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**SELECTION AND MANAGEMENT
OF INVESTMENT STRATEGIES' PORTFOLIO**

**Summary of Doctoral Dissertation
Social Sciences, Economics (04S)**

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Vilnius



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VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

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VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETAS

Raimonda MARTINKUTĖ

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PARINKIMAS IR VALDYMAS**

Daktaro disertacijos santrauka
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1. General Characteristic of the Dissertation

The topicality of the scientific problem. Increasing level of uncertainty and growing investment risk is the setting for the development of financial system and its components. Driving motive of development of financial system is the development of financial instruments giving possibility to deliver all financial services for participants in financial market. Everyone wishful to survive and expand his business has to react instantaneously and to adjust chosen investment strategy according to the market changes. Investors are looking for new means and strategies that are more adequate to changing market conditions and investors' purposes to hedge growing risk, without losing of gain possibilities. Innovations are important to financial system, because quite a big part of economical problems can be solved using financial novelties.

For a long time mostly intensive creation of financial innovations can be found in the field of derivatives especially in the sphere of option contracts and their combinations. Options may be used to construct various investment strategies, suitable for different market situations and individual standpoints of investors about risk-revenue ratio. Insurance dimension characteristic of option contracts provides distributions of incomes hardly possible using traditional investment means.

Scientific and practical utility of portfolio investments had been motivated by empirical researches of various authors long before. The same proposition could be said about analysis of advantages of option contracts and their investment strategies. It is purposeful to find methods helping to join the advantages of both portfolio investments and option investment strategies in order to satisfy investors' need to manage growing investment risk.

The author defends a thesis that for the investors seeking in particular limits to reduce losses appearing because of the market uncertainty, it is purposeful to form a portfolio of specific structure. Such portfolio should include not only separate derivatives but also their certain sets considering the influence of market factors as stochastic values on their practical usage.

It's possible to state that in financial literature there were no scientific researches of formation and management of "portfolio from portfolios" including various derivative securities under conditions of risk and uncertainty until now. In Lithuania a little attention was paid to the application possibilities of options and their investment strategies. Carried scientific research allowed creating an idea of innovative investment mean, which includes theoretical substantiation and possibilities of practical use implemented in the work.

The exploration level of scientific problems. The main portfolio construction studies and research of features and application possibilities of option investment strategies was made by foreign scientists. The biggest part of scientific works is devoted to the pricing problems of option contracts and evaluation of effectiveness of different option investment strategies. Some works

are devoted only to theoretical aspects of these investment instruments. In Lithuania only a few authors are interested in problems of practical application of option strategies, some parts of financial literature are devoted to theoretical descriptions of option contracts. A little more interest can be seen in the field of portfolio construction using stocks or government securities.

The aim of the work is to create and to verify practically the idea of portfolio construction from investment strategies, including option contracts and to use the principles of portfolio adequate to evaluation of reliability of investment results for the implementation of this idea.

The tasks of the work:

1. To systemise theoretical aspects of options as investment means in order to determine their key exceptional characteristics.
2. To investigate the scale of options' trading in foreign countries and tendencies in Lithuania and to analyse the main problems arising in using of these derivatives in our country.
3. To carry structured analysis of options investment strategies as a mean of investment decision-making, highlighting the suitability of strategies for satisfying different expectations of market directions.
4. To analyse classical and modern portfolio formation theories, to highlight their doubtful parts, and adequacy and application under real market conditions. Using the analysis to choose a model the most adequate according to certain criteria for the formation of option strategies' portfolio.
5. To investigate options' price behaviour under uncertain conditions and using imitative modelling to offer a model allowing to evaluate the price of the option as a function of stochastic values.
6. After systemising the results of investment strategies expressed arithmetically, to form investment strategies evaluation algorithm needed for the formation of strategies portfolio.
7. To create and showcase the application of investment strategies portfolio, allowing fulfilling the goals of investor under changing market conditions.

Object of the research. Investment strategies including option contracts.

Methodology and scheme of the research. Systemic, comparative, logical, graphical analysis of scientific literature was used for structuration and generalisation of theoretical aspects of the dissertation. For the evaluation of situation in Lithuanian and foreign markets, collecting and analysis of economical-statistical data was used. In order to obtain the results under uncertainty mathematical-statistical methods and imitative modelling was used.

While solving tasks rose in the dissertation, original scientific works of foreign authors, internet sources of data, investigations about topics, analysed in the dissertation, carried by Lithuanian scientists, statistical data of Bank of Lithuania, information of Statistical Department of Lithuania, internet data of foreign banks and markets were used. For the model of options investment strategies' portfolio selection and management created in the dissertation,

particular empirical data were used, on the base of which using of imitative modelling other data needed for the functioning of the model were generated.

Novelty and theoretical significance of scientific research. Model of option price determination, allowing treating the main economical factors as the random measures, was created. An idea of formation and use of portfolio of investment strategies including options was formed and the system of practical realisation of such portfolio under the conditions of risk and uncertainty, typical for the modern market was suggested.

Practical significance of the work. Practical results of this work are useful in forming the better conditions for the development of Lithuanian financial market, stimulating the application of financial innovations especially in the sphere of safer investing. After investigating the situation in Lithuanian and foreign financial markets, the main reasons impeding the application of options in our country were determined. Model of evaluation of option price as stochastic measure, proposed in the work, allows the investor to evaluate possible price of option under certain market conditions and using the obtained results to determine possible results of options' investment strategy for such a market situation. Offered portfolio formation ideology presents an original view of the whole process of portfolio formation that gives possibility to reach wanted results according to individual criteria of the investor and rationally to distribute limited financial resources.

Work approbation. The results of the work are introduced in 18 scientific articles, including 3 articles in reviewed periodical scientific editions. During the doctoral studies 13 reports were made at Lithuanian and international conferences.

