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Technology for diagnosing the effectiveness of an investment portfolio taking into account the strategic risk of emergency: the factor of economic security

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Abstract:Annotation:The technology of forming an investment portfolio, the problems of forming a portfolio in the current conditions are investigated. The approaches to assessing the profitability and risk of the investment portfolio are considered. The concept of strategic emergency risk is introduced (for example, the pandemic of the coronavirus infection COVID-19). The necessity of forecasting such risks, the impact on the economic security of companies, that is, on the profitability and risk of the investment portfolio, is substantiated. A technology has been developed to diagnose the effectiveness of the investment portfolio, taking into account the strategic risk of emergency as a factor of economic security of enterprises. Practical implementation of the developed technique is carried out.

Keywords: Investment portfolio, portfolio profitability, portfolio risk, principles of investment portfolio formation, Sharpe model, strategic emergency risk.

INTRODUCTION

These conditions of the COVID-19 pandemic justify the need to take into account the strategic risk of emergencies in the formation of the investment portfolio, which affects enterprises in different ways. The results of the analysis of statistics of bankrupt enterprises by industries in Russia for 2019 are presented in Fig. 1.

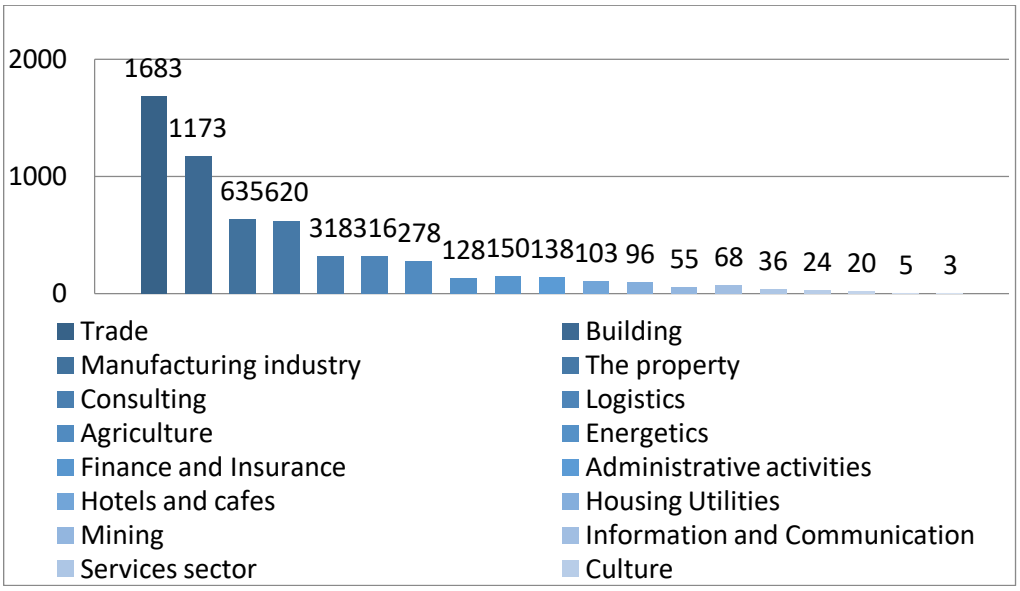

Fig.1:Statistics of bankrupt organizations by industry in Russia [10,11]

The strategic risk of emergency will be understood as the probability of loss of the organization, cost reduction in the event of force majeure negative events (for example, pandemic 2020).
The strategic risk of emergency can lead to a crisis in the production, innovation, financial, personnel potential of enterprises, to a crisis in the supply system, sales, and management as a whole. Thus, the strategic risk of emergency worsens the economic security of the enterprise, reducing its cost.
Investment portfolios are characterized by comparing a specific set of investment tools for profit. The formation of the portfolio is carried out after setting the priority objectives of the investment policy and market conditions and the investment climate. Thus, we can say that the essence of portfolio management is to optimize the management of a portfolio of stock assets, aimed at maximizing the market (exchange rate) value of the securities constituting this portfolio taking into account the strategic risk of emergency circumstances as a factor of economic security of enterprises.
The essence of portfolio management formulated above determines its content. The content of portfolio management, as well as other types of managerial activity, presupposes the availability of technologies and stages in this process. The stages of the investment management process in the stock market are determined by the need to make and revise management decisions, the essential elements of which are the assessment of the general situation, taking into account the strategic risk of emergency, an analysis of the economic security of the enterprises considered for investment, a comparative analysis of investment alternatives and the choice of their optimal options, the actual adoption decisions and monitoring the consequences of their implementation.
The aim of the study is to develop a technology for diagnosing the effectiveness of the investment portfolio, taking into account the strategic risk of emergency as a factor of economic security of enterprises.

