered an essential condition and source for ensuring the economic growth of any country and for promoting its comprehensive development. Accordingly, in order to ensure the balanced development of various sectors and branches of the economy, to take into account the socio-economic potential of regions, and to increase employment at the local level, annual national and regional investment programs are developed and implemented in our country. As a result, the volume of investments in the economy has been growing significantly year by year, creating opportunities for positive outcomes through an increase in national production volume. Modern research in the in-depth study of various theoretical and practical aspects of investment project management indicates that the current research vector is primarily focused on developing methods for comprehensively accounting for uncertainty when calculating indicators such as net present value (NPV), internal rate of return (IRR), payback period, and others[1]. According to the views of L. Abalkin, V. Lifshits, and A. Sheremet, under deterministic conditions the impact of investments can be determined using financial-economic models, which make it possible to calculate the present value of future cash flows using a discount rate, thereby determining the return on investments without accounting for risk. This approach is theoretically and practically reliable because it assumes the existence of only one precisely defined variant of cash flows and an appropriate discount rate. However, studying numerous investment projects has shown that developing methods for assessing their economic efficiency under conditions of uncertainty is of significant practical and scientific interest. In reality, the process of managing investment projects is, first, in many cases difficult or almost impossible due to the absence of economic and mathematical integrated tools that account for various uncertainties; second, the specialist must calculate a large number of alternative scenarios. The study of these problems shows that in conditions of instability in the real estate market and volatility in the economic environment, the assessment of the economic efficiency of investment projects becomes a central issue[2]. The above considerations confirm the assumption that the initial indicators of investment projects may be subject to the formation of uncertainties, which affect the economic efficiency of their implementation. Thus, the existence of various uncertainties necessitates modifying the given

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indicators used for evaluating the economic efficiency of investment projects, using mathematical methods that allow the formalization and simultaneous processing of different types of uncertainty. A theoretical review of global scientific literature shows that, in addressing these issues, methods based on expert judgment, game theory, probability theory, Bayes methods, fuzzy set theory, scenario and interval descriptions are considered the most effective. It is reasonable to elaborate on the formation and ratio of the models listed above, and we can use the following methods that determine the increasing level of uncertainty: deterministic model; classical probabilistic-statistical model; expert system model; interval and probabilistic model; scenario evaluation model; fuzzy set model; game and behavioral model; Bayesian networks and influence diagrams model; Dempster–Shafer theory of evidence model; Pawlak's rough set theory model; information gaps model. To date, one of the most widely used methods in analyzing risks and uncertainties in the construction industry is interval and probabilistic analysis. The first type of model identifies factors that are particularly sensitive to risk by showing how changes in actual variables affect the project's net present value. The second type applies the Monte Carlo method to simulate the effects arising from numerous risk factors. One problematic aspect of probabilistic analysis is that evaluating uncertainty through probability measures requires substantial effort, as determining and developing the probability distributions of the factors causing each risk demands the use of historical data, which is often complex and time-consuming. Since any investment or construction project is influenced by various factors that generate different types of risks, it is often impossible to precisely determine all influencing factors. Most analysts consider uncertainty to be a natural state that arises as a result of randomness [3]. Another method for eliminating the above shortcomings is the use of possibility theory, in which the researcher does not define influencing factors directly but instead determines the possible range and the most probable value for each investment indicator. S. Mack considers the analysis of problems within probability theory as a priority direction, where subjective judgments dominate in the process of accounting for uncertainties. In this regard, our study concludes that, in the above-mentioned situations, possibility theory appears to be a more suitable method than probability theory for modeling investment decisions under risk and uncertainty. It should be noted that, due to the depth and complexity of the issues being studied, the methodology for assessing the efficiency of investment projects under uncertainty is mainly based on methodological recommendations for evaluating the effectiveness of investment projects. A detailed examination of these recommendations reveals the following significant shortcomings that arise when applying the proposed model for evaluating the efficiency of investment projects: first, it does not reflect the specific characteristics of investment and construction projects; second, it does not accurately account for the uncertainty of the input indicators; third, it ignores their overall combined effect. Moreover, the principle commonly found in economic publications—that there is no single and effective analytical method for assessing uncertainty in investment projects—is of particular importance for our research. In general, uncertainty affects techno-economic studies in two ways: first, the cash flows of a project become variable rather than fixed; second, the resulting efficiency indicators may vary significantly and may deviate from planned values.

In making investment decisions, the use of scientifically grounded methodologies and methods for selecting, evaluating, and implementing investment projects is of great importance. Since the calculations within a project are future-oriented, they indicate the impossibility of precise prediction and carry a forecasting character. Therefore, it is essential to take into account the qualitative characteristics of an investment project, as well as the risks and uncertainties associated with it. The significance and objective necessity of an investment project lie in the fact that, under conditions where resources and time are generally limited, the project must

reflect the interests of investors and ensure the achievement of the intended goals. Based on the methods of evaluating the efficiency of investment projects, it becomes possible to determine the feasibility of allocating long-term capital to various objects and to assess whether the invested funds will generate future profits and fully pay off.

The main objectives of evaluating an investment project include: verifying the necessary information included in the project's feasibility study; analyzing the project based on final conclusions and quantitative indicators of its viability; developing requirements and recommendations for the borrower; determining the need to obtain the necessary guarantees, which serve as a key condition for the loan agreement to enter into force; preparing recommendations for the credit committee regarding the allocation of a loan to finance the investment project; identifying market requirements for conducting negotiations related to loan allocation. Thus, the purpose and framework of financial analysis lie in examining and identifying all factors related to the resolution of issues in investment and financing, as well as analyzing all financial consequences within the project. In addition, the most significant limitations of quantitative assessment can also be associated with the insufficiency of construction-related statistical data in Uzbekistan concerning risk events. The conclusions derived from our research are as follows: first, in calculating the efficiency of investment projects using such methods as statistical and dynamic approaches, future value, discounting, annuity, internal rate of return, and payback dynamics, various approaches to assessing uncertainty were studied — including deterministic, probabilistic-statistical, interval-based, minimax, game-theoretic methods, as well as approaches based on linguistic variables, Bayesian networks, and fuzzy set theory. Second, the use of certain mathematical tools (such as information gap models, interval analysis, probabilistic-statistical methods, Bayesian networks, deterministic models, and others) to evaluate the economic efficiency of investment and construction projects under uncertainty only allows for adequately reproducing certain types of uncertainties within the model. Therefore, within the context of evaluating the economic indicators of investment and construction projects from the perspective of uncertainty, it is necessary to integrate multiple methodological approaches.

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