

25th International Scientific Conference *Applications of Mathematics and Statistics in Economics (AMSE 2023)*

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The 25th International Scientific Conference *Applications of Mathematics and Statistics in Economics* was held from 30 August to 3 September 2023 in Rajecké Teplice, in the foothills of Malá Fatra.² The organiser of this year's conference was the Department of Quantitative Methods and Information Systems of the Matej Bel University in Banská Bystrica. The conference was attended by more than 40 experts from the Czech Republic, Slovakia, and Poland representing the Matej Bel University in Banská Bystrica, Prague University of Economics and Business, Wrocław University of Economics and Business, University of Wrocław, University of Pardubice, Masaryk University, Czech Technical University in Prague, University of Economics in Bratislava, Comenius University in Bratislava, the Czech Statistical Office, and the Statistical Office of the Slovak Republic.

The opening session of the conference was devoted to looking back upon the 25 years of the conference, which has been held regularly (with the exception of the Covid year 2020) since 1997 with alternating hosting among Slovakia, Poland, and the Czech Republic. Symbolic certificates of fidelity were awarded to four participants who had not missed any of the events (Rudolf Zimka and Peter Laco from the Matej Bel University in Banská Bystrica and Richard Hindls and Stanislava Hronová from the Prague University of Economics and Business). The festive nature of this opening was also added by a very kind letter of greetings from the Rector of the Matej Bel University in Banská Bystrica Vladimír Hiadlovský.

The expert programme of the conference was opened by the President of the Czech Statistical Office Marek Rojíček with an invited lecture entitled *Communication strategy and new tools for dissemination in the Czech Statistical Office*, in which he stated that challenges for official statistics can be in the simplest form characterised as the answers to the three basic questions: “What to measure?”, “What are the data sources?”, and finally “How to communicate?” data and related stories and how to find the most efficient way of transferring the information to individual users. The Czech Statistical Office systematically cooperates with journalists, especially in the public media. Another way of direct communication with users is through social networks (X, Instagram, and LinkedIn).

The second invited lecture on *Using of innovations and their impact on the selected conclusions of the Population and Housing Census 2021* was given by Ludmila Ivančíková, Director of the Social Statistics and Demography Directorate of the Statistical Office of the Slovak Republic. Her contribution focused on innovations implemented in the 2021 Census of Population, Houses and Flats in Slovakia that had

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² More information at: <<https://www.amse-conference.eu>>.

a direct impact on timeliness, completeness, data quality, and the detail of the outputs – the use of the sign of life method with its impact on completeness of coverage, fully electronic collection and item non-response rates, or data integration and the associated shorter time for processing and dissemination of the main results.

Other conference sessions were held in 6 sections: Efficiency Studies and Economic Analyses, Economic Issues and Official Statistics, Economic Demographics and Demographic Economics, Statistical Models and Techniques, Applications of Statistics and Pension Systems, Macroeconomic Models and History of Statistics. It is very difficult to highlight the most interesting contributions; therefore, I would like to highlight only some of the contributions that I consider to be of high quality, interesting, and methodologically innovative.

In the *Efficiency Studies and Economic Analyses* section, the most attention was caught by a contribution called *Comparison of the efficiency of national health systems of the European Union countries before and during the COVID-19 pandemic*. The author (M. Biernacki) tried to compare activities of national health systems aimed at ensuring the quality of health of citizens. The comparison was made in external praxeological areas, i.e. in the area of citizens' well-being and in the economic area.

Papers presented in the *Economic Issues and Official Statistics* section focused on current topics related to price developments, household budget survey, tourism taxation, etc. A contribution called *Regional price levels in the Czech Republic: recent update* by P. Musil, J. Fischerová, and J. Kahoun was devoted to the possibilities of monitoring consumer price developments by Region. Currently, the update of regional price levels seems to be very beneficial, nevertheless COVID-19 and related government measures pose further challenges. The structure of household consumption habits changed substantially, e.g. e-commerce grew up rapidly. With respect to data sources available, the updated regional price levels will be estimated for the year 2020, temporary changes in the economy will be taken out. Users will have updated estimates comparable with previous results.

