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Building of the System of Risk-significant Financial Figures

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ABSTRACT

Risk of crisis phenomena in regions emphasizes the importance to build the system of continuous monitoring for analysis and assessment of the threat level for socioeconomic security. There is the need for carrying out continuous monitoring of all reproduction socioeconomic processes state: The process of production, the cash outflow and the flow of return, the variation level of prosperity. As the basis of the system of complex monitoring, there should be used formalized algorithms on the basis of mathematical models with the use of all available data including those for specification and assessment of socioeconomic relationships rather than a traditional intuitive analysis and expert methods. The level of development of modern equipment and mathematical support allows to process the huge collections of data which the researchers of previous generations did not have. Extremum modelling is a complex area. The data on emergency situations are poor by definition, and forecasts and estimates should be often made on the brink or even beyond available data. Thus, there is the need to create the theory of risk management connected with catastrophic events.

Keywords: Figure of Economic Stability, Threshold Value, Region, Sustainable Development, Economic Stability
JEL Classifications: C60, O10, O30

1. INTRODUCTION

Objective assessment of financial standing of the enterprises demands using the system of financing and operating activities' figures. The figures which estimate economic viability of relations with the enterprise should cover the largest possible number parties of financing and operating activities of the enterprises in order the outcomes of an analysis could be used by all users of external bookkeeping reporting.

At the same time, the increased impact of catastrophic events challenges governments of the countries, assurance companies and financial institutions. Considering the importance of this issue, the UN organization has declared that the 90s of the XX century were the International decade for catastrophic events consequences reduction. During the decade there was a new strategy of the fight against disasters developed. The principles of advance disasters forecasting and prevention instead of the principle of rectification of their consequences were the basis for this strategy. It was recognized that "prevention is not only more human than rectification of the consequences but also is considerably cheaper."

Almost all countries of the world have recognized that the only right solution of the issue concerning reduction of the impact of catastrophic phenomena of any character is risk evaluation and assessment. First of all, this strategy includes the development of the theory and methods of advance forecasting and prediction.

2. MATERIALS AND METHODS

Classic forecasting approaches of economic time series are based on the mathematical apparatus of econometric theory. They are based on the assumption that observations composing forecasting time series are self-dependent, so there is the necessity for following the normal law. The last, however, is likely an exception rather than a rule for economic time series which possess so called long-term memory. During the last decade the issues concerning mathematical modeling of economic risks started being actively studied.

The scientific works of modern Russian and foreign scientists devoted to the systemic analysis, economic synergetics, statistical and fractal analysis of time series, financial choice and decision principle, multilevel approach, mathematical modeling in economics in conditions of data uncertainty and multicriteriality, and also theoretical and methodological issues concerning reflection of socioeconomic processes and systems in the form of mathematical, information and computer models present the theoretical and methodological basis of the research. The research has used Karachay-Cherkessia Federal State Statistics Service's materials, the Board of Agriculture of Karachay-Cherkessia, Hydrometeorological services of Karachay-Cherkessia, and also the author's own calculations.

As its apparatus the research has used methods of the systemic analysis, discrete mathematics, fuzzy-set theory, statistical analysis of time series, fractal analysis, phase portraits, cellular automaton and adapted method of the sequential R/S analysis.

The systematic statement of various approaches to risk economic and mathematical models development is presented in monographs and papers of such native and foreign authors as Osadchy, Akhmetshin, Mullakhmetov, Nazmiev, Serov, Shichiyakh, Putilina, Sozinova, Fokina, Vasilev, Tuktarova and others.

In these authors' publications and other works from the end of the XX to the beginning of the XXI century economic risk modeling and management are based (Vasilev, Akhmetshin, 2014; Sozinova, Fokina, 2014; Mullakhmetov, Aminova, Akhmetshin, 2014) on the principles which were created in 1952 by Markowitz and later developed by Sharpe, Litner and others. This development was issued in the form of the pricing model in the market for capital expenditures capital asset pricing model (CAPM), based on the financial model using the mathematical statistics apparatus. The last decades' experience of mathematical modeling of dynamic evolutionary processes has greatly expanded and in many respects changed the established ideas of adequacy of existing mathematical models and the root of these processes which, first of all, has a property of dynamics or evolving. It was clear that a classical store of mathematical modeling based on so-called linear paradigm (small perturbations of input system data marginally change its trajectory), in many cases is obviously insufficient for building of adequate mathematical models. This circumstance has caused the fundamental revision of the former linear concept and transition to so-called nonlinear paradigm (nonlinear science) in mathematical modeling (small perturbation of input data or values of the dynamic system variables can catastrophically change its trajectory owing to the system complexity and its behavior randomness).