LITERATURE REVIEW

Belova V.A. Galanova V.A. Nikitina T.V., Kholodkova V.V. [1,4,7]. The definition of portfolio management, given by Professor C. Harvey, characterizes portfolio management simply as a "money management process", identifying it with investment and money management (investmentmanagement, moneymanagement). However, in Russian and world practice, there is no model for assessing the effectiveness of an investment portfolio taking into account the strategic risk of emergency situations of various enterprises.

METHODS

The fundamental factor in the formation of the investment portfolio is the relationship between the analysis of the investor's own capabilities and the investment attractiveness of the external environment, taking into account the strategic risk of emergency as a factor of economic security of enterprises with the goal of establishing an acceptable level of risk in the ratio of liquidity and profitability [9]. As a result, the main characteristics of the portfolio are set, we consider it necessary to predict the level of strategic risk of emergency circumstances, to optimize the proportions of diverse investments in the entire portfolio in relation to the volume and structure of investment resources.
The general principles of the formation of the investment portfolio involve an analysis of the investment project, the choice of financing method, identification of risks, including the strategic risk of emergency as a factor of economic security of enterprises, development of a risk allocation and financing plan. The priority is to determine the factors that make it possible to pre-select projects. Portfolio investment, by definition, is an investment in order to form a portfolio of securities. Thus, this type of investment is very specific and differs significantly from the classical categories of investments and investments, both in essence and in many other aspects. Portfolio investment in the securities market is characterized by characteristic features that bring this type of investment into a separate, independent type of investment activity [1,2].
In generally accepted practice, a securities portfolio refers to a certain set of securities held by an investor or investment organization. A securities portfolio is a holistic structural asset that has a certain investment quality and a correctly selected ratio of profitability and risk, including the risk of emergency caused by, for example, COVID 2019. Portfolio investment income is the profit received from the aggregate of securities constituting a portfolio with risk-based. However, there is a problem of quantitative discrepancy between profitability and risk, which in the conditions of market volatility should be addressed as soon as possible, in already formed investment portfolios to optimize the structure, as well as in the formation of new portfolios to take into account investor preferences.
The initial stage of the portfolio management process is the formation of an investment policy that includes such areas as the choice of management technology, determination of investment objectives, the choice of stock market sectors and types of securities, the choice of investment geography and the calculation of specific proportions of portfolio formation based on aspects of investment policy taking into account economic security enterprises [3,4].
The choice of technology for diagnosing the effectiveness of an investment portfolio taking into account the strategic risk of emergency as a factor of economic security implies an orientation to the active or passive type

of portfolio management. The first type involves constant operations in order to maximize revenue and benefit from all current changes in the market, "systematic efforts to obtain results that exceed the profitability indicator selected as the goal" [1]. The passive type of management involves long-term investment — strategic investments based on fundamental analysis and forecasting of market trends — followed by a passive expectation of the result, which is set in advance as a certain indicator of portfolio profitability. The definition of investment goals means their specification in the framework of the universal dilemma of investing profitability - risk. That is, it is necessary to clarify what the main goal of portfolio management is to achieve maximum profitability or minimize investment risk.

The choice of market sectors involves specifying the types of securities that should form the portfolio - stocks (ordinary or preferred), bonds, derivatives, etc. On the other hand, it is necessary to determine market sectors in a more general sense, for example, to select securities of large, stable companies or new, fast-growing firms, highlight industry preferences, etc. The choice of investment geography is necessary in the case of the formation of a "transnational" portfolio, when investment is supposed to foreign assets. In this case, it is necessary to determine the regional areas of investment (markets in the USA, Europe or Asia).

