Comparative Efficiency of Economic Security Tools for Innovative Projects

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Abstract: - Insurance, which is the method of economic protection of projects, widespread in industrialized countries, cannot fully balance various types of threats due to the high level of uncertainty, characteristic of developing economies. At the same time, the use of other protection methods, such as redundancy, is justified only in the presence of certain conditions and a certain state of the external environment. A dynamic model of decision support when choosing the most effective method of economic protection of an innovation project, which also takes into account risks, the amount of investment and the amount of possible damage, is proposed herein. The model establishes the relationship between the marginal value of the insurance rate and the factors affecting the implementation of the project. The solution makes it possible to develop the most optimal economic protection strategy.

Key-Words: - economic security, reservation, insurance, risks, uncertainty, cost of capital, innovative project.

1 Introduction

Currently, in industrialized countries, financial capital often does not bring acceptable returns to investors [1]. Investments in financial instruments after a succession of crises can be considered quite risky investments [2]. Not only securities have significant volatility, but also many commodities: metals, oil, grain, etc. This circumstance forces investors to invest their capital in the markets of developing countries with an intensive growth of the economy and favorable conditions for the implementation of innovative projects [3]. At the same time, the risks characteristic of this kind of projects are superimposed on the uncertainty associated with changes in the economic system [4], and therefore the task of economic protection of investments [5] becomes relevant. Therefore, capital-intensive projects in developing economic systems are the main object of the study. The task of choosing an effective method of economic protection of the projects, the results of which are complex technical objects (CTOs), is particularly relevant [6].

These and other reasons determined the purpose of this study – the identification of the selection criteria for the most effective method of economic protection of innovative projects. For this, it is necessary [7, 8, 9]: to determine the order of application of various methods for the economic protection of projects; to identify the features of the developing economic system in which the project is expected to be implemented; to analyze the factors affecting the implementation of the project; to develop economic and mathematical models to make decisions on the organization of the economic protection of the project.

2 Literature Review

Research in the field of protection of innovative projects and ensuring their safe development was carried out by many scientists [10, 11, 12]. Special attention is paid to one of the most common methods – insurance [13, 14, 15]. In developed countries, this method is the most common [16]. The debugged system, consisting of a multitude of insurance organizations, brokers and agencies, allows interested parties to conclude an insurance contract that is optimal for a set of services and tariffs. The features of insurance of large high-tech projects have been reviewed by Anyushina [17]; the practical aspects have been disclosed by Mustafina [18].

In developing countries, the insurance organizations prefer, as a rule, to conclude contracts in those activities where, according to their assessment, the probability of occurrence of insurance events is insignificant and the possible damage is minimal [19]. Moreover, subject to the occurrence of an insured event, the payment of compensation is usually delayed to the maximum or sometimes not carried out at all [20, 21]. Involvement of insurance companies from developed countries in the protection of a project is not always possible. Under these conditions, insurance companies, as a rule, compensate additional costs with higher tariffs. Various problems of insurance protection of investments made in the form of capital investments are discussed in the scientific works [22, 23], where it is noted that the lack of comprehensive investment insurance programs leads to unreasonable overstatement of tariffs. These circumstances force the investor to look for other ways of economic protection of the project. Alternatively, the possibility of creation of a special reserve fund (SRF), which can be used to compensate for damage, is considered.

To increase the investment attractiveness of the projects, some researchers suggest using a public-private partnership mechanism [24, 25] – it is noted that additional resources or reserves are required to neutralize the risks. In some papers, general principles of a systemic approach to reserving have been proposed and the most significant factors influencing the development of a reserving strategy have been identified, which include the cost of equipment, objects of labor, the physical properties of reserved resources, etc. [27, 28, 29].

When choosing the methods of economic protection, the state of the external environment in which the project is implemented is of great importance. This problem was studied in the scientific work by Gatti [29]. In the works [30, 31], the widely used insurance models for various occupational risks are analyzed. The implementation of projects using the results of fundamental and applied research is associated with innovation risks [32, 33]. The literature review shows that in developing countries, the most likely threats to investors include: the supply of materials and components that do not meet technical specifications; violation of the production technology, testing and operation of the products; production accidents, storage and transportation of products; manufacturing defects, latent defects; unforeseen changes in the exchange rates, bank interest rates, inflation and other factors that adversely affect the financing of the project.