The relevance of the specified paradigm is caused by the fact that it helps to reflect more adequately specific characteristics of the concrete dynamics hierarchy and a high uncertainty degree of real social, economic, financial, physical processes and systems. The transition to the new concept has caused the necessity to create essentially new tools of mathematical modeling including risk level estimates, in particular, such as the phase analysis, fractal analysis, methods of the determinate chaos and others. In the world science of mathematical modeling this transition is dated by two last decades. Native researches' attention was paid a little bit later and, respectively, the number of publications devoted to nonlinear science in English scientific publications surpass almost by a factor of hundreds the number of publications devoted to this topic in Russian scientific publications.

Speaking about the world level of knowledge in this area, the issue concerning building of mathematical and computer methods for receiving qualitative (asymptotic) properties from quantitative characteristics of the final basic model can be referred to the number of the most important ones. The matter is about such qualitative figures which are not directly received out of the properties of system elements or out of local interactions of these elements.

3. RESULTS

The mathematical model of the higher level is the optimization theory model on the basis of which the most appropriate control over the considered system or process is executed and based (Osadchy, Akhmetshin, 2015). The mathematical model of the lower level images basic data for the model of the higher level. The time series reflecting evolution of the main figures of evolutionary processes and systems are basic data for the lower level. Considering the real weak structuring of this evolution, nonconformance its normal or other known laws of distribution, there is the need to construct the forecast model for the lower level on the basis of the apparatus of fuzzy sets and cellular automatons. Revealing of the fundamental qualitative and system properties considered in the forecast model for assessment of forecasting results reliability demands using and developing methods, algorithms and programs for assessment of long-term memory depth and a randomness measure or, on the contrary, trend-stability for identification and justification of quasi-cycles, self-similarity and other fractal properties. The offered approach provides system monitoring of modeled processes and systems for formation of time series reflecting perhaps longer periods in the field of land use, more precisely, in the branch of plant growing from the point of view of possible natural disasters, namely, floods for making verification and validation of constructed models.

Let's consider the following task. A farmer should find the funds the amount of which is equivalent to 500 thousand rubles for seeding. Supposing that he has no "cold hard" cash, but there are 300 tons of seed. As the prior year's harvest was good, the corn price on March (when it is necessary to find money for seeding) was low - 1.8 thousand rubles per ton. The experience of past years makes the farmer know that, having held seed till June, perhaps, would be sold at or better. Everything depends on harvest permit: If on June the future harvest forecast will be bad, the seed price of the last year will rise almost to 2 thousand rubles per ton. If there will be the average harvest, the price remains at the level of 1.8 thousand rubles per ton. If the harvest will be good, the price seems to be decreased to 1.51 thousand rubles. Considering long-term average annual data and the outcomes of the predictive cellular-automaton model work, it can be claimed that the probability of mentioned forecasts of the harvest on June is respectively equal to: 0.22; 0.36, and 0.42.

What decision must the farmer make (to sell seed on March or to hold it till June), if it is known that at the bank the loan of 500 thousand rubles for 3 months can be taken out at 28% per annum?