The scope of the scientific work. The scientific work consists of introduction, three parts, generalizing conclusions and suggestions, the list of literature sources, the list of author's publications and appendices.

2. Investment Strategies as a Tool of Decision-Making

Theoretical aspects of option contracts. In this section the concept of options, their existing classifications are given, the main characteristics, excepting options from other financial tools are revealed. The option is called a contract between buyer and seller, giving its buyer the right (not the obligation) to buy or sell certain asset in the future at the price fixed today. Two kinds of options are distinguished: call options and put options. Call option gives the right to buy security or other asset at the price and amount fixed in advance. Put option lets selling of fixed asset at a given price. In author's' opinion, it is essential to emphasise the main characteristic of the options – the holder is not obligated to use acquired right and necessarily buy (or sell) certain securities, but the premium he paid is not returnable. Call option buyer expects the price of object

to rise; put option buyer expects the fall of prices. This section is necessary for understanding the essence of options and their further application in investment strategies.

The development of option trades in foreign countries and Lithuania. The second section gives comparable analysis of development of option trade based on statistical data of specialised foreign exchanges and Bank of Lithuania. Using the research of statistical data author affirms that option trade is quite small in Lithuania financial market comparing to some foreign countries. In author's opinion one of the reasons, why these contracts are used not so numerously in our country, is that these instruments have recently appeared in Lithuania, in 1999, that's why the most enterprises lack general information on these contracts and all possibilities of their application. Lithuanian securities market deals with the problems of liquidity and activity, the slow application of financial innovations. Further more, the option contracts as well as their pricing are sufficiently complex for enterprises as much as for individual investors. Author makes conclusion that these shortcomings outbalance the advantages of options, but the analysis of statistical data shows that interest in option contracts is growing and the perspectives of the future of these contracts may be emphasised.

The research of investment strategies of option contracts. The third section is devoted to structural substantiation of option investment strategies, to research of their application possibilities and analysis of possible results at the different investing conditions. In order to present more clear analysis of the results of such investing graphical profit patterns of strategies are presented. After systematising the results of investment strategies given in the literature the author formed the definition of investment strategies of option contracts. It is purposive combination of different options and/or joining with underlying securities on the basis of future market perspectives and determined risk/reward intercourse. After analysing of literature and researches of existing investment strategies author proposed to classify investment strategies of option contracts by the strategy structure and criteria of market trends. Such distribution reveals the riskiness of the strategy and lets proceeding from simple to complex strategies systematically. The research reveals that a big number of option investment strategies are created so the conclusion about the exclusive characteristics and application advantages can be made. Concrete investment decision and selection of the strategy will depend on investor's bent for risk and on his expectations about market changes.

3. The Analysis of the Theories of Portfolio Formation and Management

In this part of dissertation the analysis of classical and modern theories of portfolio formation is done, having the aim to reveal their advantages and shortcomings, the possibilities of practical application and, on the basis of made

conclusions, to select model, which would be suitable for the formation and management of portfolio of investment strategies.

In the section “The development of the science of portfolio investment and evolution presumptions” the publications of such authors as Fisher (1930), Markowitz (1952), Tobin (1958), Sharpe (1963), Black, Scholes (1973) and others, revealing the stages of modern investment development, are analysed. The next sections give some more detailed research of Markowitz, market, capital asset pricing, multifactor portfolio formation models and reveal the main aspects and problems, related with application of these models in the market. Summarising the systemised material, the main problems of application may be distinguished: the presumptions used in these models are often inadequate to the real market conditions, the usage of mean and standard deviation variables to make the decision and the condition of point estimation of portfolio profitability and its influencing factors. The raised problems are partly eliminated by innovative theory of portfolio adequate to evaluation of reliability of investment results. This theory treats factors influencing portfolio results and separate portfolio characteristics as random variables, the possibilities of which are described by distributions of probabilities. In adequate portfolio theory it is proposed that the average mean of portfolio profitably is not always the most suitable value to determine the certain position of portfolio results. So in this theory the whole spectrum of possibilities of random variables is analysed. Seeking to take into consideration all possibilities of portfolio profitability this theory analyses not the efficiency line but the whole efficiency zone that is composed from efficiency lines of all quartiles. Further more it is orientated towards the evaluation of the reliability of results.

The analysis of the researches of various authors in the portfolio formation field proved the urgency and necessity of portfolio formation theories for the specialists in the finance sphere. Author made the conclusion that adequate portfolio formation method is the most suitable in the case of such financial means as options because of certain characteristic giving non-symmetrical distributions of returns of these contracts.

4. Modelling of Portfolio of Investment Strategies

The third part of dissertation is divided into three sections, dedicated to the research of the main stages of the model of portfolio of investment strategies. The author presents such a logical scheme of the investment strategies’ portfolio construction: 1) proper evaluation of option prices, 2) evaluation of chosen investment strategies including options, and 3) portfolio construction using appropriate portfolio theory. All measures have to be treated as random variables.

Determination of options prices. This section is devoted for conceptual substantiation of option price and pricing methods and for practical modelling of option price that is necessary to get further results of the work. According to

author's affirmation this is the main stage while forming the algorithm of formation of portfolio of investment strategies. The option price or premium is the sum of money got or paid while selling or buying options. Analysis of the essential factors influencing prices of option contracts enabled the author to make the conclusion that the volatility of stock price showing the riskiness of the stock is one of the main and most difficult to determine factors, because this parameter is the only one that isn't known exactly at the moment of contract conclusion. There is need to analyse this factor in detail.