Methods of economic analysis and dynamic programming are most often proposed for building models [34, 35]. To solve the problem in question, from the authors' point of view, it is most appropriate to use economic and mathematical methods to determine the optimal amount of funds needed to neutralize the risks of implementing innovative projects.

3 Methods

3.1 Comparison criterion

The problem of choosing the most effective method of economic protection is associated with differentiation of the marginal insurance rate when the insurance becomes unprofitable [36]. It is advisable to solve this problem with the help of a model that estimates the change in the cost of capital during insurance and financial reservations.

The model, offered by the authors, functions as follows: let us suppose that at the beginning of the year the enterprise (the Insured) chooses the insurance and transfers the insurance premium to the insurance company (the Insurer). At the end of the year, the cost of capital will be:

$$C_{i+1} = C_i - S + a \cdot (C_i - S), \quad (1)$$

where C_{i+1} is the cost of capital of the enterprise at the end of the year, Ci is the cost of capital of the enterprise at the beginning of the year, S is the insurance premium transferred to the Insurer's account, and is the average return on the assets of the enterprise.

In the case of choosing a financial reserve, the company assumes all risks and possible payments will reduce the cost of capital. At the beginning of the year, the funds are withdrawn from the company to the SRF and placed in the financial market in highly liquid assets. At the end of the year, the cost of capital of the enterprise will be:

$$C_{i+1}^R = C_i + r \cdot (Y - X) + a \cdot (C_i - Y), \quad (2)$$

where C_{i+1}^R is the cost of capital at the end of the reporting period in the case of organization of a financial reservation, Y is the value of SRF, X is the expected loss upon the occurrence of negative events, r is the average profitability of the financial market in which the SRF is located.

The expected losses are the average losses for the insurance events for the past period. If the amount of damage is less than the amount of SRF, then its balance will continue to operate in the financial market and will generate income. The investor decides in favor of the method of economic protection that ensures the maximum cost of capital.

The method of measuring the cost of capital makes it possible to substantiate decision-making in the implementation of innovative projects at existing enterprises that produce serial products, but it is not quite suitable as a tool for evaluating the effectiveness of protecting capital-intensive innovation projects with a relatively long term for designing and manufacturing CTOs.

The developed model of economic protection of projects is based on comparing the values of the present income of an innovative project, obtained from its insurance or reservation of funds:

$$NPV_{ins} \geq NPV_r, \quad (3)$$

where NPV_{ins} is the net present value of an innovative project protected by insurance, $NPVr$ is the net present value of an innovative project protected by reservation.

Compliance with the condition (3) gives the grounds for choosing insurance as a method of economic protection. NPV of the project, protected by insurance, will include not only the investments but merely the insurance payments, which will be transferred to the Insurer under the terms of the contract*:*

$$NPV_{ins} = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - \sum_{i=k}^{n} \frac{T}{(1+r)^i} - IC, \quad (4)$$

where CF_i is the net cash flow generated by the project, r is the discount rate, n is the number of periods of economic protection planning, m is the beginning of operation of the CTO, T is the insurance premium paid to the Insurer, IC is the invested capital.

NPV of the project protected by reservation takes into account the funds allocated to the reserve fund:

$$NPV_r = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - (IC + ICr), \quad (5)$$

where ICr is the capital directed at the creation of a reserve.

3.2 Maximum Insurance Rate

3.2.1 Simple tariff estimate

The model allows determining not only the most effective method of economic protection but also the limiting value of the insurance rate for this project. The following assumptions were taken by the authors to obtain the result in a simplified form:

a) financial resources come in a lump sum and are spent all at once, although in practice various financing options are possible;

b) the invested capital in the main and reserve objects in the model is considered to be the same, although the resources to create a reserve CTO will be required less by the amount of previously performed design work *(IC = ICr).*

The insurance premium is formed as the product of the insurance tariff for the value of the insured property:

$$T = t \cdot IC \quad (6)$$

where T is the insurance premium, t is the insurance tariff, IC is the value of the property, equal to the investments directed to the creation of the CTO.