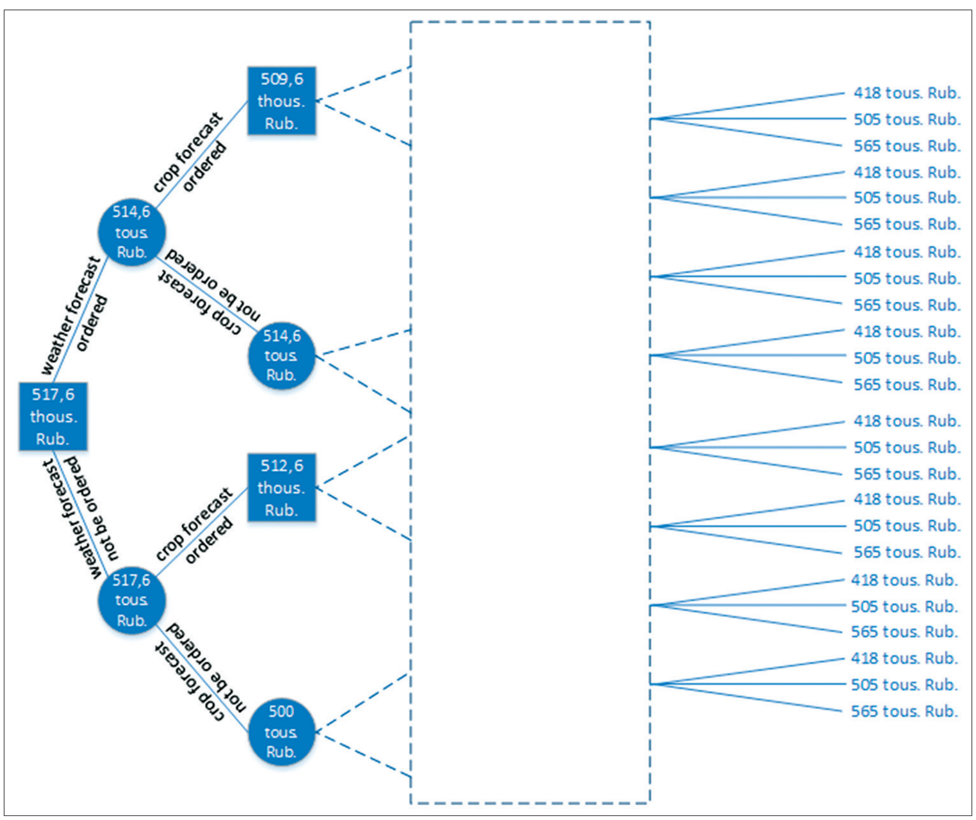
The primary decision which the farmer should make is to order or not to order the forecast both of weather patterns and the figure of harvesting capacity. If the forecast of weather patterns and the figure of harvesting capacity are not ordered, the logic of his further acts is clear. He compares the universe mean of the return if seed will be sold on June (and, respectively, drawing upon the loan for 3 months) with the purpose to sale seed on March and seeding at his own expense. As the universe mean of the return if seed will be sold on June (subject to the percent payment for the loan) is higher than the guaranteed return from sold seed on March, he must sale seed on June.

He should make the most complicated decision if both the forecast of weather risk patterns and the productivity figure would be ordered. As the top of Figure 1 shows, the farmer should make a decision on expediency of seed sale depending on the forecast outcomes in spring. If favorable weather patterns and, respectively, good harvest permits on June are forecasted, then seed should be sold on March. If the average harvest permit would be forecasted, then seed would be best sold in spring and the farmer would receive 500 thousand rubles. At last, on condition of forecasting of poor harvest permits on June it is reasonable to take upon the loan and to sell seed in summer. As Figure 7 shows, such strategy of economic carrying out will allow to provide the universe mean of the return at the level of 514.6 thousand rubles that even taking into account the need for the forecast payment is higher than the expected return if the farmer refuses from the forecast. Thus, it is possible to make a conclusion that the forecast purchase is reasonable. At such decision the universe mean of the return will be 509.6 thousand rubles.

The analysis of the solution of the given tasks allows to make a conclusion that any information on weather patterns, price state, expected harvest and so on can be very useful for development of effective economic decisions in conditions of stochastics and uncertainty. It is only important to be able to put this information to its proper use.

Let's note that development of scientifically based systems of farming for concrete enterprises considering weather patterns and supplies and utilities for production and technological processes, agricultural production position in the market allows to provide conditions for effective management. Practical use of the outcomes received as the result of expected models and thus construction and realization of adequate models of the higher level will allow a decision-maker to make reasonable administrative decisions and to provide the possibility of resources and technologies maneuvering, to stimulate the search of appropriate economic decisions (Mullakhmetov, Nazmiev, Akhmetshin, 2015).

