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Guest Editors' Introduction

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The present Special Issue of QdS - Journal of Methodological and Applied Statistics publishes a series of paper sponsored by the Italian Statistical Society (SIS); it gathers high quality papers submitted in response to an open call sent after the "47th Scientific Meeting of the Italian Statistical Society", that was held in Cagliari on June 11-13, 2014.

The call for papers, however, was not restricted to the conference contributions. Submissions from other researchers were also actively encouraged. In fact, the paper of Francesca Gagliardi was presented at the 7th International Conference of the ERCIM WG on Computational and Methodological Statistics, that was held in Pisa on December 6-8, 2014.

This Special Issue of QdS brings together 6 contributions representative of a wide spectrum of statistical methods and applications and the themes reflect the heterogeneous structure of the Scientific Meeting: from inferential issues to advanced application.

The Special Issue closes with the review of the Vijay Verma's book *"Sampling elusive populations: Applications to studies of child labour"* which can be freely downloaded from the site: `http://www.ilo.org/ipecinfo/product/download.do?type=document&id=25535`.

The paper of Luisa Bisaglia of University of Padua and Margherita Gerolimetto of University Ca' Foscari (Venice), titled *"Testing for (non)linearity in economic time series: a Monte Carlo comparison "* provides a review and a comparative analysis of the most popular tests used to detect nonlinearities in time series data. The authors consider linearity tests against both non-specific and specific alternatives and investigate,

via Monte Carlo experiments, their power and size properties. The paper, on one hand, makes clear how these tests work when applied to time series generated by a set of nonlinear parametric models which are very popular in modeling economic data, on the other hand, provides a new and fair picture of the relative performance of the examined tests, delivering some useful hints for their use in real data application.

The paper of Alberto Caimo and Antonietta Mira of University of Lugano (Switzerland), titled *"Delayed rejection algorithm to estimate Bayesian social networks"* introduces a modification of available MCMC algorithms to estimate Exponential Random Graph Models (ERGM) for network data. In particular authors focus on a variation of Metropolis-Hastings (MH) algorithms via delayed rejection (DR). They key idea behind DR is to consider a second stage move when the MH rejects a proposed value. The proposal distribution at the second stage depends not only on the current position of the chain, but also on the rejected value at the first stage. This strategy improves standard MH mixing and reduces the number of rejected candidates, while preserving the reversibility of the Markov chain with respect to the target posterior density, as shown in an application to Zachary's karate club network.

The paper of Elisabetta Carfagna of University of Bologna titled *"Spatial data for agricultural statistics, focus on spatial resolution, change of support and transformations of spatial data"* and co-authored by Simone Maffei of Terra Nova Gis and Andrea Carfagna presents a critical review of methods for producing agricultural statistics. In particular, the focus is on spatial resolution of data, on change of support and on other transformations like aggregation and disaggregation of spatial data when remote sensing data, Global Positioning Systems (GPS) and Geographic Information Systems (GIS) are used. The impact of above-mentioned characteristics and transformations of spatial data on sampling frame construction and sample design, stratification, use of remote sensing data for agricultural statistics, small area estimation and yield forecasting is discussed.

The paper of Giancarlo Ferrara, Francesco Vidoli, Arianna Campagna and Jacopo Canello of SOSE - Soluzioni per il Sistema Economico S.p.A., titled *"A non-parametric stochastic frontier for the analysis of labour-use efficiency in the Italian machinery industry"* investigate the labour-use efficiency in the Italian machinery industry in order to give new insights on the dynamics of the Italian manufacturing system in the last decade. The authors consider a non-parametric stochastic frontier approach applied to a panel data of manufacturing small and medium enterprises operating in the mechanical industry for the period 2002-2012. The sample has been extracted from the Italian Ministry of Economy and Finance annual survey. The results of the analysis show a persistent level of labour-use inefficiency in the sample under study. Particularly, this is issue is apparent for those firms using non standard jobs, while firms entitled to access to wage redundancy fund show, on average, higher levels of efficiency in labour input use. Interestingly, the inefficiency gap between the two subsets of firms tends to reduce in absolute terms over time.

The paper of Francesca Gagliardi of University of Siena, titled *"SAS routines for variance estimation of poverty measures based on sample cumulated over waves of a*

panel" proposes how to pool data with the objective to enhance the sample size, in particular with reference to subnational (regional) estimates for which sample sizes are usually too small. The proposed methodology introduces an additional issue of dealing with correlations between samples from consecutive waves of a rotational panel such as EU-SILC survey. The SAS routines presented in this work have been developed for application when full information on the sample structure is available. The empirical application is based on micro-data for the survey of for years 2009, 2010 and 2011, to which the Author has got a privileged access through a project with OECD.

The paper of Tommaso Luzzati, Bruno Cheli and Sabrina Arcuri of University of Pisa, titled *"Measuring the sustainability performances of the Italian regions"* has two main aspects, one methodological and one empirical. From the methodological point of view it aims at contributing to the debate about composite indicators, from the empirical one it assesses the relative sustainability of the Italian regions. Instead of building a single composite indicator (score) for each region, the authors calculate many composite indices by combining different weighting systems and rules of normalization and aggregation. Such an approach represents a good compromise between the need of synthesising the information provided by many variables and the need to avoid the loss of relevant information that occurs when several indicators are aggregated into a single composite index.

This Special Issue is concluded by a Review performed by Fulvia Mecatti of the Book *"Sampling elusive populations: Applications to studies of child labour"* written by Vijay Verma, for the Department of Statistics of ILO, the International Labour Organization in Geneva. The book is written under the International Programme on the Elimination of Child Labour of the Fundamental Principles and Rights at Work Branch (FPRW/IPEC); it has been funded by the United States Department of Labor and it is dedicated to the memory of Leslie Kish, who the author named as both teacher and friend. The book essentially shows two main purposes. First to complement a former work (2008) within a similar ILO program, where the author dealt with sampling issues in conventional, large-scale household surveys of child labor. In this more recent book, while still focusing on sampling issues for designing child labor surveys, Verma tooks a non-standard perspective, which allowed for enlarging the survey goals also to hidden, elusive sectors of the working children population such as child street vendors or child domestic workers. The second purpose, also a byproduct of the first one above, is then its contribution to survey methodology for difficult-to-sample populations as a contemporary research field actively facing the growing complexity of the global social research.

References

Verma, V. (2008), Sampling for Household-based Surveys of Child Labour. Geneva: International Labour Office.