After taking into account the assumptions (6) in the expressions (4) and (5), the following is obtained:

$$NPV_{ins} = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - IC(t\sum_{i=k}^{n}(1+r)^{-i} + 1) \quad (7)$$

$$NPV_r = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - 2IC \tag{8}$$

Equate the expressions (7) and (8):

$$\sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - IC(t\sum_{i=k}^{n}(1+r)^{-i} + 1) = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - 2IC \tag{9}$$

After the transformations (9), the expression is obtained:

$$t\sum_{i=k}^{n}(1+r)^{-i} = 1, \tag{10}$$

from which the limit value of the insurance rate can easily be calculated:

$$t \le \frac{1}{\sum_{i=k}^{n}(1+r)^{-i}} \tag{11}$$

If the insurance tariff t offered by the Insurer satisfies the condition (11), then the insurance protection is recommended for this project. Otherwise, one should focus on reservations. The insurance contract is usually concluded for a year and then extended by agreement of the parties. In the case of choosing insurance as a method of economic protection, insurance payments are made from the moment of completion of the design and manufacture of the object (k), while the funds allocated for the protection of the CTO are sent to the reserve fund and frozen for the duration of the project.

3.2.2 Estimation of the tariff taking into account the losses

It should be noted that the insurance protection provides compensation for the funds lost in the event of an accident, in the amount of the value of the insured property, but does not take into account the losses associated with the cost of time required to restore the project characteristics. These losses are associated with the rupture of previously concluded contracts for the provision of services, the supply of products, penalties for the supply of materials and components, etc. During the time required for the manufacture of a new CTO, its testing, transportation to the place of operation, installation, commissioning and other works, revenues will not be accumulated.

Losses are falling revenues from the sale of goods and services during the restoration of project characteristics:

$$Q = \sum_{i=m}^{2m} \frac{CF_i}{(1+r)^i} \tag{12}$$

where Q is the losses in the amount of lost profits upon the occurrence of an insured event, m is the time required for production and preparation of the CTO for the operation.

When evaluating insurance as a possible method of economic protection, it is necessary to take into account, along with the cost of insurance, possible losses, which are estimated as the product of the probability of an accident and falling income (12). Possible losses are estimated as follows:

$$q = p \cdot Q \tag{13}$$

where q is possible losses.

If the funds of the SRF fund are not frozen, but used to create a reserve CTO, which must be promptly put into operation instead of an emergency one, then the loss of lost profits can be avoided. Let us calculate the possible losses using the expression (7):

$$NPV_{ins} = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - IC(t\sum_{i=k}^{n}(1+r)^{-i} + 1) - p \cdot Q \tag{14}$$

After the equation of (8) and (14), one can obtain:

$$\sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - IC(t\sum_{i=k}^{n}(1+r)^{-i} + 1) - p \cdot Q = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - 2IC \tag{15}$$

After the transformation:

$$t\sum_{i=k}^{n}(1+r)^{-i} + p \cdot \frac{Q}{IC} = 1 \tag{16}$$

The presented model makes it possible to choose the most effective method of economic protection of unique projects that have no further continuation.

3.2.3 Tariff assessment taking into account the sale of the reserve complex technical object

If further development of the direction is forecasted, implying the production and sale of a similar type of complex technical object, then it becomes possible to sell a reserve object in the market in the event of a favorable outcome of events. In this case, the expression (5) takes the form:

$$NPV_r = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - 2IC + P \tag{17}$$

The reserve CTO can be modified upon request of the customer or sold with a discount (d). Due to the fact that income can be obtained only after the risks, associated with putting the main CTO in operation, decrease significantly, the model should include the discounting of funds received from future sales and the likelihood of a favorable outcome (1 – p). The implementation of the reserve CTO will bring income in the amount of:

$$P = (1-p) \cdot \frac{IC \cdot (1-d)}{(1+r)^n} \tag{18}$$

After application of (18) in the expression (17), the following dependence is obtained:

$$NPV_r = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - 2IC + (1-p) \cdot \frac{IC \cdot (1-d)}{(1+r)^n} \tag{19}$$

