FROM THE EDITOR

I am pleased to announce that, with this issue, our journal's Editorial Board is being extended by another distinguished scholar as Partha Lahiri has accepted our invitation to join the group of scientific advisors and supporters of the Statistics in Transition new series (SiTns). Known for his extraordinary scientific achievements and organizational activity worldwide, Partha has also agreed to take on a leading role, as a Guest Editor-in-Chief, in organizing a special issue of SiTns devoted to statistical data integration – see call for papers (page 187).

The third issue of Statistics in Transition new series 2019 is composed of a set of seven research articles and of two papers based on presentations at the conferences held in Łodz (Multivariate Statistical Analysis, 2018) and in Ciechocinek (Classification and Data Analysis. Theory and Applications. 2018).

The issue is opened by **Vivek Verma's** and **Dilip C. Nath's** paper ***Characterization of the sum of binomial random variables under ranked set sampling*** in which authors examine the characteristics of the sum of independent and nonidentical set of binomial ranked set samples, where each set has a different order depending success probability. The characterization is done by establishing the general recurrence relations for two different situations based on the number of cycle, which is initially pre-assumed as a constant integer and when it is a random variable. To extend the knowledge about the characteristics of the sum in terms of their behaviour and pattern, first four moments, i.e. mean, variance, skewness and kurtosis are derived and compared with the sum of binomial simple random samples with the same success probability. The proposed procedure is illustrated with a real-life data on survivorship of children aged under one in Empowered Action Groups (EAG) states of India. Results show that the sum based on ranked set samples provides more reliable and accurate estimates than that of alternative one, for all selected states taken into account.

The next article, by **Mohammed Abduljaleel, Habshah Midi** and ***Mostafa Karimi, Outlier detection in the analysis of nested Gage R&R, random effect model***, starts with an observation that measurement system analysis is a comprehensive valuation of a measurement process and characteristically includes a specially designed experiment that strives to isolate the components of variation in that measurement process. Gage repeatability and reproducibility is the adequate technique to evaluate variations within the measurement system. Repeatability refers to the measurement variation obtained when one person repeatedly measures the same item with the same Gage, while reproducibility refers to the variation due to different operators using the same Gage. The two factors factorial design, either crossed or nested factor, is usually used for a Gage R&R study. In this study, the focus is only on the nested factor, random effect model. Presently, the classical method (the method of analysing data without taking into consideration the existence of outliers) is used to analyse the nested Gage R&R data. However, this method is easily affected by outliers and, consequently,

the measurement system's capability is also affected. Therefore, the aims of this study are to develop an identification method to detect outliers and to formulate a robust method of the measurement analysis of the nested Gage R&R, random effect model. The proposed methods of outlier detection are based on a robust mm location and scale estimators of the residuals. The results of the simulation study and real numerical example show that the proposed outlier identification method and the robust estimation method are the most successful methods for the detection of outliers. However, the other two methods are not performing well and suffer from masking effect.

Mansoor Rashid Malik and **Devendra Kumar** discuss *Generalized Pareto distribution based on generalized order statistics and associated inference* taking into account various structural properties of the distribution that are derived, including (quantile function, explicit expressions for moments, mean deviation, Bonferroni and Lorenz curves and Renyi entropy). Authors provided simple explicit expressions and recurrence relations for single and product moments of generalized order statistics from generalized Pareto distribution. The method of maximum likelihood is adopted for estimating the model parameters. Authors are considering the Bayes estimators of the unknown parameters under the assumption of gamma priors with respect to the shape and the scale parameters. The Bayes estimators are inaccessible in explicit forms, therefore authors analyse the above with reference to both symmetric and asymmetric loss functions. The Bayes interval of this distribution is also derived and - for different parameter settings and sample sizes - various simulation studies are performed and compared to the performance of the generalized Pareto distribution.

In the paper *estimation of product of two population means by multi-auxiliary characters under double sampling the non-respondents* **Brij Behari Khare, Raghaw Raman Sinha** consider the problem of estimating the product of two population means using the information on multi-auxiliary characters with double sampling the non-respondents. Classes of estimators are proposed for estimating P under two different situations in the literature using known population mean of multi auxiliary characters. Further, this problem is extended to the case when population means of the auxiliary characters are unknown and they are estimated on the basis of a larger first phase sample. In this situation, a class of two phase sampling estimators for estimating P is suggested using multi-auxiliary characters with unknown population means in the presence of non-response. The expressions of bias and mean square error of all the proposed estimators are derived and their properties are studied. An empirical study using real data sets is given to justify the theoretical considerations.