Based on the above aspects of the formed investment policy, an approximate calculation of the proportions of asset allocation by sectors, types of securities and investment regions should be made. In other words, the so-called investment schemes or "cost schemes" should be selected, in which the internal proportions of the portfolio are determined, both in terms of inter-instrumental ratios and in terms of the cost content of the invested funds.

The second step in the technology of forming and diagnosing the effectiveness of the investment portfolio should be an analysis of general factors that have a significant impact on the market situation. In particular, at this stage, an analysis of the general economic situation in the country (or region) should be carried out, including both an analysis of macroeconomic indicators and an analysis of the situation in the financial sector (national currency stability, interest rate dynamics, public debt parameters and other indicators that can directly impact on the stock market). In addition, at this stage, it is necessary to analyze the main parameters and trends of the stock market in order to identify its growth potential, predict the dynamics of quotations, determine the possibility of the manifestation of negative factors. Finally, to clarify the proportions of the portfolio being formed, at this stage it is necessary to analyze the industry securities markets (as well as regional ones in the case of international investment), aimed at identifying the advantages and disadvantages of certain areas and industries whose securities may be included in portfolio taking into account the strategic risk of emergency as a factor of economic security of enterprises. [5,12]

The third stage is the analysis and selection of specific securities for the portfolio. The choice should be based on both fundamental and technical analysis of securities (however, the role of the last case of a passive, long-term management style is not very significant). Since the choice of securities is also based on the current level of their quotes, at this stage, clear forecasting guidelines for their dynamics should also be determined - both in case of growth and in case of decline. These guidelines are necessary to specify the subsequent portfolio management technique, namely, to determine levels of closing positions or to stop losses when quotes are reduced. It should be noted that these guidelines should be calculated on the basis of the portfolio proportions calculated at the first stage, and should provide for a balance of forecasted indicators of possible profits and losses.

The fourth stage is the formation of the portfolio itself, that is, the acquisition of securities in accordance with the planned proportions and prices. A mandatory element of this stage should be such technical methods of portfolio management as placing limit orders for closing. These orders are formalized instructions to brokers to close a position if quotes of any security reach certain limits and serve either to fix profits when the planned growth of quotations is reached and investment income can be received in cash by closing a position or to prevent loss buildup for an unsuccessful position that loses value. Accordingly, it is necessary to place orders of both types.

At the fifth stage of the technology of forming and diagnosing the effectiveness of the investment portfolio, taking into account the strategic risk of emergency circumstances as a factor of economic security, operational monitoring of the stock market should be carried out, aimed at identifying changes occurring on it, both positive and negative, that may introduce adjustments to the investment policy and cost parameters of the portfolio. In the case of the manifestation of such factors, there is a need for a situational response to unforeseen changes in the market. Situational management can be considered as an independent stage, however, given that it is episodic in nature, we take into account at this stage.

The sixth stage is the assessment of portfolio performance, which assumes both a qualitative component (within which all key portfolio parameters are assessed - profitability, riskiness, reliability, growth prospects and other characteristics of assets included in the portfolio) and a quantitative assessment of the current portfolio profitability level and its comparison some key indicators (inflation rate, return on alternative investment instruments, stock indices, etc.).

The final stage of the technology for forming and diagnosing the effectiveness of the investment portfolio,

taking into account the strategic risk of emergency as a factor of economic security, provides for the restructuring of the portfolio based on the results of evaluating its effectiveness at the previous stage. Restructuring includes both reforming inefficient investments by selling the corresponding assets and channeling the funds received from it to new investments, and reinvesting part of the income received from successful investments, which also go to form an updated portfolio [6, 11].

The portfolio is formed on the basis of a fundamental analysis of the investment attractiveness of issuers as follows:

1. A comprehensive study of a wide range of responsible and traded securities, the study of associated risks. The moment of entry can be determined by technical analysis tools, choosing the most interesting and promising sectors of the economy (in order to reduce risks).
2. Analysis of portfolio performance through various methods of calculating analytical coefficients used to compare different funds.
3. Risk assessment, including strategic emergency risk. The investor should understand how much he can donate due to risks. For example, an indicator of volatility indicates the presence in the portfolio of assets whose value can change dramatically at any time. Alpha coefficient measures the information about the investor's correct actions. Beta coefficient - how sensitive is the portfolio to index changes [9].