The analysis of various authors' works proved the importance of the riskiness of stock price in options evaluation. The main problem has already emerged choosing which volatility to use for option price calculation. This concept can have three meanings: historical volatility, implied volatility and forecasted volatility. Based upon presumption about non-determination of market factors made in the adequate portfolio model the author used the ideology of forecasted volatility and real market data to evaluate the riskiness of stock price as random variable. For that purpose the certain situation have been modelled: it was supposed that at the end of option contract the price of underlying stock would be random variable, that under the settled practice should submit to laws of normal distribution with known mean (μ) and standard deviation (σ) parameters $\sim N(\mu=120 \text{ Lt}; \sigma=12 \text{ Lt})$. Using imitative modelling and fixed parameters a set of possible stock price at the end of contract had been modelled. The stochastic distribution of the stock price is given in the Figure 1.

Based on the distribution of stock price and the main parameters of mean and standard deviation, the factor of stock price volatility has been calculated, necessary in determining the size of option premium.

In the most models of option evaluation the presumption is made that the above mentioned volatility factor doesn't change, but this is not true in the point of view of real market conditions. Volatility is random variable that has its own riskiness and possible fluctuations.

With the aim that modelled portfolio would be more close to real market conditions and wouldn't break heavily the presumptions of Black-Scholes model used for option pricing as well, the condition have been raised, that stock price volatility will be treated as random variable with the mean equal to obtained volatility meaning and certain little meaning of standard deviation.

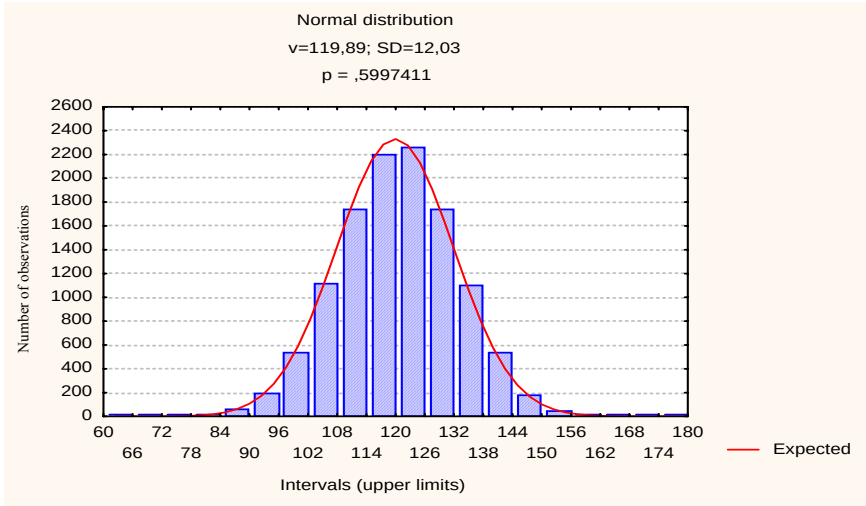


Figure 1. Stochastic distribution of the stock price

It is quite hard to determine proper option price in the practice. This price is sensitive to any small changes of factors influencing it. As it was mentioned Black-Scholes option pricing model was chosen for the research. This model includes all necessary factors significant for calculating of option price which historical data can be collected and edited. Mathematical expression of Black-Scholes model used in the work is presented in Formulas 1-4:

$$c = S N(d_1) - X e^{-r(T-t)} N(d_2), \quad (1)$$

$$p = X e^{-r(T-t)} N(-d_2) - S N(-d_1), \quad (2)$$

$$d_1 = \frac{\ln(S/X) + (r + \sigma^2/2)(T-t)}{\sigma\sqrt{T-t}}, \quad (3)$$

$$d_2 = \frac{\ln(S/X) + (r - \sigma^2/2)(T-t)}{\sigma\sqrt{T-t}} = d_1 - \sigma\sqrt{T-t}, \quad (4)$$

where: c – value of European call option; p – value of European put option; S – current stock price; X – strike price of the option; $T-t$ – time to expiration of option; r – risk-free interest rate; q – rate of dividends; σ – volatility of stock price; N_1 , N_2 – cumulative probability distribution function.

Because of stochastic nature of many financial parameters, the price of option contract should be treated as stochastic variable, described using probability distributions. In order to analyse the behaviour of the option price under conditions of uncertainty, the author treated risk free interest rate as stochastic variable with known parameters of mean value and standard deviation. Other influencing parameters were constant. The research showed that growing

riskiness of interest rate had an effect not only upon riskiness of option contract but upon its mean value too. Put option is more sensitive to these changes, so it is necessary to pay proper attention to riskiness evaluation of factors influencing the price of option contract.

Originated computerised model of option price estimation under conditions of interest rate as stochastic variable and estimated set of possible variations of stock price was supplemented by other necessary calculations and conditions. This supplemented model was used to simulate chosen situations needful for further formation of investment strategies' portfolio. Using concluded remarks about the relationship between option price and riskiness of its influencing factors and inadequate conditions of point estimated values of these factors, a few cases of option prices were estimated. All composing elements of option price were treated as random values, with forecasted parameters of mean and standard deviation expressing the riskiness of describing element.

Evaluation of investment strategies In this section, basing on option prices modelled and arithmetical expressions of option investment strategies, the author created algorithm of evaluation of chosen investment strategies and applied it practically. The determination of the exact logical – arithmetical expression of investment strategy is the most important stage of evaluation of strategy, because the greatest part of strategies consists of positive cash flows, as well as negative ones. Logical – arithmetical expressions of the results of some investment strategies are presented in Table 1, where A presents the price of the stock at the end of option contract, X presents the strike price, S is the purchase price of the stock, c and p are the premiums of call and put options accordingly.

Table 1. Possible results of the evaluation of options investment strategies

Investment strategy	Market conditions	Results of the strategies
Buying protective put	$A < X$	$X - p - S$
	$A > X$	$A - p - S$
Writing covered call option	$A < X$	$c + A - S$
	$A > X$	$X + c - S$
Buying call option	$A < X$	$-c$
	$A > X$	$A - X - c$
Writing call option	$A < X$	c
	$A > X$	$X + c - A$

After analyzing of computed possible results of investment strategies generated using imitative modelling, the author has noticed regularities typical to options, stressed in analysed researches, such as asymmetry and decreasing risk factor, when option is included in investment strategy, in case when changes of market factors are predicted properly. The results were received taking an assumption that the factors influencing the prices of options are random variables, while in analysed sources of literature the assumption, that factors have

exactly estimated value, is emphasised. It is possible to make a conclusion, that the involvement of risk and uncertainty in options and in evaluation process of their strategies does not change their main characteristics. Fitting to theoretical normal distribution of the results of chosen investment strategy, is presented in Figure 2.

