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PREFACE

It is with pleasure that we present the 2019 issue of the *Annals of the Department of MEMOTEF*. As announced in the previous volumes, the Annals migration process on the Sapienza University's Open-Access Journal system (OJS) is ongoing. The achievement of the digital turn is the most relevant development of the Journal, and it goes along with the development of its international orientation, with increasing collaboration from international scholars in the peer review system and a growing number of contributions carried out by colleagues from international research institutions. The expanding international orientation has allowed the Annals to be included, since 2018, both in the list of scientific journals recognized by the Italian institution for the evaluation of academic research (ANVUR) for most of the scientific sectors active in the Department, and in the Class A list of the most prestigious journals for Economic Geography.

In pursuing our mission, this volume wants to further promote the multidisciplinary scientific debate in the field of applied and behavioural sciences, presenting a selection of articles from both internal and external contributors, representing the variety of scientific disciplines in the Department of MEMOTEF (Sapienza).

As regular readers will know, the journal is divided in three parts: the main section is dedicated to *Research Papers* selected following a peer review procedure, a second section of *Notes and Discussion* is aimed at representing a forum for thought on current research, and a third section on *Book Reviews* reflects the will of the journal to be a means of deepening and disseminating knowledge. This year, besides the traditional partition, the volume includes a *Special Report* written by Felice Roberto Pizzuti, which discusses and presents most important data and findings from the 2019 Welfare State Report. The 'Welfare State Report' was actually first published by Sapienza University Press in 2005 and it is now in its thirteenth edition. It is considered an important platform for the discussion of welfare state issues.

The 2019 selection of research papers includes contributions from colleagues from national and international research institutions. The first paper by Marco Battaglini, Giorgia Capacci and Silvia Capuano is a contribution to research on human lifespan and survival, presenting the most recent and validated Italian database on semi-super and supercentenarians. It particularly describes the methodology of data collection and data validation process and provides a "picture" of centenarians in Italy.

In the second contribution, Giorgia Bressan and João Lourenço Marques discuss the use of composite indicators to monitor the accomplishment of Sustainable Development Goals in the health domain, paying particular attention to their application at the subnational level. The authors provide a critical examination of data sources and offer insights into the ideal properties of a composite indicator for use in the SDGs context, with an interesting analysis of the Portuguese experience.

The third article by Maria Giuseppina Bruno, Pierluigi Fava, Antonio Grande and Maria Rita Scarpitti deals with option pricing. The authors review the salient mathematical steps that lead to the evaluation of financial options with the Heston model. The paper analyses some important aspects related to the implementation of the model and shows the results of an empirical analysis carried out on real data.

The study by Roberto De Marchis, Antonio Grande, Stefano Patrì and Daniela Saitta is also framed in the discipline of mathematics. The paper proposes an application of the Jordan canonical form to the proof of Cayley-Hamilton theorem. The authors extend the simple proof for diagonalizable matrices to the case of non-diagonalizable ones over a generic field. They obtain a proof for non-diagonalizable matrices over an algebraically closed field and then, by virtue of the properties of field extensions, they show that this proof also holds in the case of a generic field.

Cristina Giudici, Silvia Polettini, Maria Felice Arezzo and Nicolas Brouard's research analyses the role of family support on the survival of older people looking at private and collective households. Taking into account the selection bias which characterises the institutionalised population, the authors compare the mortality levels of individuals in institutional settings with those in private households, and test the protective role of different family relations within the institutional context.

The paper by Alessandro Piergallini and Michele Postigliola focuses on Italian primary surplus policies with respect to their compatibility with the sustainability of public debt. The Authors propose an analysis of historical data in relation to the public budget in post-unitary Italy, from 1862 to 2012. Applying the theory of "tax smoothing" and using appropriate econometric models, they monitor the responses of

primary surpluses to changes in debt and test any policy reactions that are significantly consistent with its sustainability.

The research by Paolo Onorati and Brunero Liseo proposes a methodology to estimate the value-at-risk applying the conditional copula approach to financial data. Referring to a portfolio with two assets, the authors use a time varying Archimedean copula. The proposed method offers a useful tool for the mathematical modelling of dependence between random variables. The method finds its natural implementation in risk management, although it is not necessarily limited to this field.

Gian Pietro Zaccomer proposes an interesting insight into the construction of homogeneous regions through the use of classical clustering algorithms. Starting from different zoning experiences developed through multivariate analyses methods, and referring to the Italian Friuli Venezia Giulia region as a case study, the author addresses the matter of contiguity among territorial units. The article discusses the use of "direction indicators", if these exist, to solve partially the issue of contiguity.

The discussion section presents a note by Adriana Conti Puorger in the disciplinary field of Economic Geography, which offers a critical assessment on climate change and the political agenda.

The last section presents two reviews of scientific research dealing with socio-demographic and geographic aspects in Italy and in the Mediterranean.

We thank the authors of the articles and all who responded to our call for papers. Hence, we also thank our referees for their commitment to reviewing the submitted papers. We cannot close this Preface without expressing special appreciation of our editorial team and advisory board and the members of the scientific publications commission for their support and advice. It is our hope that this issue will further stimulate interdisciplinary debate in the field of applied and behavioural sciences and will be a precious resource for the Department of MEMOTEF.

December 2019

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