The investor should regularly analyze the volatility and trend in the stock market, the impact of strategic emergency risks on the economic security of the companies included in the portfolio. As a result, decisions are made on a possible sale if the paper:

- did not bring projected income, future growth is not expected, the strategic risk of emergency circumstances adversely affects the economic security of enterprises;
- performed the function assigned to it;
- options for the use of capital appeared more efficient than investing in a given asset with less impact of the strategic risk of emergency [7].
- In order to optimally manage the investment portfolio, the investor chooses from a variety of portfolios his unique option, which ensures the maximum expected return at the minimum risk level for this return, including the strategic risk of emergency as a factor of economic security of enterprises.
- After some time, the initial portfolio can no longer be considered by the investor as optimal, in connection with the transformation of his attitude to risk, profit, preferences for investment instruments, change of forecasts. In this case, you need to review the portfolio:
- Decide on the new composition of the optimal portfolio.
- Identify the types of securities in the current portfolio, necessary for sale, and those that need to be bought in return.

To restructure the existing portfolio.

There are two approaches to actively manage your investment portfolio:

1. A diversified portfolio is similar to a passive index strategy, when an investor does not have specific preferences for relative companies, industries, or individual indicators. He does not change the structure of the portfolio, seeking to benefit from temporary revaluation, or underestimation of certain groups of securities;

2. Non-diversified portfolio - it is dominated by financial assets that relate to a specific market sector, segment, group of enterprises. In this approach, several alternative strategies are distinguished [8,11]:

- Growth strategy - the choice of shares of enterprises for which a rapid increase in profit is observed and expected to exceed the average market indicators;
- Aggressive growth - concentration on shares of companies that are characterized by the highest rates of expected profit growth;
- Income strategy - the prevalence of shares with high dividends;
- Cost analysis - an assessment of the real value of shares. The portfolio consists of a high concentration of strictly defined groups of companies that the market has underestimated in the current time. This type of portfolio is subject to frequent review;
- Timing - identification of short-term movements of the stock market, and in accordance with forecasts, quick rebalancing of the portfolio [3,12].

Even taking into account the rapid growth of assets held by passive investors, the management of most international and national asset portfolios applies active management.

Investment risks - options in which the invested financial resources in the development of the project as a result of certain actions and processes may be partially or completely lost [6]. Recently, strategic risks of emergency circumstances affecting the economic security of enterprises and the reliability of the investment portfolio have

become especially significant.

The classification of sources of risk for investment is divided into two types:

- market risk (systemic) - is closely related to environmental factors that have a global impact on the common market. Risks associated with the level of inflation, the situation in politics, changes in interest rates, currency quotes, the level of demand and others can be more or less calculated, but it is almost impossible for an investor to control them - everything can change at any moment. However, they are the ones that have the greatest impact on portfolio investment;
- non-market risk (non-systemic) - typical for a particular industry. Similar risks are inherent in the activities of an individual investor. Their impact on project development can be minimized if portfolio investments are properly worked out, if necessary, change the investment strategy, streamline project management [2,9].

Strategic risk assessment of emergency is proposed to be carried out by the following methods:

- expert method: for its implementation, it is necessary to attract an expert who does not apply to your company or project. He, based on the data obtained after studying all the materials, provides his expert assessment, calculating the potential risk levels;
- Delphi method: is a kind of expert method. Its essence is to simultaneously attract several experts to evaluate investments. Based on a comparison of their findings, a concept is developed for further actions regarding investment in the development of the project;
- method of analysis: the method under consideration evaluates the appropriateness of costs, identifying the most “promising" areas of risk. This procedure can be carried out by both the investor himself and the involved expert;
- analogy method: the essence of the methods is the evaluation and analysis of investment projects that are interconnected or similar to your project;
- quantitative assessment method: according to experts, this particular method of risk assessment is the most complex and costly. The thing is that it contains several tools for analytics, which ultimately allow you to get qualitative and quantitative estimates in numerical terms for the final decision [9].