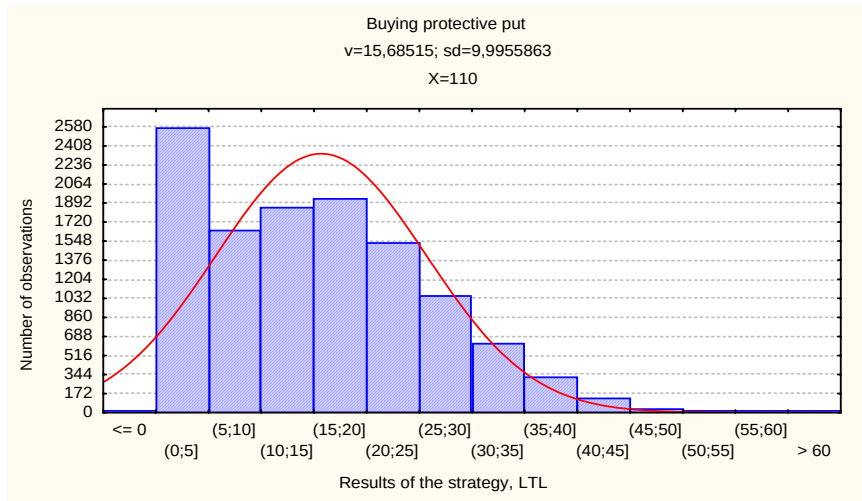


Figure 2. Histogram and its fitting to theoretical normal distribution of protective put buying strategy

The research carried out by the author has shown, that integration of options and stocks into one strategy changes receivable earnings distributions, besides options reduce value of standard deviation in the case of the right guess about the market directions and often gives negative asymmetry coefficient. Therefore the use of average-standard deviation method for the analysis of such combinations can lead to incorrect conclusions. Willing to understand correctly effectiveness of stock and option set, it is necessary to evaluate not only two first distribution moments, but also moments of higher degree of the distribution.

Formation and analyses of investment strategy portfolio. In this section of dissertation options portfolio is formed, using evaluated effectiveness results of options strategies and chosen portfolio method. The choice of adequate portfolio model is based on the assumption, that use of options in portfolio gives asymmetrical results, while theory of classical portfolio is suitable in the case, when asset incorporated in portfolio can be described using symmetrical distribution and it is enough to evaluate its average and standard deviation for its analysis. An idea of formation of strategies' portfolio is rationale usage of both options features and portfolio ideology together, pursuing to create innovative financial instrument.

Three portfolios having different structure were composed for the demonstration of the efficiency of investment strategies portfolio formation model. The first portfolio was composed of two strategies, other two portfolios – of four strategies. The first portfolio is designed to demonstrate possible portfolio results in the case of false guess of market direction. The second one because of its structure is suitable in the case, when there are no particular prognoses of market behaviour. The third portfolio is used for investing in the market where prices increase, because such assumption was already made in the first stage of portfolio formation, devoted to the evaluation of option prices.

The objective of investor to choose the optimal portfolio, depending on individual investing characteristics, motivates to appeal to main characteristics of average portfolio profitability and risk, expressed in terms of standard deviation. The set of these parameters is important for the investor, especially portfolios, which are on the bound of the criteria set. In the modern portfolio theory stressed average-standard deviation sets of portfolio results are shown in Figure 3.

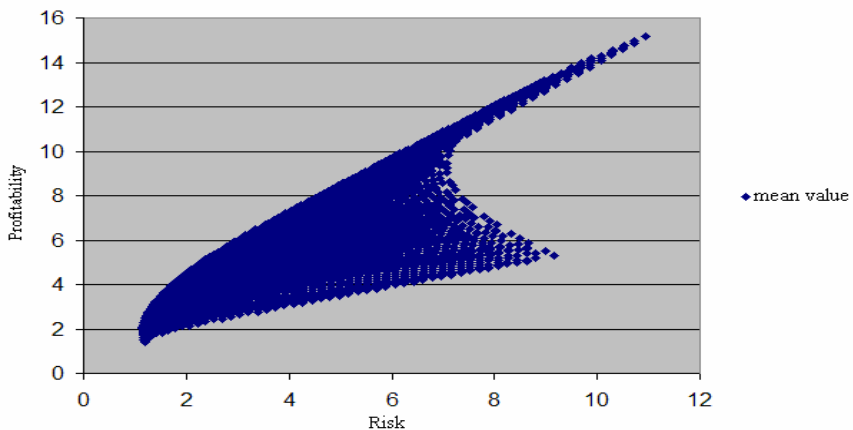


Figure 3. Sets of average-standard deviation portfolios

It is possible to find out from Figure 3 that the logic of classical portfolio remains and investor content to take the highest risk for maximum profitability has to choose one strategy giving the highest point in portfolio results set. However, two parameters can complicate investor's selection of optimal portfolio, especially when strategies with asymmetrical distributions are in the place of traditional assets and possible portfolio profitability is stochastic values. Therefore adequate portfolio formation model was invoked for further analysis of portfolio. Investor is usually interested in all profit possibilities under certain level of risk and guarantees of these possible values, not only average value. For the accomplishment of this goal it is advisable to analyze distributions of other

values, characterizing profit, as well. In Figure 4 the author presents sets of the results of investment strategies' portfolios, including mean value, maximum value, minimum value, first quartile, second quartile and third quartile of portfolios results.