After the transformation, the following dependence is obtained:

$$NPV_r = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - IC \cdot [2 - \frac{(1-p)\cdot(1-d)}{(1+r)^n}] \quad (20)$$

After the equation of (14) and (20):

$$\sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - IC(t\sum_{i=k}^{n}(1+r)^{-i}+1) - p\cdot Q = \\ = \sum_{i=m}^{n} \frac{CF_i}{(1+r)^i} - IC\cdot[2 - \frac{(1-p)\cdot(1-d)}{(1+r)^n}] \quad (21)$$

After the transformation, the following expression is obtained:

$$t\sum_{i=k}^{n}(1+r)^{-i} = 1 - p\cdot\frac{Q}{IC} - (1-p)\cdot(1-d)\cdot(1+r)^{-m} \quad (22)$$

from which the limit value of the insurance rate can be found:

$$t = \frac{[1 - p\cdot\frac{Q}{IC} - (1-p)\cdot(1-d)\cdot(1+r)^{-m}]}{\sum_{i=k}^{n}(1+r)^{-i}} \quad (23)$$

4 Results and Discussion

The organization of the economic protection of projects for the creation of the CTO by the method of reservation may be preferable to insurance in some cases. Subject to occurrence of a negative event, the reserve funds are immediately sent to compensate for the damage, while it takes considerable time to obtain the insurance compensation. Therefore, a dynamic model of decision making, which takes into account all the time spent on the innovation process, is proposed to choose the methods of economic protection.

The authors introduce the following values into the initial conditions of the model:

– the probability of irretrievable loss of special relativity – (p) = 0.05;
– the ratio of losses due to lost income and investment – (Q / IC) = 0.2;
– the size of the discount in the implementation of the CTO or the cost of its modernization from investments in the project – (d) = 0.2
– the period of development of the CTO – (n) = 5 years.

For the discount rate, the authors apply the capital return rate (Km), calculated as the sum of the risk-free investment rate and market risk, which depends on the level of development and stability of the economic system.

The model shows that in a stable economy, where the rate of return on capital (discount rate) is within 6-9%, the insurance rate is at an acceptable level and does not exceed 8% of the sum insured.

Table 1. The limit of insurance rates for the group of industrially developed countries with sustainable economies

Industrially developed countries with sustainable economies	*Discount rate, %*	*Maximum insurance rate, %*
Germany	6.8	6.16
USA	8.3	7.31
Japan	7.2	6.45
France	7.3	6.53
EU	8.76	7.68

For developing economies, where the discount rate is taken in the amount of 11-17% [37], the limit value of the insurance rate can reach 14%, which may not always be acceptable to the Investor.

Table 2. Insurance tariff limits for the developing countries

Developing countries	*Discount rate, %*	*Maximum insurance rate, %*
Mexico	15.5	12.98
Indonesia	16.2	13.54
Malaysia	11.4	9.76
India	14.8	12.43
South Africa	16.4	13.69
China	11.5	9.83
Russia	16.8	14.01
Brazil	15.4	11.4
BRICS	14.9	12.51

For countries that are in conditions of external or internal instability, the discount rate is higher than 18% [37], which makes the project's insurance protection organization dubious due to high tariffs (see Table 3).

Table 3. Limiting size of insurance tariffs for countries with unstable economies

Countries with unstable economies	*Discount rate, %*	*Maximum insurance rate, %*
Nigeria	35.8	29.43
Venezuela	36.3	29.82
Sri Lanka	19.3	16.52

Argentina	25.0	20.97
Ukraine	18.2	15.67
Iran	24.4	21.28
Group average	26.5	22.14

The reduction of the insurance rate will damage the insurance organization, which will be unable to collect reserves and, accordingly, will be unable to compensate for the damage under the concluded insurance contracts.