Possible tools:

- analysis of possible project development scenarios;
- calculation of project sensitivity;
- determination of startup sustainability levels;
- development of risk models according to the Monte Carlo method.

To minimize the possibility of obtaining distorted results of assessing the strategic risk of emergency as a factor of economic security of enterprises, it is advisable to use different types of assessment in practice, taking into account all the indicators obtained.

We highlight the specific principles of portfolio investment:

1. The principle of high information and analytical security of investment activities.

2. The principle of adaptability to changing market conditions. The implementation of this principle in practice implies, firstly, constant monitoring of the market and the macroeconomic situation, aimed at tracking the influence on the dynamics of quotations of all significant factors and, secondly (in relation to analysis), prompt updating of the system used in the process of forecasting indicators. In emerging markets, these theses are even more relevant, since the set and significance of factors that influence the dynamics of the market are constantly changing.

3. The principle of reasonable sufficiency of income. The application of this principle implies the refusal of the investor from excessively risky investments and the restriction of the portfolio's return on some rationally sound values. This principle comes down to optimization by various methods of the ratio “income - risk”.

4. The principle of responsiveness to a market situation which implies the use of situational management based on forecasting a number of scenarios of possible market behavior in unusual situations.

5. The principle of non-standard investment decisions taking into account the strategic risk of emergency.

The distinguished principles determine the set and nature of the basic conceptual approaches to the technology of forming and diagnosing the effectiveness of the investment portfolio, taking into account the strategic risk of emergency as a factor of economic security.

The technology for creating a portfolio is formed taking into account the needs, goals and requirements of the investor himself: does he need regular income from the portfolio or is it enough to have only a capital gain; whether the investor wants capital gains in the short or long term; whether he wants to have a combination of regular income and capital gains. Finally, the investor must determine his attitude to risk, for example, whether he wants to have a portfolio with low, medium or high risk [1,2,11].

In any portfolio, there is always a need for some free amount of money on deposit. Bonds may be entered into the portfolio. This part of the portfolio has a low degree of risk, bringing a small guaranteed income. Larger portfolios may contain real estate, which can bring a certain fixed income (rent), as well as medium and long-term capital gains. The next part of the portfolio may consist of equity securities (ordinary shares). Here there may be a number of different companies from different industries and more risky shares issued to improve the

company, and shares of new issues. Derivatives, as a hedging element, are also often included in the investment portfolio. Each of the above groups may include not only national but also foreign securities with an acceptable level of strategic risk of emergency as a factor of economic security of enterprises.

The purpose of allocating funds to asset classes is to try to ensure that the portfolio is invested in assets that contribute to the achievement of the portfolio goal in the most optimal way.

There are active and passive investment portfolio management technologies. This separation originates from W. Sharpe [3] and D. Litner, as well as from the work of James Tobin, who noted that the market portfolio, that is, the totality of all the securities currently available to the investor, is effective. Moreover, any combination of a market portfolio, taking into account the strategic risk of emergency with a risk-free asset, again gives an effective portfolio that has less risk, although with a lower expected return.

It should be remembered that D. Tobin made his conclusion under a number of theoretical assumptions that were not true. In particular, it was assumed that the market is in a state of equilibrium, transaction and transaction costs are not significant, the investor has the opportunity to receive and provide loans at the same risk-free rate, etc.

Nevertheless, the very assumption that the market portfolio is close to effective laid the foundation for passive portfolio management. This strategy means that the investor, when compiling the portfolio to determine its expected return, focuses entirely on the market portfolio and is not very busy changing the composition of the portfolio after its formation. The philosophy of passive management is to minimize the costs of market research and the formation of the portfolio itself with a sufficiently high guarantee of stable returns.

It must be borne in mind that an investor adhering to a passive strategy, however, should periodically review its portfolio. The market is constantly changing, so the proportion of individual securities in connection with the changing environment may change so much that the difference between the investor's expected income and the market portfolio income can be very significant.