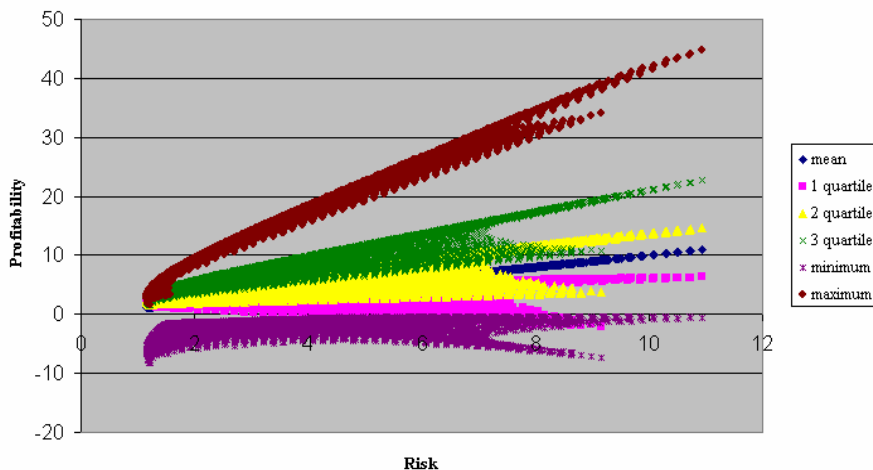


Figure 4. The sets of results of all quartiles – standard deviation portfolios

Seeking to highlight the reliability of portfolio results the author presents the aggregate of possible results of portfolios where every level of profitability has its risk zone and the level of guarantee. Such set of results is called as the set of density functions, depending on risk level. Density function shows probability, guarantying certain level of profitability under chosen level of risk or vice versa. Investor is interested in probability, that chosen profitability won't be less than certain level. He seeks to maximise guarantee that his profitability won't be less than chosen level. The set of density functions of portfolio results is presented in Figure 5. Using information presented in Figure 5 investor can find out that combination of maximum possible profitability and highest risk value can be achieved with quite a low possibility. Having such information investor can choose more guaranteed results matching his individual criteria.

After the analysis of results of investment strategies' portfolio the conclusion can be made that portfolio as the mean of decision making is suitable not only for the research of the set of assets but for the set of strategies too.

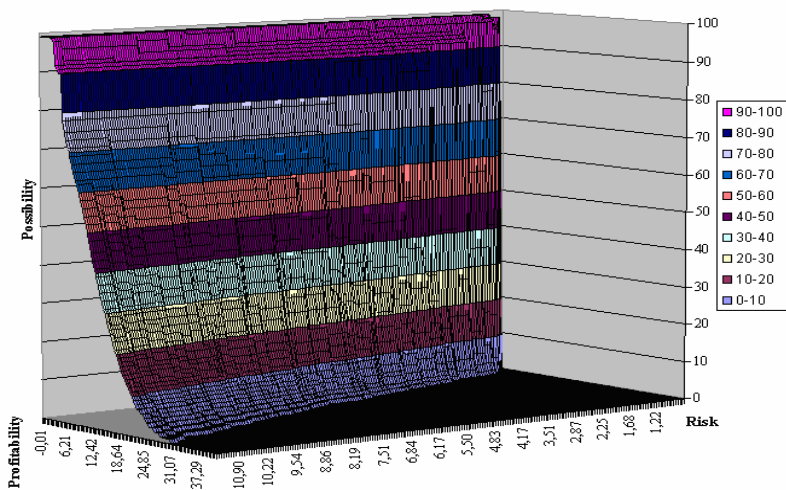


Figure 5. Set of density functions of investment strategies portfolios results

Despite the fact that the structure of portfolio is innovative, the method of adequate portfolio is appropriate for the reception, analysis and further adoption of the received results. Portfolio of investment strategies is suitable mean for investment decision making. Having possibility to regard at the guarantees of possible results investor can form and manage portfolio, suiting his individual requirements under changing market conditions.

Generalization of Work Results and Suggestions

1. Systemic analysis of the literature leads to the conclusion that only quite intensive and innovative development of financial system can create realistic conditions for development of economical, technological and social processes. Development of financial system should follow all three extremely important aspects: development of financial institutions, means and markets. The key aspect is the development of financial means ensuring full-fledged whole of financial tools, satisfying needs of economy, citizens and state's financial sphere.

2. The analysis of the state and the development of financial means shows that, in this point of view, Lithuanian financial system is not enough innovative and asks for immediate solution of some important problems, especially in the field of derivative securities.

3. The key obstacles of the application of options in Lithuanian markets are the lack of detailed information, which causes the absence of potential customers, scarce number of needed specialists, problems and weaknesses characteristic for the Lithuanian securities market, certain characteristics of the society, which cause a slack usage of financial innovations. Options and their pricing are quite

complicated for Lithuanian companies, individual investors that have a little experience, and, despite that, they are more expensive than other derivatives.

4. After analyzing and generalizing literature, devoted for the investigations of options and their strategies, author proposed the conception of options investment strategy: it is a result of combining or joining different options with other financial means, obtained considering the potential economical changes and risk/profit ratio individually determined by the investor.

5. Finance science is developing and investment means are becoming more and more complicated, so new portfolio formation and management ideas, more advanced models helping to solve the problems of classical models adequacy to the real market conditions are looked for. Carried analysis of different authors in the sphere of portfolio formation allowed evaluating problems of classical portfolio theories and to choose the appropriate model for reaching the dissertation goal. For the formation of investment strategies portfolio the adequate portfolio method was chosen as the most proper for the solution of the problems of such portfolio.

6. Author suggests dividing investment strategies portfolio model into three basic stages: 1) evaluation of option price as a stochastic measure, 2) selection and evaluation of the investment strategy as the result of the interaction of stochastic measures, 3) selection of theoretical portfolio model adequate to the situation and usage of evaluation results of strategies in forming the portfolio of particular structure.