The diagram (Fig. 1) shows the insurance rates that correspond to the level of development of the economic system.

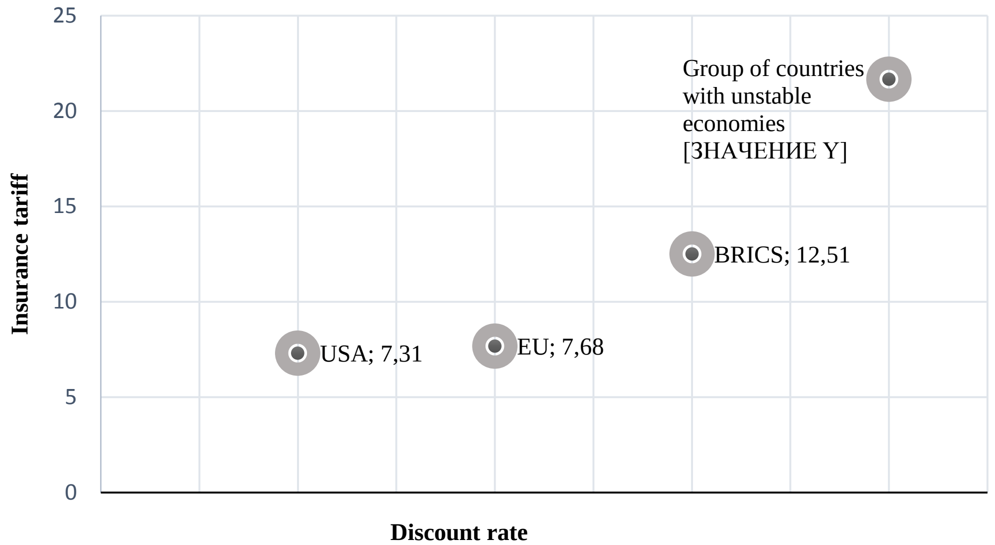

Figure. 1. Limit insurance rates for groups of countries

According to the analysis, the value of the insurance tariff depends on the discount rate, which, in turn, is determined by the level of risks in the economy as a whole. In developing economies, there is a high level of uncertainty in the environment in which an innovative project is implemented, and therefore the use of insurance as an instrument of economic protection may not always be justified.

Previously conducted research in the field of economic protection of projects was focused, as a rule, on a particular method and evaluated the possibility of its use in a particular sector of the economy [38, 39]. In contrast, the article presents an effective tool for making decisions on the organization of economic protection, firstly, in various industries, secondly, with a relatively small amount of input information.

5 Conclusion

The analysis carried out herein showed that in the practice of organization of the economic protection of innovative projects in the developing economic systems, such methods as property insurance, self-insurance and reservation are most actively used. These methods are well studied, but the lack of a decision-making mechanism for their selection significantly reduces the practical level of economic security of the project. In conditions of uncertainty, the timing of the project and its final result depend on the choice of a method of economic protection. This article presents a dynamic model that takes into account the state of the external environment, the risks, the amount of investment and the amount of possible damage. The model establishes the relationship between the marginal value of the insurance rate and factors affecting the implementation of the project. The developed model makes it possible to improve the quality of management decisions when choosing the method of economic protection of an innovative project.

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References

[1] Baker, H.K., Filbek, G., *Investment Risk Management*, Oxford University Press, 2015. https://doi.org/10.1093/acprof:oso/9780199331963.001.0001

[2] Bazhenov, O.V., Zasukhina, Ye.A., An Econometric Analysis of Factors of Attracting Foreign Direct Investment to Developing

Countries, *Economic Analysis: Theory and Practice*, vol. 16, No. 1 (460), 2017, pp. 188-200. https://doi.org/10.24891/ea.16.1.188

[3] Idrisov, M-Kh.M., Specifics of Innovations Financing in Developing Countries, *Economy and Entrepreneurship*, No. 11-1 (64), 2015, pp. 970-973.

[4] Kuzmin, E.A., Uncertainty Cyclicity and Projectionness, *International Journal of Applied Engineering Research*, Vol. 10, No. 17, 2015, pp. 37783-37791.

