Editorial

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Biographical notes: Giovanni Cerulli is researcher at the Unit of Rome of the IRCrES–CNR, Research Institute on Sustainable Economic Growth, National Research Council of Italy. He took a degree in Statistics and a PhD in Economics at Sapienza University of Rome. Giovanni is mainly interested in developing new models for statistical causal inference and for the econometrics of program evaluation. His contribution is also computational with several Stata routines developed (some published in "*The Stata Journal*"). He is an Editor-in-Chief of "*The International Journal of Computational Economics and Econometrics*", coordinates GRAPE – Research Group on the Analysis of Economic Policies, and is the author of the book "*Econometric Evaluation of Socio-Economic Programs: Theory and Applications*" (Springer, 2015). He has published papers in numerous prestigious refereed journals.

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Economies are sophisticated social systems characterised by pervasive uncertainty, which makes agents' behaviours and systemic outcomes difficult to predict.

As uncertainty increases, decisions become more challenging and a management structure specifically devoted to handling uncertainty seems to be more attractive.

The study of complex socio-economic systems thus requires new datasets and more reliable statistical techniques. This is a necessary requirement for enabling policy-makers to assess and regulate economic performance vis-à-vis uncertainty.

This special issue aims to raise a rigorous scientific debate on the many interconnections between uncertainty and socio-economic performance, by focusing on the tools offered by modern quantitative socio-economic science.

This issue includes some of the most representative contributions presented at the 2016 edition of the *International Workshop on Computational Economics and Econometrics (IWcee16)* held in Rome, National Research Council of Italy, 30 June–1 July.

Measuring uncertainties: a theoretical approach

Speaking about the measure of uncertainties means to highlight an apparent paradox. Considering in particular an application in the field of social sciences, it may appear to be incompatible with the idea of an accurate and stable measurement. It may seem to be a nonsense, especially in the field of forecast studies, and especially in a Futures Studies approach. However, the history of science in the last two centuries can provide useful elements to support such a paradoxical effort.

In trying to understand uncertainty, especially for building futures, each one of the elements in play has its own weight and its validity, only provided that a correct methodological approach to be at the basis of the research work.

Technology diffusion of Industry 4.0: an agent-based approach

Governmental interventions, such as public policies and programs, play a vital role in innovation diffusion, particularly if the application area is heterogeneous, like the German federal high-tech approach of Industry 4.0. Interventions can thus inhibit market failure and negative externalities or disseminate the technology and promote positive externalities.

To analyse the impact of governmental intervention, considering the particularities of the Industry 4.0 approach, an agent-based model is proposed, particularly to test the sensitivity of Industry 4.0 innovation diffusion speed and degree due to interventions such as promotion, educational support, technology networks (hubs), technology standardisation, and financial aid among manufacturing SMEs in Germany.

The paper describes a conceptual model structured along the overview, design concept, and details framework. Grounding and calibration of input parameters and agent behavior are based on firm characteristics and adoption determinants (technology-organisation-environment model) from survey data and Industry 4.0 case studies.

Forecasting inflation in Tunisia during instability using dynamic factors model: a two-step based procedure based on Kalman filter

This work presents a forecasting inflation model using a monthly database. Conventional models that forecast inflation use a few macroeconomic variables. In the context of globalisation and dependent economic world, models have to take into account a large amount of information. This model is the goal of recent research in various industrialised

countries as well as developing ones. With the dynamic factors model (DFM), the forecast values are closer to the actual inflation than those obtained from the conventional models in the short term.

In this paper, authors devise the inflation into "free and administered inflation" and test the performance of the DFM under instability in different types of inflation and trend inflation, namely administered and free inflation. Authors have found that the DFM with an instability factor leads to substantial forecasting improvements over the DFM without an instability factor in the period after the revolution.

Do the flexible employment arrangements increase job satisfaction and employee loyalty? Evidence from Bayesian networks and instrumental variables

This study explores the relationship between job satisfaction, employee loyalty and two types of flexible employment arrangements; teleworking and flexible timing. The analysis relies on data derived by the workplace employee relations survey (WERS) in 2004 and 2011. Authors apply the propensity score matching approach and least squares regressions. Furthermore, they employ the Bayesian Networks (BN) and directed acyclic graphs to confirm the causality between employment types explored and the outcomes of interest. Additionally, authors propose an instrumental variables approach based on the BN framework. The results support that a positive causal effect from these employment arrangements on job satisfaction and employee loyalty is present.

On the validity of exclusion restrictions in the structural multivariate framework: a Monte Carlo simulation

This paper aims to examine the validity of identifying restrictions used in the structural multivariate models. Whether we are under short-term identification approach and/or long term identification one, the scheme adopted implies the imposition of additional assumptions, which usually take the form as exclusion restrictions.

Authors believe that the value of a restriction is not necessarily equal to zero even if it expresses the lack of impact of a shock on a variable. They think that this lack of impact may reflect an effect asymptotically equal to zero and that the little nuance could be amplified with the model dynamics and affect the structural analysis. Authors have chosen to study this problem by using a Monte Carlo simulation and to examine the consequences of slipping of the identification restriction value. The results that emerge from this work confirm the sensitivity of variables' responses to change, even the slightest it may be, in the value of identification restrictions. Whatever the strength and elegance of the theory and the economic reasoning from which emanate the exclusion restrictions, precision measurements should be considered.

Career mobility of PhD holders in social sciences and humanities: evidences from the POCARIM project

The paper aims at investigating factors that could affect the likelihood of changing job of *PhD* holders in the fields of social sciences and humanities. Authors use data collected through a survey developed within the POCARIM project, funded by the European Commission under the EUFP7, in order to analyse variations in *PhD*s' career paths in a longitudinal dimension: they consider the career of each agent as a whole and investigate what elements related to individual features can influence career's entropy in term of changes of sector and/or country.

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