7. The instability of a stock price is treated as the stock risk estimation in the work, in author's point of view, should be treated as the main factor determining the price of option, which inappropriate evaluation can be one of the main reasons of options investment strategies ineffectiveness.

8. Due to stochastic nature of financial parameters their behavior in the future can be described only by probability distributions of their possible results. The price of the option in the market should also be treated as a random variable influenced by random market measures such as current stock price and its fluctuation amplitude, interest rate, stock dividend rate. In order to investigate option's price behavior under uncertainty, author investigated how the mean value of this price and risk is influenced by the growing risk of the interest rate factor, expressed as a stochastic variable. Investigation proved that the increase in the interest rate risk increased not only the risk of option's price, but also the mean value of the price. Put option is more sensitive to the changes of interest rate than the call option. This fact should be considered when investing in the case of instable market.

9. Evaluation results of options investment strategies as the sets of stochastic measures showed that usage of only mean – standard deviation estimations is not proper for description of such sets, that is why author suggests to evaluate also other moments of the investment strategies results distributions.

10. Created logical model of investment strategies' portfolio allows forming objective set of investment means which gives the opportunity to react to the changing factors of environment influencing the effectiveness of such set and to evaluate the set of investment means proper to the investor considering to the effectiveness of possible results, risk and guaranty of obtaining results. These three criteria are mostly informative and important to the investor, making investing decisions.

Published Works on the Topic of the Dissertation

In the Periodical Scientific Editions

1. Martinkutė, R. Riskiness of Option Contracts and Their Combinations. *Business: Theory and Practice*, Vol. 6, No 3, Vilnius: Technika, 2005, p. 171–179. ISSN 1648-0627.
2. Martinkutė, R. Exotic Option Contracts. In: *Business, Management and Education'2004. Proceedings*. Vilnius: Technika, 2005, p. 51–61 (in Lithuanian). ISSN 1648-8156.
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INVESTAVIMO STRATEGIJŲ PORTFELIO PARINKIMAS IR VALDYMAS

Disertacinio darbo aktualumas. Didėjantis rinkų neapibrėžtumo laipsnis bei sparčiai auganti investavimo rizika yra pagrindinis finansų sistemos bei jos sudedamųjų elementų plėtros fonas. Kiekvienas, norintis išlikti ir sėkmingai plėtoti savo veiklą šiose rinkose, turi laiku reaguoti į pasikeitimus bei, remiantis šiais pokyčiais, keisti pasirinktas investavimo strategijas. Investavimo tikslams pasiekti investuotojai ieško naujų priemonių ir strategijų, labiau tinkančių besikeičiančios rinkos sąlygomis bei adekvatesnių investuojančiųjų poreikiui apsidrausti nuo didėjančios rizikos, neprarandant galimybės pasinaudoti teigiamais rinkos pokyčiais.

Finansinių inovacijų kūrimo sferoje neišnaudotų galimybių galima rasti tarp išvestinių finansinių priemonių, ypač pasirinkimo sandorių bei jų strategijų taikymo srityje. Pasirinkimo sandorių naudojimas sudaro prielaidas kurti įvairias investavimo strategijas, lengvai pritaikomas skirtingomis rinkos sąlygomis bei tinkančias individualiems investuotojų poreikiams rizikos ir norimų gauti pajamų atžvilgiu. Pasirinkimo sandoriams būdingas draudimo aspektas leidžia gauti pajamų galimybių skirstinius, sunkiai įmanomus investuojant į akcijų ar obligacijų rinkinius.

Lietuvoje pasirinkimo sandoriai lyginant su jų paplitimu JAV ar didžiosiose Europos Sąjungos šalyse naudojami dar gana negausiai. Lietuvai tapus Europos Sąjungos nare tenka pakeisti ir priderinti prie Europos šalių savo finansų sistema, kurioje, palyginus, dar yra daugybė spragų, susijusių ir su išvestinių finansinių priemonių taikymu.

Portfelinių investicijų tiek mokslinis, tiek praktinis naudingumas seniai pagrįstas įvairių autorių teoriniais ir empiriniais tyrimais. Tą patį galima pasakyti ir apie pasirinkimo sandorių ir jų investavimo strategijų taikymo privalumų išryškinimą. Tikslinga rasti būdą, padedantį apjungti portfelinių investicijų ir pasirinkimo sandorių investavimo strategijų teikiamus privalumus, siekiant patenkinti augančios investavimo rizikos valdymo poreikį.

Disertaciniame darbe ginama tezė, kad investuotojams aktyviai dalyvaujant investavimo procese ir siekiant tam tikrose ribose sumažinti dėl rinkos nenuspėjamumo galinčius atsirasti nuostolius, tikslinga formuoti investavimo rinkinį, apjungiantį ne tik pavienes išvestines finansines priemones, bet ir tam tikras jų sąrankas, tiesiogiai atsižvelgiant į rinkos veiksmų kaip atsitiktinių dydžių poveikį jų praktiniam panaudojimui.

Galima teigti, kad iš esmės finansų literatūroje iki šio laiko nebuvo atlikta „portfelio iš portfelių“, turinčio savyje ir įvairius išvestinius popierius, sudarymo ir valdymo rizikos ir neapibrėžtumo sąlygomis mokslinių tyrimų. Lietuvoje mažai dėmesio skirta pasirinkimo sandorių ir jų investavimo strategijų taikymo galimybėms, nenagrinėtos portfelio iš strategijų sudarymo galimybės. Atlikti moksliniai tyrimai leido sukurti inovatyvios struktūros investavimo priemonę, turinčią teorinį pagrindimą ir praktinio panaudojimo galimybes, kurias autorė realizavo disertaciniame darbe.