In fact, when drawing up its portfolio, the investor focuses on some benchmark portfolio, that is, one whose profitability is the benchmark compared to the profitability of the real portfolio.

The main objective of active technologies is to obtain higher returns than the reference portfolio. At the same time, he decides in advance for himself what his reference portfolio will be. After that, the investor's work is assessed by comparing the returns of his portfolio with the reference. Since, according to the Sharp-Litner Capital Asset Pricing Model (CAPM), the expected return on a portfolio is completely determined by its market risk, i.e., its beta coefficient, but taking into account the strategic risk of emergency circumstances.

As an approach used in the process of portfolio investment, we can name the efficiency of portfolio management. This approach also assumes that the investor is always prepared for unusual situations (periodically occurring in emerging markets) and is aimed at increasing the psychological stability of a market participant to the effects of destabilizing factors. The implementation of this approach in practice is based on the use of certain patterns of behavior in the context of various scenarios of non-standard situations, which should be developed in advance at the stage of preparation of the investment policy. The role of such methods in developing markets is very large, since they are constantly influenced by various factors (political, macroeconomic, global), the main negative property of which is unpredictability and suddenness of manifestation. Since it is extremely difficult to predict such factors (for example, the resignation of the president of a country or the outbreak of hostilities), there is a need to apply situational management in portfolio management, involving the use of previously developed methods for responding to destabilizing factors.

As the last of the most significant approaches to organizing portfolio management in emerging markets, we can offer a reduction in portfolio risk. The need to apply this approach is determined by the high level of systemic risk, the strategic risk of emergency, as a result of which it is advisable to use methods aimed at reducing the risk level of a particular portfolio. Two forms of risk reduction can be distinguished. First, portfolio restructuring after evaluating its effectiveness, in which, on the one hand, the liquidation of unsuccessful positions is performed and, on the other hand, reinvestment of the received income at the end of a certain investment cycle. In our opinion, in modern conditions it is also necessary to quickly and continuously reduce the level of risk by involving a number of investment technologies.

Operational reduction of the risk level should be carried out by transferring part of the assets from high-risk stock instruments to cash after reaching the rational yield on these securities (which is due to the principle of reasonable sufficiency of the income level formulated above). Such operations should be aimed at maintaining the proportions of the portfolio that determine its level of risk, which are laid at the stage of formation of investment policy. The transfer of part of the assets into cash (it can be just cash, or their investment in low-risk assets such as government securities or deposits of reliable banks) involves the mandatory formation of a certain reserve fund within the portfolio. The funds of that part of the portfolio serve both as a reduction in the overall level of portfolio risk and as a reserve in case additional investments are necessary under certain conditions (for example, when positive factors appear that can be used to increase the profitability of operations), and the formation of such a reserve for strategic emergency risk can highlight as an auxiliary approach to the organization of portfolio management. In addition, for the operational reduction of strategic risk, it is proposed

to use investment technologies aimed at insurance of risks, such as hedging, averaging, lock ("locking").

In modern conditions, there are the following main problems of investing. This is, first of all, the lack of the ability to maintain normal statistical series for most financial instruments, which leads to the impossibility of applying classical Western methods. Difficulty in predicting the strategic risk of emergency as a factor of economic security.

At the analytical stage, such a stage is also necessary, such as determining the degree of influence of fundamental factors on the market and identifying empirical laws, which is also determined by the presence of individual characteristics of each market. So, events of a political (for example, presidential election) or macroeconomic nature (changes in the rates of the central bank), medical COVID 19. have different degrees of influence in different markets and the application of certain universal standards is impossible here. The same applies to empirical patterns. Another stage of this stage also involves the analytical development of the investment environment, namely, the identification of optimal time ranges for opening and closing positions. The need for this stage is determined by the cyclical behavior of the market economy and the dynamics of the stock market reflecting its state (based on this cyclical nature, numerous theories have been developed, the most famous of which is the wave theory of R.N. Elliot). The presence in the dynamics of the stock market of periods of recession and growth makes it possible to obtain additional advantages by opening positions at the bottom of the market and closing them at the peak, which must be taken into account in the asset management process. The last stage of this stage is actually forecasting the movement of the market as a whole and individual instruments, then it precedes the stage of portfolio formation and management.