Figure 1: Decision tree



The main conclusion is that the basis of effective control over economic risks is high-quality forecasting.

For the area of risk agriculture the development of a multicriteria approach to assessment of investment prospects of the agricultural enterprises which are located on various districts of most of the regions of Russia relating to the area of risk agriculture is actual.

The multicriteria model, which is based on Markowitz' portfolio theory, is used as the economic-mathematical model. The main outcome of his portfolio theory is the process of weighing risk as a variance which measures spreading of possible returns in relation to the average return. Along with a variance there is its square root, which is called standard or mean square deviation, considered. Thus, it should be noted that the use of both standard deviation and variance was supposed on the condition that the return was distributed subject to the normal law, namely, the less standard deviation, the lower both probability distribution and risk. However, this fundamental Markowitz' statement is inadequate in relation to time series considered in the present paper. At the same time, the universe mean and standard deviation keep the predominating place in vector-objective distribution.

In the offered economic-mathematical model we use the following statement: Variability of the expected return is adequately reflected by variability of harvesting capacity of basic crops. The model of time series of harvesting capacity of basic crops from 1980 to 2004 was analyzed as the example. The amount of harvesting capacity is considered as a random variable which is empirically determined on the basis of corresponding statistical data. For representation of considered criteria (figures) we use the following designations k = 1, 2,…, 9 - the numbers of crops which are grown in Karachay-Cherkessia (k = 1 - winter wheat, k = 2 - white straw crops, k = 3 - corn for seed, k = 4 - potato, k = 5 - sugar beet, k = 6 - vegetables, k = 7 - corn for silage, k = 8 - sunflower, k = 9 - annual grasses for velours grasses).

j = 1.9 - the areas in Karachay-Cherkessia where basic crops are grown (x_1 = 1 - Adyge-Khablsky District, x_2 = 2 - Zelenchuksky District, x_3 = 3 - Karachayevsky District, x_4 = 4 - Malokarachayevsky District, x_5 = 5 - Prikubansky District, x_6 = 6 - Ust-Dzhegutinsky District, x_7 = 7 - Urupsky District, x_8 = 8 - Khabezsky District, x_9 = 9 - Cherkessk). Here it is considered that on land of District X this harvesting capacity has an average figure $M = M$ (*,•), $\kappa = k$ = 1, 2,…, 9.

A group of fundamental figures F_v, v = 1.5 defining the structure of in vector- objective distribution $F(x) = (F(x),\ldots,F_5(x))$ consists of the following five figures which are respectively presented by the formulas: $F_l(x_j) = M^k$ (>max) - the universe mean of harvesting capacity for a crop in k District, x_t\ F_2{x^)^cr{$M^{k>}$)^vci\$n$ - root-mean-square deviation of harvesting capacity of this crop, $F_3(Xj)$ = V^k (>min) - a coefficient of a variance of the expected harvesting capacity of this crop, $F_4(Xj) = A^k$ (>max) - an asymmetry coefficient, $F_5(x_/) = E^k$ (> max).

- A coefficient of measure of kurtosis of the expected harvesting capacity of this crop.

4. DISCUSSION

Characterizing the most typical definition of risk in neo-classical theory, we will give the following statement obtained from Shackle's, Snowden's, Sevruk's publications (Malinetsky and Potapov, 1996; Shapiro, 1993): "Risk is the probability of the valid return of a producer will be less than he needed, planned, and expected." Other authors' formulations actually keep this meaning, however, differ by their smaller rigidity. For example, Balabanov and Roumasset characterize risk as the danger of financial losses (Economics and Business, 1993; Williams, 1985). The author of the present paper has paid his special attention to other approach for definition of risk. This alternative definition can be found in monographs of such Hungarian economists (Bachkai et al., 1979) and American economists (Greene, 1988; Vaughan, 1986). These authors define risk as not the damage caused by the decision realization but as the possibility of target deviation which achievement demands the decision. The key concept here is the term "the possibility of target deviation," and deviations can be both positive and negative. Preceding the basic statement we will notice that the given definition of risk was one of the bases for introduction of such risk figure as an excess.