[5] Nikitina, M.G., Pobirchenko, V.V., Shutaieva, E.A., Karlova, A.I., The Investment Component in a Nation's Economic Security: The Case of the Russian Federation, *Entrepreneurship and Sustainability Issues*, Vol. 6, No. 2, 2018, pp. 958-967. https://doi.org/10.9770/jesi.2018.6.2(32)

[6] Batkovskiy, A.M., Semenova, E.G., Fomina, A.V., Khrustalev, E.Iu., & Khrustalev, O.E., The Methodology and Mathematical Tools to Assess and Mitigate the Risk of Creating High-Tech Products, *Indian Journal of Science and Technology*, Vol. 9(27), 2016, pp. 242-252. https://doi.org/10.17485/ijst/2016/v9i28/97659

[7] Hull, J.C., *Risk Management and Financial Institutions*, 4th ed., Wiley Finance, 2016.

[8] Schmeisser, W., Mohnkopf, W., Hartmann, M., Metze, G., *Innovation Performance Accounting: Financing Decisions and Risk Assessment of Innovation Processes*, Springer Publishing, 2016.

[9] Vlasov, A.V., Specificity of the Refinancing of Mortgage Loans in Russia and Conceptual Approaches to Them, *Entrepreneur Guide*, No. 27, 2015, pp. 129-134.

[10] Hopkin, P., *Fundamentals of Risk Management: Understanding, Evaluating and Implementing Effective Risk Management*, 5th ed., Kogan Page, 2018.

[11] Boldyrevskiy, P.B., Igoshev, A.K., Kistanova, L.A., Risk Assessment of Innovation Processes, *Economic Analysis: Theory and Practice*, vol. 17, No. 8(479), 2018, pp. 1465-1475. https://doi.org/10.24891/ea.17.8.1465

[12] Shvetsova, O.A., Rodionova, E.A., Epstein, M.Z., Evaluation of Investment Projects under Uncertainty: Multi-Criteria Approach Using Interval Data, *Entrepreneurship and Sustainability Issues*, Vol. 5, No. 4, 2018, pp. 914-928. https://doi.org/10.9770/jesi.2018.5.4(15)

[13] Dalton, J., Dalton, M., Langdon, T., *Insurance Planning*, 6th ed., Money Education, 2018.

[14] Rejda, G.E., McNamara, M., *Principles of Risk Management and Insurance*, 13th ed., Pearson Series in Finance, 2016.

[15] VanderLinden, S.L.B., Millie, S.M., Anderson, N., Chishti, S., *The INSURTECH Book: The Insurance Technology Handbook for Investors, Entrepreneurs and FinTech Visionaries*, 1st ed., Wiley, 2018.

[16] Vaughan, J., Vaughan, T., *Fundamentals of Risk and Insurance*, 11th ed., Wiley, 2018.

[17] Anyushina, M.A., Problems of Insurance of Risks in Complex Technical Objects in Russia to Meet International Standards of Risk Management, *Labor and Social Relations*, No. 6, 2018, pp. 63-71.

[18] Mustafina, A.R., Characteristics of the Main Risks of the Insurance Sector of Countries with Developing Economies, *Insurance Business*, No. 5(266), 2015, pp. 48-54.

[19] Teale, J., *Insurance and Risk Management*, John Teale, 2016.

[20] Robertson, E., *Solving the Enterprise Risk Management Puzzle: Secrets to Successful Implementation*, ER Technical Inc., 2016.

[21] Lam, J., *Implementing Enterprise Risk Management: From Methods to Applications*, 1st ed., Wiley Finance, 2017. https://doi.org/10.1002/9781118922415

[22] DeFusco, R., McLeavey, D., Pinto, J., Runkle, D., Anson, M., *Quantitative Investment Analysis*, CFA Institute Investment Series, 2015.

