APPLICATION OF MATHEMATICS AND STATISTICS IN ECONOMY THE 14TH INTERNATIONAL SCIENTIFIC CONFERENCE

Beata Zmyślona

Wrocław University of Economics

By tradition the international conference Application of Mathematics and Statistics in Economy (AMSE) has been organized every year since 1998 by three departments, namely the Department of Statistics and Probability of the Faculty of Informatics and Statistics of Economic University in Prague, the Department of Quantitative Methods and Informatics of the Faculty of Economics of Matej Bel University in Bańska Bystrica and the Department of Statistics of the Faculty of the Management, Computer Science and Finance of Wrocław University of Economics. In the year 2011 the Department from Poland organized the conference in Lądek-Zdrój on September 1st and 2nd.

The main purpose of the conference is an exchange of the latest attainments and knowledge in application of mathematical and statistical methods in economics. The thirty eight contributions were presented in six sessions, four of them were proceeded parallelly, so in fact there were ten sessions.

Two sessions were concerned with macroeconomic aspects. In presentation *On intergenerational Equity in an Economy with Non-Renewable Resources* Anton Dekrét and Rudolf Zimka analysed the relation between Hartwick's rule without and that with price relation. They looked for a condition for the intergenerational equity with respect to consumption. Emilia Zimková and Vladimír Úradníček identified the homogenous groups of countries in the United Europe. They based on the selected economic and human resource indicators. The results were presented in paper *Macroeconomic Development in Integrated Europe.* The contribution *Changes in the Monetary Aspects of the Economic Processes*

in The Slovak Republic in Consequence of Entering the Economic and Monetary Union was presented by Martin Bod'a and Viera Roháčová. The authors investigated the qualitative changes in the transmission mechanism of monetary policy in the Slovak economy as a consequence of the entry of Slovakia to the economic and monetary union. Jakub Fischer and Jaroslav Sixta attempted to estimate Gross Domestic Product of the Czech Republic in years 1970-1990. In socialist countries estimates of the economic development were provided within the framework of Material Product System, which did not take into account non-productive and non-market services. The authors in paper *Estimates of GDP for the Czech Rebublik 1970-1990* presented the transformation of original statistical data based on MPS into the system of national accounts. Katarina Makovínyiová and Rudolf Zimka in contribution *On transformation of an Open Economy Model to Its Normal Form Centred Manifold* analysed a four-dimensional dynamic model of a small open economy describing the development of income, capital stock, interest rate and money stock. Jana Kramulová and Petr Musil dealt with estimates of regional consumer price index in the Czech Republic. The results were presented in paper *Regional Aspects of CPI*.

One session involved the statistical methods of data analysis. Two papers (*Robust Bootstrapping in Regression* by Dagmar Blatná and *Application of Robust Methods* by Jindrich Cerny) were concerned with methods of robust analysis. In *Alternative Approaches for the Analysis of Multidimensional Contingency Tables* Iva Pecáková presented some alternative methods of analysis of the sparse data sets. The three authors Pavol Král, Lenka Lašova and Mária Stachová in *Visual Data Mining* showed a set of tools and techniques which used R for visualization of data mining models.

Two sessions dealt with the problems of labour market. During the first session three contributions were presented. The first *The Czech Labour Market and the Current Economic. What Can the Linked Employer-Employee Data Tell Us?* by Kateřina Duspivová presented the possibility of a wider usage of microdata from the Average Earning Information System to identify the labour market indicators. They facilitated the research of the impact of economic crisis on the employment in some industries. In the second paper *Causes and Consequences of Economic Inactivity in the Czech Republic* by Ludmila

Petkovová the causes of economic inactivity of Czech working age population were analysed. In the third paper *Is it possible to estimate labour productivity for the Czech regions?* Kristýna Vltavská presented the methods of estimation of the labour productivity on the basis of hours worked and gross domestic product. In the second session two papers were presented. The contribution *Czech Labour Market Development in the Period of the Recent Economic Downturn – A Combined View form Employment and Wage Statistics* by Věra Jeřábková and Martin Zelený focused on the analysis of the Czech labour market development in the period of recent economic downturn. The last paper in this session was *Hours Worked as an Input to the Input-Output Tables per Hour Worked* by Jaroslav Zbranek.