The papers in the section *Economic Demographics and Demographic Economics* were mainly devoted to problems of the so-called silver generation, which Polish colleagues have been dealing with for a long time. Of these, I consider it appropriate to highlight the contribution of B. Zmyslona and A. Marciniuk entitled *Analysis of differences in the living conditions of the "silver" generation, including pension and healthcare systems*. The authors compared the living conditions of the silver generation in Poland, Slovakia, and the Czech Republic. It is clear that changes in the age structure of the population are increasing the burden on the pension and health care systems. From the point of view of social policy, this means an increase in the demand of this population group for health care and long-term care services. The burden on the health care system is assessed on the basis of the structure of expenditure on prevention and treatment incurred both by the state and by households of the elderly. The pension system is influenced by, for instance, the expected life in retirement and in the future, the current state of public spending and public debt, real economic growth, and the labour force of the elderly.

In the *Statistical Models and Techniques* section, a theoretical paper by O. Vozár and L. Marek on *Real life application of randomized response techniques to estimation of population means: a case of Slovak and Czech wage data in 2016–2019* attracted a lot of attention and discussion. The authors proceeded from the well-known fact that direct questioning of a sensitive variable leads to a high rate non-response or reporting by highly distorted values. The authors proposed how to estimate in real conditions the population mean of a quantitative variable with broad span of values in short time series to also estimate reliable year-on-year growth rates.

The section *Applications of Statistics and Pension Systems* brought papers on various topics with the dominance of the two areas mentioned in the section title. In the context of the population ageing and the need to reform pension systems, the benefit of the paper called the *Amendment to the Act No. 43/2004 Coll. on old-age pension savings and risks associated with the payment phase* should be highlighted.

The authors (J. Špírková and S. Zelinová) discussed the impact of the amendment to the Act on old-age pension savings that established a precisely defined default investment strategy, which should help savers achieve the highest possible rate of appreciation of their assets in pension companies, and thus higher future pensions. The conditions for the payment of pensions in 2023 remain unchanged, but from the beginning of 2024, the payment phase of the second pillar will fundamentally change. At retirement, the (old age) pensioner will be able to withdraw half of the amount saved; the other half will be further appreciated and paid out in the form of a lifetime pension. The wording of the amendment to the Act leads to a significant decrease in the amount of the pension payment when switching from a programme withdrawal to a lifetime pension by almost 50%, provided that the saver's savings are divided in half. The scenarios offered by authors solve and reduce the risk of the transition between programme selection and a lifetime pension.

In the last section *Macroeconomic Models and History of Statistics*, two theoretical papers were presented (*The impact of multi-dimensional model's critical parameters on the equilibrium's stability and the existence of limit cycles and On some qualitative properties of a liquidity-growth model*). The authors (R. Zimka, M. Demetrian and E. Zimková) of the latter paper presented a two-dimensional nonlinear dynamical model describing the development of liquidity and profit of a firm around its equilibrium. They analysed the qualitative properties of liquidity and profit in a neighbourhood of their boundary values which separate the domain of prosperity from the domain of bankruptcy of a firm and they showed that the method of Bautin bifurcation can describe the possible reality in relations between a firm and its bank more suitably than Hopf bifurcation method. The last paper (by P. Závodský and O. Šimpach) was traditionally devoted to the history of statistics (*230 years of statistical theory in Bohemia*).

Hiking is a traditional part of the AMSE conference, this time in the Súľovské Rocks area. A group of the fittest set out on a challenging route through Roháč saddle to the Súľov Castle and back to Lietavská Zavadka. However, most of the participants chose the medium difficulty option, i.e. a visit to the Wedding Palace in Bytča and a climb to the Súľov Castle. History lovers were not left out with a visit to the Wedding Palace, the village of Súľov, and other important historical buildings in the area.

A full programme of AMSE 2023 including abstracts of the papers presented, can be found at: <http://www.amse-conference.eu>. You can also find there information about the history of AMSE and links to previous years of the international conference.³

The tradition of alternating hosts (Slovakia – Poland – Czech Republic) continues, and the 26th AMSE conference, which will be hosted by colleagues from the Department of Statistics at Wrocław University of Economics and Business, will be held in Pawlowice, a suburb of Wrocław, Poland, at the turn of August and September 2024.

³ In this report on the Conference, texts of the Book of abstracts www.amse-conference.eu were used.