[23] Flachenecker, F., Rentschler, J., *Investing in Resource Efficiency: The Economics and Politics of Financing the Resource Transition*, 1st ed., Springer, 2018. https://doi.org/10.1007/978-3-319-78867-8

[24] Kurbanov, S.A., Khamuradov, M.A., Risks and Their Role in Public-Private Partnerships, Politics, *Economics and Social Sphere: Problems of Interaction*, No. 8, 2016, pp. 16-22.

[25] Berduygina, O.N., Vlasov, A.I., Kuzmin, E.A., Investment Capacity of the Economy during the Implementation of Projects of Public-Private Partnership, *Investment Management and Financial Innovations*, Vol. 14, No. 3, 2017, pp. 189-198. http://doi.org/10.21511/imfi.14(3-1).2017.03

[26] Finnerty, J., *Project Financing: Asset-Based Financial Engineering*, 3rd ed., Wiley, 2017.

[27] Gubin, V.N., On Optimal Reservation on an Infinite Interval, *Modern Problems of Science and Education*, No. 4, 2014. http://science-education.ru/ru/article/view?id=14484

[28] Mamonov, V.I., Principles of a Systematic

Approach to the Reservation of Production and Economic Systems, *Eurasian Scientific Association*, Vol. 1, No. 3(3), 2015, pp. 70-72.

[29] Gatti, S., *Project Finance in Theory and Practice: Designing, Structuring, and Financing Private and Public Projects*, 3rd ed., Academic Press, 2018. https://doi.org/10.1016/B978-0-12-811401-8.00006-4

[30] Pingataro, P., *Financial Modeling and Valuation: A Practical Guide to Investment Banking and Private Equity*, 1st ed., Wiley, 2017.

[31] Batkovskiy, A.M., Fomina, A.V., Batkovskiy, M.A., Klochkov, V.V., Semenova, E.G., Implementation Risks in Investment Projects on Boosting High-Tech Business Production Capacity: Analysis and Management. *Journal of Applied Economic Sciences. Romania: European Research Centre of Managerial Studies in Business Administration*, Vol. XI, No. 6(44), 2016, pp. 1200-1209.

[32] Bannikov, A.Yu., Sokolov, D.S., Experience in Insuring Risks of Investment and Innovation Projects in Russia, *State Counselor*, No. 2 (14), 2016, pp. 32-36.

[33] Gasparian, M.S., Kiseleva, I.A., Korneev, D.G., Lebedev, S.A., & Lebedev, V.A., Strategic Analysis of Risks When Implementing Investment Projects, *Espasios*, Vol. 39, No. 27, 2018, pp. 16-21.

[34] Bodmer, E. *Corporate and Project Finance Modeling: Theory and Practice*, 1st ed., Wiley, 2014. https://doi.org/10.1002/9781118957394

[35] Batkovskiy, A.M., Konovalova, A.V., Semenova, E.G., Trofimets, V.Ya., Fomina, A.V., Risks of Development and Implementation of Innovative Projects. *Mediterranean Journal of Social Sciences*, Vol. 6, No. 4, S 4, 2015, pp. 243-253. https://doi.org/10.5901/mjss.2015.v6n4s4p243

[36] Kadyrbayev, I.A., Methodology for the Study of Theoretical Issues of Investment Risk Insurance, *Innovation and Investment*, No. 1, 2016, pp. 26-29.

[37] Fernandez, P., Martinez, M., Fernández-Acín, I., *Market Risk Premium and Risk-Free Rate Used for 69 Countries in 2019: A Survey*, 2019, March 23. https://ssrn.com/abstract=3358901

[38] Kosovskikh, E.A., Trifonov, Yu.V., The Use of Houston Method for Evaluating Maximum Acceptable Insurance Tariff in Property Insurance of a Business, *Vestnik of Lobachevsky University of Nizhni Novgorod*, No. 4, 2009, pp. 216-218.

[39] Ahmed, A., Ali, R., Ejaz, A., Ahmad, M.I., Sectoral integration and investment diversification opportunities: evidence from Colombo Stock Exchange, *Entrepreneurship and Sustainability Issues*, Vol. 5, No. 3, 2018, pp. 514-527. https://doi.org/10.9770/jesi.2018.5.3(8)