The next four papers were concerned with the denouements of the education system. The first one *Information Strategy Creation at the Faculty of Economics* was presented by Peter Laco. In the second the authors Savina Finardi and Jakub Fischer tried to answer the question: *Do Recent Changes in Public Universities Funding in the Czech Republic Have Any Impact on Quality of Education?* Miroslav Hužvár and Zuzana Rigová presented *Personnel Demands of Study Programmes at Universities.* The last paper *The Dynamics of the Efficiency of Teaching in Secondary Schools in Wroclaw in the Years 2004-2011* was presented by Marek Biernacki.

The demographic topics and the economic situation of households pose an important field in social-economic analysis. Two sessions dealt with those problems. Tomas Fiala and Jitka Langhamrová in the paper *Projection of the Development of the Human Capital of the Czech Republic* presented a projection of the development of the population in the Czech Republic based on the latest demographic and educational level forecasts. In the presentation *The Projection of the Economically Active Population* Petr Mazouch and Martina Šimková analyzed the structure of the population of the Czech Republic in terms of education and economic activity. In the article *Development of Live Expectancy and Its Impact* Jana Langhamrová, Jitka Langhamrová and Martina Miskolczi analyzed the historical data of selected demographic indicators together with prognosis prepared till 2060 for EU countries. The authors took into account life expectancy, healthy life expectancy, infant morality, fertility characteristics, proportion of

population ages 65+ and old-age dependency ratio. In the paper *Intensity of Ageing in EU Countries* the same authors presented the indicators which characterized velocity and intensity of the ageing process. The economic situation of households was analysed by Alena Kaščáková in the paper *Regional differences in the economy of Slovak households*. The methods of modelling of household income were presented in two papers. The first *Modelling of Household Incomes in the Czech Republic* by Adam Čabla dealt with modelling of household incomes in the Czech Republic with regard to different categories of households according to the characteristics such as the type of economic activity, the number of persons in the household, the education of the head of the household and the kind of income of the household. In the contribution *Conditional Distribution of Finite Mixtures of Probability Distribution* Ivana Malá presented theoretical results of the modeling of conditional distribution of the net annual income per capita in households in the Czech Republic.

Two contributions were concerned with the problems connected with health. Marin Bod'a, Janka Butková and Viera Roháčová presented in which way the data envelopment analysis could be applied in measuring the efficiency of health care facilities. The results were presented in the paper *Evaluation of the Efficiency of Health Care Providers in the Slovak Republic and the Czech Republic*. In the second contribution *Quality of Care for Diabetes* Cyprian Kozyra and Beata Zmyślona presented the main assumptions of the investigative project. The topic of this project was the analysis of economic aspects of treatment in case when the diabetes occurred with the kidney or circulation diseases. The analyses were based on the data from National Health Fund from Lower Silesia.

The distinct session involved issues connected with the financial market and insurance. The methods of modelling financial data were presented in three contributions. In the presentation *Fitting Exposure Curves and Nonlinear Regression* Jan Hrevus described the application of the exposure curves in reinsurance pricing and the proposal for their construction using nonlinear regression. Albert Gardoń presented the methods of modelling financial data with the jump-diffusion processes, driven by Winer and Poisson processes. Marin Bod'a and Mária Kanderová showed the application of the Monte Carlo simulation

techniques in the process of financial planning. Their results were presented in the paper *Utilization of Monte Carlo Simulation in Financial Planning.* The problems of insurance were considered by Stanisław Heilpern in the paper *Risk Process with Dependent Interclaim Times – Analysis of the Probability of Ruin.* The author investigated the continuous, dependent risk process and the influence of degree of dependence on the probability of ruin. Anna Nikodem-Słowikowska analysed *The Effect of Dependence on Life Insurance*.

In the last session four papers were presented. In the first *AI – Inspired Approach to Customer Data Analysis* the authors Lukáš Pastorek, Hana Řezanková, Lukáš Sobíšek and Tomáš Vintr illustrated the application of machine learning clustering techniques to reveal the hidden relations among clients of a financial institution. Katarzyna Ostasiewicz analysed *Models of Willingness to Pay for Sustainable Development.* Jakub Fisher and Lenka Hudrlíková presented *Index of Economic Well-being for the Czech Republic, Poland and Slovakia*. The authors compared trends in economic well-being to trends in GDP per person and cross-country comparison. Prokop Závodský presented the biography of *Stanislav Kohn – Classic of Modern Czech Statistics from Warsaw.*