Olga Komorowska, Arkadiusz Kozłowski and **Teresa Słaby** present the results of *Comparative analysis of poverty in families with a disabled child and families with non-disabled children in Poland in the years 2014 and 2016*. The presence of a child with disabilities in a family presents more challenging conditions than the presence of a non-disabled child. One of the difficulties is of financial nature. One of the parents often has to give up their job to care for the child, which shrinks the household income. At the same time, the family has higher expenses resulting from, e.g. costs of treatment. All this increases the risk of falling into poverty. The goal of this paper is to analyse the financial situation of households with a disabled child, mainly in the context of poverty, and compare it to the financial

situation of households with non-disabled children. The study is based on data from Polish Household Budget Survey, covering two years, 2014 and 2016. The study revealed that families with a disabled child are generally poorer than families with non-disabled children. The financial situation improved over the studied period in both types of families, but the improvement in the families with a disabled child was much greater. The main factor in reducing the risk of poverty in both types of families is the education attainment level of the reference person (the household head), which should be at least upper secondary.

OlaOluwa Simon Yaya, Olalekan J. Akintande, Ahamuefula E. Ogbonna, Hammed Mumimi Adegoke in the paper *CPI inflation in Africa: fractional persistence, mean reversion and nonlinearity* discuss the price stability as the key mandates that apex monetary authorities strive to achieve globally. While most developed economies have achieved single digit inflation rates, most developing economies, especially African countries, still experience alarming double-digit inflation rates. Therefore, this paper examine the dynamics of inflation in sixteen African countries. Authors employed the fractional persistence framework with linear trend and non-linear specifications based on Chebyshev's polynomial in time. The results indicated nonlinear time trend in inflation for most of the countries. With the exception of Burkina Faso, which exhibited plausibility of naturally reverting to its mean level, the majority of the selected African countries would require stronger interventions to revert their observed inflationary levels to their mean levels.

Authors conclude that mean reversion is likely to occur in CPI inflation of Burkina Faso. In the choice of methodology for analysing inflation in Africa, this work recommends a careful selection of the estimation approach, particularly in countries where nonlinearities are detected.

Wojciech Roszka's paper *spatial microsimulation of personal income in Poland at the level of subregions* presents application of spatial microsimulation methods for generating synthetic population to estimate personal income in Poland in 2011 using census tables and EU-SILC 2011 microdata set. In the first section a research problem is presented along with a brief overview of modern estimation methods in application to small domains with particular emphasis on spatial microsimulation. The second section contains an overview of selected synthetic population generation methods. In the last section personal income estimation on NUTS 3 (sub-region) level is presented with special emphasis placed on the quality of estimates. Solving the problem of the sample size, correction of random and non-random errors, the possibility of performing different simulations are undoubted advantages of the discussed (SMM) methods, which encourage deepening the work and analysis of the effectiveness and reliability of the estimates.

The section Other articles containing post-conference papers starts with **Katarzyna Budny's** article *Power generalization of Chebyshev's inequality – multivariate case*. Some qualities of the multivariate power generalizations of Chebyshev's inequality are discussed and some improvements with extension to a random vector with singular covariance matrix are suggested. For these generalizations, the cases of the multivariate normal and the multivariate *t* distributions are considered along with presenting some financial application.

In the paper *Decomposition of gender wage gap in poland using counterfactual distribution with sample selection*, **Joanna Małgorzata**

Landmesser compares income distributions in Poland taking into account gender differences. The gender pay gap can only be partially explained by differences in men's and women's characteristics. The unexplained part of the gap is usually attributed to the wage discrimination. The objective of this study is to extend the Oaxaca-Blinder decomposition procedure to different quantile points along the income distribution. The RIF-regression method is used to describe differences between the incomes of men and women along the two distributions and to evaluate the strength of the influence of personal characteristics on the various parts of the income distributions using data from the EU-SILC for Poland in 2014. As the sample selection is a serious issue for the study, the applied decomposition is adjusted for sample selection problems. The results suggest existence of not only differences in income gap along the income distribution (in particular sticky floor and glass ceiling), but also differences in the contribution of selection effects to the pay gap at different quantiles.

Włodzimierz Okrasa
Editor