Along with the researches listed above, the new theory of a portfolio, which basis Markowitz presented in the work (Markowitz, 1952), began being created since the beginning of the 1950s. In this theory he has defined a figure of risk as a variance measuring a variance of the average expected return. Along with a variance, there was its square root defined as standard or average quadratic deviation considered. Thus, it should be noted that the use of a variance was supposed on the condition that that returns are normally distributed.

Markowitz's concept was expanded by Sharpe (1964), Litner (1965), and Mossin (1966). The specified expansion has developed into "the model of capital assets assessment" which received wide popularity. This term was offered by Sharpe and appeared in scientific literature as a type of the English abbreviation CAPM. According to the CAPM any combination of risk assets (namely, actions in financial markets) and risk-free assets has to be an optimal portfolio for any investor. A cornerstone of the CAPM base is "a linear paradigm" which basis is a linear measure of sensitiveness of risk of security to market risk. This linear measure is called "beta." If all risk assets will be placed in coordinates "beta - the expected return," then the straight line piercing the axis Y (return) at the risk-free rate will be the result. An investor has chosen a point at the specified straight line of the financial market which corresponds to the market portfolio.

It should be again emphasized that on its conceptual meaning the CAPM demands that expected returns follow to normal or log-normal distribution. Thus, we receive a final a variance that means a risk measure which is guaranteed limited from above. It is remarkable that during these years (the beginning of the 1960s) Mandelbrot has published the paper (Mandelbrot, 1964) containing empirical data on the basis of which the conclusion about the need for replacement of normal distribution to Pareto's distribution was formulated. The last, as we know, differs by an unlimited growing variance that according to the CAPM means with it is public concepts means unlimited increasing risk. In other words, Mandelbrot's statement actually claims the need for possible revision of Markowitz' portfolio theory, Sharpe and Miller who a little bit later became nobel laureates. It seems that Mandelbrot has determined the time, because at the beginning of the 1970s the discussions on portfolio theory of risks have ended, its fundamental assumptions concerning self-dependence and the normal law of distribution of expected returns became standard in modeling. The only theoretical achievement of the works of the 1980s devoted to the above subject is the postulate saying that market volatility (namely, the standard deviation of security prices changes) varies over time. It means that volatility is dependent on its previous levels, and it already means the prerequisite for revision of the portfolio theory fundamental assumption on self-dependence of expected returns. The specified potentially possible revision was delayed by the assumption on so called "short-term memory" in studied processes.

While the classical portfolio theory has being only approved, there was Osborn's paper (Osborn, 1981) published where he has presented the probability density function of stock market returns. The author has called this the probability density function "approximately normal" though it had the feature which had a fundamental difference from normal distribution. The specified feature was "heavy tails" by which statistics understand the term "excess." Actually the weight of tails in Osborn's variance taking into account Mandelbrot's publication (Mandelbrot, 1964) gives ground to claim that distributions of stock market returns, properly speaking, do not follow the normal law. However, neither Osborn nor other researches did not attach any serious importance to this fact, "the linear paradigm," which means that expected returns should have approximately normal distribution and to be self-dependent, has being further developed.

From the point of view of a strict scientific approach the above facts of nonconformance to the normal law of returns distribution in the capital market have fundamental meaning in the sense that causes the challenging issue concerning illegality of the application of a big part of statistical analysis methods by analysts including the ways of diagnostics developed in econometric theory. All these facts have caused the linear paradigm crash (Petere, 2000), more precisely, its replacement with the nonlinear paradigm which components are evolutionary economy, theory of chaos, fractal statistics, nonlinear dynamics and other non-leaner science directions (Zang, 1999; Malinetsky and Potapov, 1996). By now modern economic theory offers using the following four methods of risk assessment (Grabovy et al., 1994):

- Statistical;
- Expert estimates;
- Analytical;
- The use of analogs.

Representatives of various economic schools subject these or those methods among specified ones to the analysis. The smallest number of objections causes the first of listed ones- statistical (Kurdyumov et al., 1996; Mandelbrot, 1964). The principle of the statistical method means that at first there are all statistical data on losses (or on expected returns) analyzed, there is the frequency of their emergence stated and according to the established frequency there is the probability for getting the certain return or certain losses predicted for a similar type of activity is predicted.