The next problem is related to the process of mathematical modeling and investment portfolio management. When forecasting a possible change in the value of the portfolio, problems arise in modeling and using the mathematical apparatus, in particular, the statistical one. However, at the moment, an adequate mathematical apparatus for all possible options has not yet been developed. This is due to both the small experience in the development of the Russian financial market and the objective mathematical complexity of the models.

In addition, there is the problem of optimal achievement of investment goals. To set the task of forming a portfolio, an investor needs to give a clear definition of profitability and reliability, as well as to predict their dynamics in the near future. The development of the goals system in the framework of the investment policy of the portfolio manager, in our opinion, is specific in nature, which is due to the two-level orientation of activities in the securities market. On the one hand, a traditional goal setting is required, similar to that used in any management process. On the other hand, the goals of portfolio investment should be expressed in the specific final characteristics of the securities of the portfolio being formed. Not enough attention is paid to this particular goal of portfolio investment targeting: for example, the US Open and Mutual Funds Association (Institute of Investment Companies) identifies such diverse investment goals as, for example, aggressive growth, a balanced fund and municipal bonds, that is, they combine as linearly aligned goals completely heterogeneous categories. In our opinion, the duality of portfolio investment goals makes it difficult to apply conventional approaches to building their hierarchy (linear, "goal tree", etc.). It seems more rational to cross-targeting aimed at mutual coordination of the investment goals and target characteristics of the securities of the portfolio being formed.

Methodology for assessing the effectiveness of the investment portfolio taking into account the strategic risk of emergency as a factor of economic security of enterprises

- Determining the market value of the portfolio;
- Determining the profitability and liquidity of the portfolio;
- Determination of the strategic risk of emergency and the total financial risk of the portfolio;
- Definition of duration, or average maturity of securities portfolio.
- Optimization of the portfolio structure in accordance with the objective function and system of restrictions.

When analyzing the liquidity of securities, it is necessary to study its two components. Since the company works with securities in two modes - active when it buys securities of other issuers in order to generate income, and passive when the company itself issues securities in order to raise cash. It is necessary to distinguish between active and passive liquidity of securities.

The liquidity of active-type securities occurs when the company, as the holder of securities, selling them on the stock market, receives the planned cash. The liquidity of passive securities is characterized by the financial condition of the issuer itself as a seller of securities, capable or incapable of fulfilling its obligations to buyers or holders of securities to pay the face value and accrued interest. Liquidity is inversely related to the financial risk of the security.

We assess the risk of the securities portfolio by the range of fluctuations or the standard deviations of income for the securities in question, taking into account the strategic risk of emergency for each security. The smaller the standard deviations of the income of the securities, the more stable, and therefore more reliable the investment of the enterprise in securities. The standard deviation (SD) of income is calculated using the following formula:

$$\sigma_j = \sqrt{\sum_{i=1}^{n} (D_i^j - D_{cp}^j)^2 * p_i^j} * (1 + r_j)$$

where, D_i^j, D_{cp}^j is the security income predicted in accordance with static probability and the total, by all probability estimates, security income;

p_i^j - statistical probability of income of securities in accordance with different levels of risk;

rj - is the level of strategic risk of emergency.

The total portfolio risk is determined by the formula:

$$\sigma_{\text{portfolio}} = \sqrt{\sum_{j=1}^{n} D_j^2 \ * \sigma_j^2 + \sum_{j=1}^{n}\sum_{i=j}^{n} D_j * D_i \ * \sigma_j * \sigma_i * cor_{ji}}$$

Then we determine the beta coefficient of the shares according to the formula:

$$\beta_j = \frac{COV_{jx}}{\text{var}_x}$$

COV_{jx} -covariance of profitability j and reference value

var_x - standard variance

To determine the beta coefficient of the portfolio, we use the formula:

$$\beta_{\text{portfolio}} = \sum_{j=1}^{n} \beta_j * q_j$$

Beta coefficient is a measure of market risk, the coefficient can be calculated both for an individual stock and for an investment portfolio, determines the ratio of the yield of the security to the yield of the market, it has a number of conditions from which conclusions can be drawn:

