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From the Editor

This year's latest issue contains twelve articles. Their 34 authors come from 10 different countries such as the United Kingdom, USA, India, Poland, Germany, Nigeria, Iran, Turkey, Pakistan, Australia, Ukraine, Jordan, Saudi Arabia and Egypt, which proves that our journal is a very good place for scientists from different parts of the world to exchange ideas and share research results.

The publication of the final issue of the year is traditionally also a moment to express our gratitude and thanks to our authors, reviewers and all the participants of the editorial process. Our success is to cooperate with an international team of experts and great articles' founders that are the basis to publish high quality scientific papers. A list of the names of these people of merit for our journal is included in the Acknowledgements. On behalf of the Editorial Board, Associate Editors and the journal's readers I sincerely thank all our partners and patrons.

Invited papers

This issue starts with the invited paper ***Unreported standard errors in meta-analysis*** by **Nicholas T. Longford**. The paper discusses how to assess the loss of information caused by the practice excluding from meta-analysis these studies when the standard error of its treatment-effect estimator, or the estimate of the variance of the outcomes, is not reported and cannot be recovered from the available information. The author presents two sets of examples of the methods used, explaining in each section assumptions, difficulties, and conclusions from the analysis, noting also the context of the conducted studies (for example countries with different levels of development or organisation of health care).The examples shown in sections 4 and 5 confirm that even simple methods, using some shortcuts on proper imputation, exploit nearly to the full the information about an incompletely reported study and they estimate the standard error of the overall treatment effect with negligible bias.

Research articles

The article entitled ***Approximately optimum strata boundaries for two concomitant stratification variables under proportional allocation*** by **Faizan Danish** and **S. E. H. Rizvi** deals with a problem of proper choice of the strata boundaries as an important factor as regards the efficiency of the estimator of population characteristic under consideration. For obtaining approximately optimum strata boundaries a Cum

Rule (i=3,4) has been provided based on a single study variable along with two concomitant variables used as the basis of stratification variables. The simulation study proved the superiority of the proposed methods with regard to the existing methods. The research also showed that the use of two stratification variables gains efficiency over a single auxiliary variable and the proposed methods are more precise than the existing methods.

Henryk Gurgul, Jessica Hastenteufel, and **Tomasz Wójtowicz** in their article ***Changes in the impact of US macroeconomic news on financial markets the example of the Warsaw Stock Exchange*** analyse the behaviour of 5-minute returns of the WIG20 in a short period after the announcements of 13 macroeconomic indicators describing the US economy. Authors examine how US macroeconomic news affected the WIG20 in years 2004-2019. The WIG20 reacts significantly to announcements of most of the indicators considered. This reaction is immediate and it is usually limited to the first 5-minute returns. The strongest impact is observed after NFP announcements. The analysis in sub-periods leads to the conclusion that, in general, US macroeconomic news announcements induced the highest averages of abnormal returns during the global financial crisis (2007-2009) and in the first few years after the crisis. In later years, the impact of information from the United States was notably weaker.

The next paper ***Agu-Eghwerido distribution, regression model and applications*** by **Agu Friday Ikechukwu** and **Joseph Thomas Eghwerido** presents a one-parameter distribution called the Agu-Eghwerido (AGUE) distribution with its simple mathematical representation and the regression model of the AGUE distribution. The AGUE parameter was estimated using the method of maximum likelihood estimation. The lifetime applications of the AGUE distribution was illustrated using two lifetime data sets. The characteristic of the introduced model for a larger sample size was examined via simulation study and the simulation results showed that the increase in parameter values decreases the mean squared error value. Similarly, the mean estimate tends towards the true parameter value as the sample sizes increase. Thus, it provides the best fit and more flexible than Pranav, exponential and Lindley distributions for the data sets. Ultimately, the AGUE distribution can serve as an alternative model to Pranav, exponential and Lindley distributions in the literature.

The article entitled ***A new extension of Odd Half-Cauchy Family of Distributions: properties and applications with regression modeling*** prepared by **Subrata Chakraburty, Morad Alizadeh, Laba Handique, Emrah Altun** and **G. G. Hamedani** proposes a new family of continuous distributions called the extended odd half Cauchy-G. The distribution bases on the T −X construction of Alzaatreh et al. (2013) by considering half Cauchy distribution for T and the exponentiated $G(x;\xi)$ as the

distribution of X. Authors have outlined several particular cases and a number of important statistical characteristics of this family were investigated. On this basis a new regression model was proposed and its application in modelling data in the presence of covariates was presented.