Analyzing monographic literature devoted to estimates of financial and economic risks (Vaidaitsev, 1992; Mossin, 1996; Grabov et al., 1994), it is possible to present the following statement: In our country there are not many fundamental researches in the field of decision-making in risk conditions. This paper has taken a shot at least partially to fill this lack.

It is necessary to note the book (Management of Risk: Risk, 2000) from all monographs devoted to management of risk. It makes the contours of the research program connected with creation of mathematical theory of security and risk, strategy and practice of risk management (Shichiyakh, Putilina, 2011; Vasilev, Tuktarova, Akhmetshin, 2013). Here a special attention is paid to the concepts stating the view of risk from the standpoint of the systemic analysis, of predictability limits and the forecast of rare events, and also of cyclic risks and systems with delay. By now two basic approaches to assessment of a measure of economic risk were created. According to the first approach a risk is treated as the probability that the valid return of a producer will be less than he planned, expected (Svobodina, 1996; Sevruk, 1994; Shackle, 1969; Snowden, 1985). According to the second a risk is defined not as a damage caused to the decision realization and as a possibility of target deviation which achievement demands the decision. In the present paper the author carried out efforts to unite these two approaches on the basis of multicriteria optimization that, in addition, allows to use methods of choice and decision-making theory in theory of risk (Emilyanov and Larichev, 1985; Larichev, 1979).

5. CONCLUSION

The role of economic risk quantitative assessment bears much importance when there is the possibility for the choice from a set of alternative solutions of the optimal decision providing the greatest probability of the best result at the smallest expenses and losses subject to the problems concerning minimization and programming of risk. The elements of considered economic should be revealed, numerically measured, estimated and compares here, the interrelations, tendencies, regularities with their description in the system of economic figures should be revealed and defined that is impossible without the use of mathematical methods and models in the economic analysis. Considering the above, we cannot say the common conventional representation of risk, even in case this concept will be defined in the restricted sense of financial and economic risk. Moreover, there is the number of indisputable points. Building on the system approach to definition of risk (Serov, 2005; Sozinova and Fokina, 2015), it is possible to claim assuredly that a category of risk has a complicated systemic character, defining both the qualitative and quantitative sides of the concept. On one hand, risk is a measure of uncertainty and propensity towards conflict in human activity. On the other hand, risk is an objective-and-subjective economic category reflecting an extent of the enterprise success or failure in achievement of its stated objectives taking into account the influence of controlled (internal) factors and uncontrolled external factors (Osadchy, Akhmetshin, 2015). A specified system character of the concept "risk" has formed for the author of the present paper a strong reason to claim about the need for the multicriteria approach to economic-mathematical modeling of risk.

It should be noted that there is no common theory of risks which will be used covering all spheres of human activity. The justice of this statement becomes obvious if especially various character of efficiency criteria relating to economics, ecology, biology, medicine, astronautics and other sciences will be noted.

REFERENCES

Bachkai, T., Mésen, D., Miko, D. (1979), Economic Risk and Methods of its Measurement: Translation from Hungarian., etc. Moscow: Economics. p184.

Economics and Business. (1993), In: Kamaeva, V.D., editor. Moscow: MSTU Publishing House. p464.

Emilyanov, S.V., Larichev, O.I. (1985), Multicriteria Methods of Decision-making. Moscow: Knowledge. p32.

Grabovy, P.G., Petrova, S.N., Poltavtsev, S.I., Romanova, K.G., Khrustalyov, B.B., Yarovenko, S.M. (1994), Risks in Modern Business. Moscow: Publishing House Alane. p200.

Green, M.R. (1988), In: Green, M.R., Trieschmann, J.S., editors. Risk and Insurance. Cincinnati: South-Western Publication. p785.

Kurdyumov, S.P., Malinetsky, G.G., Potapov, A.B. (1996), Unsteady structures, dynamic chaos, cellular automatons. The new in synergetic. Mysterious World of Non-equilibrium Structures. Moscow: Science. p95-164.

Larichev, O.I. (1979), Science and art of Decision-making. Moscow: Science. p200.