Darbo tikslas – sukurti ir praktiškai patikrinti investavimo strategijų, apimančių pasirinkimo sandorius, portfelio idėją, jos įgyvendinimui pasitelkiant adekvataus investavimo rezultatų patikimumui įvertinti portfelio principus.

Darbo uždaviniai:

1. Susisteminti pasirinkimo sandorių kaip investavimo priemonių teorinius aspektus, siekiant nustatyti jų esmines inovatyvias savybes.
2. Ištirti prekybos pasirinkimo sandoriais raidos mastus užsienio šalyse ir tendencijas Lietuvoje ir išanalizuoti pagrindines išvestinių priemonių naudojimo mūsų šalyje problemas.
3. Atlikti struktūrizuotą pasirinkimo sandorių investavimo strategijų kaip investavimo sprendimo priėmimo priemonės analizę, išryškinant strategijų tinkamumą skirtingiems investuotojų lūkesčiams tenkinti.
4. Išanalizuoti klasikines ir naujausias portfelio formavimo teorijas, išsiaiškinti jų kritikuotinas vietas ir pritaikomumą realiomis sąlygomis. Pagal atitinkamus kriterijus pasirinkti modelį, labiausiai tinkantį pasirinkimo sandorių strategijų portfelio formavimui.

5. Ištirti pasirinkimo sandorių kainos elgseną neapibrėžtumo sąlygomis bei, naudojant imitacinį modeliavimą, pasiūlyti modelį, leidžiantį įvertinti pasirinkimo sandorio kaip funkcijos nuo atsitiktinių dydžių kainą.

6. Susisteminius aritmetiškai išreikštus investavimo strategijų rezultatus, suformuoti investavimo strategijų vertinimo algoritmą, reikalingą strategijų portfelio formavimui.

7. Sukurti sprendimų priėmimui tinkamą investavimo strategijų portfelį, leidžiantį įgyvendinti investuotojo tikslus besikeičiančios rinkos sąlygomis.

Tyrimo objektas. Pasirinkimo sandorių investavimo strategijos.

Tyrimo metodika ir tyrimo schema. Teorinių disertacinio darbo aspektų struktūrizavimui ir apibendrinimui naudota sisteminė, lyginamoji, loginė, grafinė mokslinės literatūros analizė. Situacijos Lietuvos ir užsienio šalių rinkose įvertinimui naudoti ekonominių-statistinių duomenų rinkimo bei analizės metodai. Rezultatams neapibrėžties sąlygomis gauti naudoti matematiniai-statistiniai metodai, imitacinis modeliavimas.

Disertacijoje kuriamam portfelio modeliui buvo naudojami konkretūs empiriniai duomenys, kurių pagrindu imitacinio modeliavimo pagalba buvo generuojami kiti modelio funkcionavimui reikalingi duomenys.

Darbo struktūra. Pirmoje darbo dalyje atlikta teorinių pasirinkimo sandorių ir jų investavimo strategijų aspektų analizė, išryškinant esmines pasirinkimų ir jų strategijų ypatybes bei taikymo galimybes. Pateikta prekybos pasirinkimo sandoriais raida užsienio šalyse ir Lietuvoje, išryškintos problemos, stabdančios šios prekybos plėtrą. Antroje dalyje nagrinėti klasikiniai, tokie kaip Markowitz, pagrindinio kapitalo įkainojimo ir kiti portfelio formavimo metodai bei inovatyvi adekvataus portfelio teorija, iš dalies eliminuojanti pagrindinius klasikinių teorių trūkumus. Trečioje darbo dalyje, remiantis pasirinktu teoriniu modeliu, suformuotas ir praktiškai patikrintas investavimo strategijų portfelis, detalai ištirti tokio portfelio formavimo etapai.

Darbą sudaro įvadas, trys dalys, apibendrinančios išvados ir pasiūlymai, naudotų literatūros šaltinių sąrašas, autorės publikacijų sąrašas ir priedai.

Mokslinis tyrimų naujumas ir jų teorinė reikšmė. Sukurtas pasirinkimo sandorių kainos nustatymo modelis, leidžiantis pagrindinius kainą įtakančius ekonominius veiksnius traktuoti kaip atsitiktinius rinkoje dydžius. Sukurtas ir pritaikytas modelis, leidžiantis novatoriškai pažvelgti į portfelio struktūrą bei racionaliau išnaudoti investavimo strategijoms charakteringas savybes šiuolaikinei rinkai būdingomis rizikos ir neapibrėžties sąlygomis. Suformuota investavimo strategijų, turinčių savyje pasirinkimo sandorius, portfelio sudarymo ir panaudojimo idėja, sukurta praktinio realizavimo sistema.

Praktinė darbo reikšmė. Praktiniai šio darbo rezultatai yra naudingi sudarant palankesnes sąlygas Lietuvos finansų rinkos plėtotei, skatinant finansinių inovacijų taikymą, ypač saugesnio investavimo srityje. Atlikus situacijos Lietuvos ir užsienio finansų rinkose tyrimą, nustatytos pagrindinės priežastys, stabdančios pasirinkimo sandorių taikymą mūsų šalies sąlygomis.

Pasiūlytas pasirinkimo sandorių kainos kaip stochastinio dydžio įvertinimo modelis leidžia investuotojui kompleksiskai įvertinti tam tikromis rinkos sąlygomis galimą pasirinkimo sandorio kainą bei remiantis gautais rezultatais nustatyti galimus tokiai rinkos situacijai tinkamas pasirinkimo sandorių investavimo strategijos rezultatus. Siūloma portfelio formavimo ideologija parodo naują požiūrį į visą portfelio formavimo procesą, leidžiantį pasiekti norimus rezultatus pagal investuotojo individualius kriterijus.