Muhammad Aslam, Mehreen Afzaal and **Muḥammad Ishaq Bhatti** discuss ***A study on exponentiated Gompertz distribution under Bayesian discipline using informative priors.*** This distribution has been recently used in almost all areas of human endeavours, starting from modelling lifetime data to cancer treatment. This paper explores the important properties of the EGZ distribution under Bayesian discipline using two informative priors: the Gamma Prior (GP) and the Inverse Levy Prior (ILP). The usefulness of the model is illustrated with the use of real-life data in relation to simulated data. The simulated study and real-life data were used for various sample sizes with 10,000 replications. The results for real life data and simulation are identical.

In the next paper entitled ***The problem of statistical assessment of the potential for the development of regional integration processes*** **Oleksandr Osaulenko, Olena Bulatova, Olha Zakharova** and **Natallia Reznikova** show the use of integrated indices to evaluate the potential for the development of regional integration processes. A new research and methodological approach were proposed with regard to the intensity of the influence of internal and external factors on integrative relations development. Countries of the world choose their own strategy for participation in the processes of regional integration depending on challenges determined by their level of socio-economic development, the existing potential, the nature of the development of external relations, etc. Thus, it is advisable to apply integral indicators as they allow providing a comprehensive and quantitative description of processes of economic integration that take place in the world economy at a certain moment of time.

Rama Shanker's and **Umme Habibah Rahman's** article presents ***The Type II Topp-Leone Frechet distribution: properties and applications.*** Authors discuss the properties of the distribution including hazard rate function, reverse hazard rate function, Mills ratio, quantile function and order statistics as well as the maximum likelihood estimation used for estimating the parameters of the proposed distribution. The paper deals also with the problem of applications of the distribution for modelling several data sets relating to temperature and the goodness of fit of the proposed distribution compared with that of the Frechet distribution.

The next paper ***Record data from Kies distribution and related statistical inferences*** by **Nesreen M. Al-Olaimat, Husam A. Bayoud** and **Mohammad Z. Raqab** describes the Kies probability as an alternative to the extended Weibull models due to

the fact it provides a more efficient fit to some real-life data sets. The classical and Bayesian inferences for the Kies distribution based on records were proposed and the maximum likelihood estimates were studied jointly with asymptotic and bootstrap confidence intervals. The Bayes estimates, along with credible intervals were discussed assuming squared and LINEX loss functions. The performance of the different estimation methods was assessed via Monte Carlo simulations. From the simulation study it was concluded that the proposed informative Bayes estimates outperform the classical estimates in all considered cases. However, non-informative Bayesian and the classical estimation methods perform almost the same under SE and LINEX under small ν, while better results of the Bayesian methods are obtained under LINEX assuming other positive values of ν. The Bayes credible intervals compete the classical confidence intervals in terms of the coverage probability in all cases.

Amal S. Hassan, Salwa M. Assar, Kareem A. Ali and **Heba F. Nagy** in their paper ***Estimation of the density and cumulative distribution functions of the exponentiated Burr XII distribution*** consider seven different estimators of the PDF and CDF of the EBXII distribution when the shape parameters k and c are assumed to be known. Maximum likelihood estimator, uniformly minimum variance unbiased estimator, least squares estimator, weighted least squares estimator, maximum product spacing estimator, Cramér-von-Mises estimator and Anderson-Darling estimator are obtained. A simulation study was performed to compare the behaviours of the proposed estimates. The results show that the maximum likelihood and uniformly minimum variance unbiased estimates perform better than the other estimators.

The last paper prepared by **Jagdish Saran**, **Narinder Pushkarna** and **Shikha Sehgal** presents ***Relationships for moments of the progressively Type-II right censored order statistics from the power Lomax distribution and the associated inference***. Several recurrence relations between single and product moments of progressively Type-II right censored order statistics from the power Lomax distribution were established. The relations enable the computation of all the single and product moments of progressively Type-II right censored order statistics for all sample sizes n and all censoring schemes (R_1,R_2,…,R_m), m ≤n, in a simple recursive manner. The maximum likelihood approach was used for the estimation of the parameters and the reliability characteristic. A Monte Carlo simulation study was conducted to compare the performance of the estimates for different censoring schemes.

Research Communicates and Letters

The Research Communicates & Letters section presents a paper ***Towards a target employment rate within age and gender groups*** by **Stanisław Jaworski** and **Zofia Zielińska-Kolasińska.** The aim of the article was to state the prognosis about

employment rates in European countries. It seems that governments of many countries should revise their economic strategies affecting labour markets if they want to achieve satisfactory employment rates. The research presents a pessimistic prognosis of employment rates in European countries with respect to young and partly to older workers. The German employment rate served as a benchmark for this research. The likelihood was estimated by a Monte-Carlo simulation based on the class of exponential smoothing models.

Włodzimierz Okrasa
Editor