Litner, J. (1965), The Valuation of risk assets and the selection of risk investments in stock portfolios and capital budgets. Review of Economic Statistics, 47, 13-37.

Malinetsky, G.G., Potapov, A.B. (1996), Nonlinear nature. New problems, new opportunities. The new in synergetic. Mysterious World of Non-equilibrium Structures. Moscow: Science. p165-190.

Management of Risk: Risk, (2000), Sustained development. Synergetics. Moscow: Science.

Mandelbrot, B. (1964), The variation of certain speculative prices. In: Cootner, P., editor. The Random Character of Stock Price. Cambridge: MIT Press.

Markowitz, H.M. (1952), Portfolio selection. Journal of Finance, 7, 77-91.

Mossin, J. (1966), Equilibrium in a capital Asser market. Econometrica, 34, 768-783.

Mullakhmetov, K.S., Aminova, R.M., Akhmetshin, E.M. (2014), Control in a management system in modern conditions. Asian Social Science, 10(24), 237-247.

Mullakhmetov, K.S., Nazmiev, E.F., Akhmetshin, E.M. (2015), Control in the system of public administration in Russia. International Business Management, 9(7), 1732-1736.

Osadchy, E.A., Akhmetshin, E.M. (2015), Accounting and control of indirect costs of organization as a condition of optimizing its financial and economic activities. International Business Management, 9(7), 1705-1709.

Osadchy, E.A., Akhmetshin, E.M. (2015), Development of the financial control system in the company in crisis. Mediterranean Journal of Social Sciences, 6(5S2), 390-398.

Osborn, M.F.M. (1981), Brownian motion in the stock market. In: Cootner, P., editor. The Concepts, Cognition. Washington: US Naval Research Laboratory. p9.

Petere, E. (2000), Haos and order in capital markets. New Analytical View on Cycles, Prices and Market Variability. Moscow: World. p333.

Serov, V.M. (2005), Program goals management of regional agrarian and industrial complex. Moscow: State University. p242.

Sevruk, V.T. (1994), Bank Risks. Moscow: LLC Delo. p72.

Shapiro, M. (1993), The Globalization of Law. Indiana Journal of Global Legal Studies, 1(1), 37-64.

Shackle, G., editor. (1969), Decision, Order, and Time in Human Affairs. 2nd ed. Cambridge: Cambridge University Press. p330.

Sharpe, W.F. (1964), Capital asset price: A Theory of Market Equilibrium Under Conditions of Risk. Journal of Finance, 29(3), 425-442.

Shichiyakh, R.A., Putilina, I.N. (2011), Improvement of methodical approaches to development of target indicators of regional programs of development of industrial fruit growing. New Technologies, 2, 140-143.

Snowden, P.N., editor. (1985), Emerging Risk in International Banking Origins of Financial Vulnerability in the 1980s. London: George Allen. p146.

Sozinova, A.A., Fokina, O.V. (2014), Study of economic and technological factors influencing development of services market. Life Science Journal, 11(7s), 318-321.

Sozinova, A.A., Fokina, O.V. (2015), Special aspects of studying the internet as a marketing communication channel of the service industry. Mediterranean Journal of Social Sciences, 6(4S1), 139-145.

Svobodina, M. (1996), Assessment of the agricultural enterprise financial state of the A.I.C. Economics and Management, 7, 72-77.

Vasilev, V.L., Akhmetshin, E.M. (2014), The role of information and information technology in the management control function. Biosciences Biotechnology Research Asia, 11(3), 1469-1474.

Vasilev, V.L., Tuktarova, E.M., Akhmetshin, E.M. (2013), A balanced scorecard and economic security of companies. World Applied Sciences Journal, 27(13A), 424-427.

Vaughan, E.J., editor. (1986), In: Fundamentals Risk and Insurance. 4th ed. New York: John Wiley & Sons. p723.

Williams, C.A. (1985), In: Williams, C.A., Heins, R.M., editors. Risk Management and Insurance. 5th ed. New York: McGraw-Hill Book Co. p755.

Zang, V.B. (1999), Synergetic economics. Time and Changes in Nonlinear Economic Theory. Moscow: World. p335.