- If beta = 0, then there is no correlation between the yield of the market and the security;
- If beta = 1, then the price of the security changes in the same way as the market index;
- If beta> 0, then the price of a security grows faster than the market grows and falls faster than the market falls;

If beta <0, then the yield of the security and the market are multidirectional

The calculation of the U. Sharpe ratio of stocks and portfolio taking into account the strategic risk of emergency is carried out according to the formula:

$$SHR_j = \frac{D_j - D_m}{\sigma_j * (1 + r_j)}$$

D_j - yield j of a security

D_m - return on risk-free investment

σ_j - security deviation j

r_j - strategic emergency risk for j security

Sharp's coefficient (SR) shows the level of additional yield of a security per unit of risk. Risk-free yield is the yield of government bonds. The yield on government bonds is 6.50%.

It is recommended that investors choose the assets with the highest U. Sharpe ratio and it makes sense to increase precisely such shares of portfolio assets.

RESULTS

The technology of forming and diagnosing the effectiveness of the investment portfolio taking into account the strategic risk of emergency as a factor of economic security has been implemented.

stocks	weight%	income, r (%)	risk σ (%)	Probability of losses from the risk of emergencyrisk
MTS ao	25,54%	0,71%	4,07%	0,06
Sberbank	11,50%	-0,27%	3,32%	0,05
MOS exchange	4,28%	-0,54%	4,29%	0,05
Rosneft	10,63%	-0,24%	5,75%	0,25
GAZPROM	4,40%	-1,07%	2,90%	0,1

Aeroflot	11,34%	1,07%	6,06%	0,2
Lukoil	32,30%	-0,44%	8,27%	0,3
M, INDEX		-0,48%	3,10%	0,23

Portfolio return	
R portfolio	0,034%
Dispersion	0,22%
Risk (σ)	4,678%

Sharpe ratio (SR) for stocks		
MTS	0,156617037	
Sberbank	-0,104848521	
MOS exchange	-0,143843179	
Rosneft	-0,055224282	
GAZPROM	-0,396751797	
Aeroflot	0,164448275	
Lukoil	-0,062856758	
β-coefficient for each stock in the portfolio	**β-coefficient**	cov im
MTS ao	1,057996788	0,000674091
Sberbank	1,034555931	0,000659156
MOS exchange	1,168598138	0,00074456
Rosneft	1,348385835	0,00085911
GAZPROM ao	0,767160603	0,000488788
Aeroflot	1,16595615	0,000742876
Lukoil	1,507120056	0,000960245
β coefficient for portfolio	1,235426133	

Excluding the strategic risk of emergency, the results are as follows.

Portfolio return	
R portfolio	0,034%
Dispersion	0,15%
Risk (σ)	3,875%

Thus, the study carried out the practical implementation of the methodology for assessing the effectiveness of the investment portfolio, taking into account the strategic risk of emergency as a factor of economic security of enterprises. The analysis will allow you to adjust the investment portfolio taking into account the various strategic risks of emergency circumstances of enterprises in various industries.

DISCUSSION

The authors identified the problems of forming an investment portfolio in the current conditions of strategic risks in different ways affecting the economic security and value of companies. The approaches to assessing the profitability and risk of the investment portfolio are considered. A methodology has been developed to assess the effectiveness of the investment portfolio, taking into account the strategic risk of emergency as a factor in the economic security of enterprises. However, the authors are not clearly spelled out the algorithm for determining the level of strategic risk of emergency for enterprises in various sectors of the economy.

CONCLUSION

The study proposed a new meaningful interpretation of the concept of strategic risk of emergency as a factor of

economic security of enterprises. Investigated are the procedures for forming an investment portfolio, approaches to assessing the return and risk of an investment portfolio. The necessity of predicting the impact of the strategic risk of emergency on the economic security of companies is substantiated. And, as a result, on the return and comprehensive risk of the investment portfolio. A technology has been developed to form and diagnose the effectiveness of the investment portfolio taking into account the strategic risk of emergency as a factor of economic security. A practical implementation of the developed methodology was carried out using the example of a group of Russian companies.

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