Darbo rezultatų apibendrinimas ir siūlymai

1. Sistemiška įvairių mokslo sričių literatūros studija leidžia tvirtinti, kad tik pakankamai intensyvi ir inovatyvi finansų sistemos plėtra gali sukurti realias prielaidas ūkio, technologijų ir socialinių procesų plėtrai. Finansų sistemos plėtra turi vykti visais trim ypač svarbiais ir tarpusavyje susietais aspektais: finansinių institucijų plėtros, finansinių priemonių plėtros ir finansų rinkų plėtros. Kertinis plėtotės aspektas – tai finansinių priemonių raida, kuri turi užtikrinti pilnavertę finansinių priemonių visumą, tenkinančią ūkio, gyventojų ir valstybės finansinės srities poreikius bei finansinių institucijų galimybės tuos poreikius tenkinti

2. Atlikta finansinių priemonių būsenos ir plėtros analizė liudija, kad minėtu požiūriu Lietuvos finansų sistema nėra pakankamai inovatyvi ir reikalauja neatidėliotino svarbių problemų sprendimo, ypač išvestinių priemonių plėtros srityje.

3. Konkretizavus situaciją Lietuvos rinkoje galima teigti, kad esminiai pasirinkimo sandorių taikymo Lietuvos rinkose trūkščiai yra detalios informacijos trūkumas, lemiantis ir potencialių vartotojų trūkumą, menkas reikiamų specialistų skaičius, problemos ir trūkumai, būdingi Lietuvos vertybinių popierių rinkai, tam tikri visuomenės bruožai, lemiantys vangų finansinių inovacijų taikymą. Pasirinkimo sandoriai ir jų kainodara yra ganėtinai sudėtingi mažai patirties turinčioms Lietuvos įmonėms ir pavieniams investuotojams.

4. Ištyrus ir apibendrinus literatūrą, skirtą pasirinkimo sandorių ir jų strategijų analizei, autorė pasiūlė pasirinkimo sandorių investavimo strategijos sąvoką: tai skirtingų pasirinkimo sandorių tarpusavio derinimo arba jungimo su kitomis finansinėmis priemonėmis rezultatas, gautas atsižvelgiant į potencialius ekonominius pokyčius bei individualiai investuotojo apsibręžtą rizikos/pelno santykį.

5. Plėtojantis finansų mokslui bei sudėtingėjant investavimo priemonėms, ieškoma naujų portfelio formavimo ir valdymo idėjų, pažangesnių modelių, padėsiančių išspręsti klasikinių modelių adekvatumo realioms rinkos sąlygoms problemas. Atlikta įvairių autorių darbų portfelio formavimo sferoje analizė leido įvertinti problemas, būdingas klasikinėms portfelio teorijoms ir pasirinkti disertacijos tikslui pasiekti tinkamą modelį. Investavimo strategijų portfelio formavimui buvo pasirinktas adekvataus portfelio metodas, kaip tinkamiausias tokio portfelio problemoms spręsti.

6. Investavimo strategijų portfelio modelį autorė siūlo skirstyti į tris bazinius etapus: 1) pasirinkimo sandorių kainų kaip funkcijos nuo atsitiktinių

dydžių įvertinimas, 2) investavimo strategijos kaip atsitiktinių dydžių sąveikos rezultatų parinkimas ir įvertinimas, 3) adekvataus situacijai teorinio portfelio modelio parinkimas bei strategijų vertinimo rezultatų panaudojimas formuojant konkrečios struktūros portfelį.

7. Akcijos kainos nepastovumas, darbe traktuojamas kaip akcijos rizikingumo įvertis, autorės nuomone turi būti laikomas svarbiausiu pasirinkimo sandorio kainos dydį lemiančių veiksniu, kurio netinkamas įvertinimas gali būti viena esminių pasirinkimo sandorių investavimo strategijų neefektyvumo priežasčių.

8. Dėl tikimybinės finansinių parametų prigimties, jų elgsena ateityje gali būti nusakoma tik tikimybiniiais jų galimų rezultatų skirstiniais. Pasirinkimo sandorio kaina rinkoje taip pat turi būti traktuojama kaip atsitiktinis kintamasis, įtakojamas tokių atsitiktinių rinkos dydžių kaip einamoji akcijos kaina ir jos svyravimų amplitudė, palūkanų norma, akcijos dividendų norma. Siekiant ištirti pasirinkimo sandorio kainos kaip priklausančios nuo stochastinių veiksnų elgseną, autorė ištyrė kaip šios kainos vidutinę reikšmę ir rizikingumą įtakoja stochastiniu kintamuoju išreikšto palūkanų normos veiksnio rizikingumo didėjimas. Tyrimas įrodė, kad palūkanų normos rizikingumo didėjimas padidino ne tik pasirinkimo sandorio kainos rizikingumą, bet ir kainos vidutinę reikšmę. Pardavimo pasirinkimo sandoris jautresnis palūkanų normos pokyčiams nei pirkimo pasirinkimo, į ką reikėtų atkreipti dėmesį investuojant nestabilios rinkos sąlygomis.

9. Pasirinkimo sandorių investavimo strategijų kaip atsitiktinių dydžių rinkinių įvertinimo rezultatai parodė, kad vien vidurkio – standartinio nuokrypio įverčių naudojimas tokių rinkinių aprašymui yra neteisingas, todėl autorės siūlymu būtina įvertinti ir pilno galimybių spektro tikimybių skirstinį.

10. Sukurtas loginis investavimo strategijų portfelio modelis leidžia sudaryti tikslinį investavimo priemonių rinkinį, suteikiantį galimybę reaguoti į besikeičiančius aplinkos veiksnus, turinčius įtakos tokio rinkinio efektyvumui bei parinkti ir įvertinti investuotojui tinkamą investavimo priemonių sąranką, atsižvelgiant į galimų rezultatų efektyvumą, rizikingumą ir rezultatų gavimo garantiją. Šie kriterijai yra ne tik svarbiausi, bet ir informatyviausi rodikliai investuotojui.

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