

**APPLICATION OF MATHEMATICS
AND STATISTICS IN ECONOMICS.
THE 18TH INTERNATIONAL
SCIENTIFIC CONFERENCE**

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According to the annual tradition, the 18th international scientific conference “Applications of Mathematics and Statistics in Economics” took place in 2015. The conference has been organized since 1998 alternately by three departments, the Department of Quantitative Methods and Informatics of the Faculty of Economics of Matej Bel University in Banská Bystrica in the Slovak Republic, the Department of Statistics and Probability of the Faculty of Informatics and Statistics of University in Prague in the Czech Republic and the Department of Statistics of the Faculty of Management, Information System and Finance of Wrocław University of Economics in Poland. In 2015, the conference was organized by the department of University in Prague from 2 to 6 September in Jindřichův Hradec in the Czech Republic.

The presentation of applications of mathematical and statistical methods to solve theoretical and practical economic problems poses the main purpose of the conference. The subject of the presentation during the conference comprises the following issues: macro- and microeconomics, public and methodological problems of economics, social and demographic topics, subject matter connected with financial market, risk measurement and insurance, and applications of multidimensional statistics.

53 scientists took part in the conference, presenting 29 papers. The contributions were divided into thematic sessions. The conference began with a plenary session which consisted of two papers. The two-dimensional model of monetary policy, which takes into account the development of nominal interest rate and expected inflation, was analyzed in the first presentation *On the existence of limit cycles in a two-dimensional model of monetary policy* by R. Zimka and M. Demetrian. The general framework for the science of equity and sustainability was described in the second paper *Towards a science of equity and sustainability* which was presented by K. Ostasiewicz and W. Ostasiewicz. The subsequent sessions were held simultaneously in two conference rooms.

The first session concerned macroeconomic issues and social economics. The macroeconomic problems are connected with two papers. The first presentation entitled *Gross Domestic Product of the Czech Republic before and after adjustment* was presented by four authors (K. Vltavska, J. Sixta, M. Simkova, J. Zeman). It concerned the methodology connected with the reconstruction of the main macroeconomic indicators for the Czech Republic for 1970–1989. In the second paper entitled *Regional differences in the spotlight of input-output tables* by J. Kramulova, P. Musil and J. Fischer, the differences among Czech regions were analyzed using input-output tables. The social economic problems concerned health economics issues. In the first presentation, M. Grausova, M. Huzvar and J. Strangfeldova described the change of the efficiency of healthcare systems in the Czech Republic and Slovakia after the dissolution, compared to other European countries. The title of the presentation was *The efficiency of healthcare systems in the Czech Republic and Slovakia after the dissolution of Czechoslovakia*. In the second paper (*Differences in longitudinal developments of financial performances of Czech hospitals*), L. Komarkova, T. Hladkova, P. Pirozek and A. Komarek used a linear mixed model to describe the financial situation in hospitals.

The second session consisted of two parts, the first connected with macroeconomics problems and the second with insurance and retirement system. In the session concerning the macroeconomic issues three contributions were presented: *Coherence of trend and business cycle in the development of main macroeconomic indicators* by A. Zikova, H. Fialova, *Non-parametric and parametric approaches to the Czech business cycle dating* by L. Vrana and *Level of income differentiation by groups of people according to their social status in society* by M. Brazdilova, P. Mazouch. In the first paper the limits of the application of statistical extrapolation methods used in forecasting the economic growth of a country were presented. The second paper applied some non-parametric algorithm and parametric model on several indicators of business cycles and compared their performance. The main aim of the third contribution was to identify and describe socio-economical factors which influence income inequality in a society. In the session connected with insurance and retirement system three papers were shown. In the first contribution, V. Farkosovsky presented a paper entitled *Pension system financing schemes in the light of the Aaron-Samuelson condition*. The second paper *Dependent structure induced by Markov chain in the multiple life insurance* by S. Heilpern was devoted to the modelling of

the dependent structure connected with the multiple life insurance of a married couple. J. Dębicka, A. Marciniuk and B. Zmyślona described the construction of the new option of insurance-financial product in a paper entitled *Combination reverse annuity contract and critical illness insurance*.

The third session was divided into two parts, the first connected with finances and taxation issues, the second with microeconomic problems. The first part of the session consisted of four presentations. E. Zimkova, in the paper *Cost efficiency of Slovak commercial banks under the standpoint of the intermediation approach*, presented a new approach to evaluate the efficiency. M. Boda and M. Kanderova in the contribution *Reflection of stylized facts in measuring dependencies between financial assets returns* described a new view on using an alternative approach to modelling dependencies based on the concept of copulas and rank correlation. M. Ficura and J. Witzany presented the methodology connected with statistical inference approach used in paper *Bayesian estimation of stochastic-volatility jump-diffusion models on intraday price returns*. In the last paper *Losses and profits on the child tax credit in the Polish tax system*, E. Mazurek conducted a statistical analysis of the influence of changes introduced to the tax system connected with the child tax credit. The second part of the session consisted of four presentations: *Analysis of financial distress of Slovak companies using repeated measurements* by M. Stachova, P. Kral, L. Sobisek and M. Kakascik, *Corporate failure prediction using DEA: An application to companies in the Slovak Republic* by V. Rohacova and P. Kral, *Measuring the level of corporate internet presentation in relation to economic performance* by I. Kollar, P. Kral, P. Laco, and *European call options for the freight rate in container shipping* by A. Gardoń.

The fourth session concerned the problem of aging population. A. Kascakova, L. Kubisova and G. Nedelova presented the living conditions of society members after 50-years of age in a contribution *Social and economic situation of silver generation in Slovakia*. The influence of aging population phenomenon on economy was presented by M. Simkova and J. Sixta in the paper *Macroeconomic impact of aging in the Czech Republic*. The methodology connected with estimation of elderly mortality was introduced by T. Karel, J. Fojtik, M. Matejka and P. Zimmermann in a contribution *Modelling of high age mortality for the Czech Republic using Bayesian methodology*.

The problems connected with modelling of unemployment were considered in the contributions presented during the fifth session. The

first two contributions *Unemployment duration in the Czech Republic after the economic crisis* by A. Cabla and *Modelling of unemployment duration in the Czech Republic with the use of L-moments* described the methodology connected with estimation of unemployment duration. In the last paper *Evaluation of higher education institutions using data envelopment analysis*, M. Huzvar and Z. Rigova focused on performance assessment of higher education institutions in their core areas connected with education, research and development.

The last, sixth session was dedicated to the usage of statistical methods in economics. Three contributions were presented: *Application of robust regression methods in an analysis of the European countries' share of renewable energy in gross final energy consumption* by D. Blatna, *Dimensionality reduction of categorical data: Comparison of HCA and CATPA approaches* by Z. Sulz and H. Rezankova and the last one, entitled *Jan Stocky, Southern Bohemia and mathematical methods in economics* by J. Kodera, P. Zavodsky and O. Simpach.

The collection of papers was sent to Thomson Reuters to be considered for inclusion into the Conference Proceedings Citation Index (CPCI). The materials from the previous conference in 2014 were successfully included into CPCI. The 2015 conference is still in the process of evaluation.