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Editorial

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The 2015 winter issue is my first issue since I stepped in as Editor of the International Journal of Microsimulation at the Luxembourg World Conference in September 2015. It is a great honour and a great responsibility, which I share with the new Editorial Board, to succeed to the previous Editor Gijs Dekkers, now President of the International Microsimulation Association.

The current issue contains four articles, plus a book review. The articles cover a wide range of applications, from transport (Cao *et al.*) to health (Hennessy *et al.*), pensions (Tikanmäki *et al.*) and taxes (Albarea *et al.*). The first two papers deal with methodological issues. The paper on subway carriage design by Cao and coauthors introduces state-of-the-art machine learning methods for model evaluation, while Hennessy and coauthors describe how to use data fusion techniques to match different datasets or impute missing data, with an application to health care in Canada; they provide a good discussion of the limitations of this empirical attempt. The last two papers deal with important policy issues. Tikanmäki *et al.* evaluate the pension reform that will be implemented in Finland starting in 2017. They show that the reform will slightly increase the overall inequality among pensioners, as it will phase in only gradually; however, within each cohort it will reduce pension disparities. Finally, Albarea and coauthors introduce BETAMOD, a new static model for individual income taxation in Italy. The main peculiarities of this model are a detailed set of tax expenditures characterizing each taxpayer, and the estimation of individual-specific tax evasion rates. It would be interesting to see in a future issue of this journal a comparison between the many existing tax-benefit models for this country (see the reference list in their paper).

Overall, this variety of applications is representative of the flexibility of the microsimulation approach, and stresses the multidisciplinary nature of the journal. Also, the big number of coauthors (almost six per article, on average) is a reminder of the importance of collaborative research for the development of microsimulation models. Unfortunately, the possibility to extend (implicit or explicit) cooperation beyond specific research groups is often limited by the lack of publicly available, well documented source code. In simulation, the code is the analogue to proofs for analytical models. While a good model description, possibly complemented by pseudo-code, should in principle allow replicability, a common experience is that replicability is hard, often very hard. Hence, most models are built from scratch, or on the basis of previous work by the same authors/research groups, generating at best *genealogies* of models with little crossbreed. This impedes the development of the field. As a counter-example, think of Dynamic Stochastic General Equilibrium (DSGE) models, which are also simulated. A large and increasing number of the best known models are easily available through the Macroeconomic Model Database (Wieland et al., 2012): PhD students can download, modify and extend these models, contributing to the diffusion of the methodology.[1] I personally believe that the code of our microsimulation models should be made available from public, stable repositories, not only to referees but to the scientific community at large, and I invite authors to submit their code to the journal as an appendix to their manuscripts.

In the first months in office, we have agreed upon a new Copyright Policy, along the terms of the Creative Commons Attribution (CC BY) License. This license leaves the copyright on any research article to the Authors, which grant the IJM a license to publish the article and identify itself as the original publisher. In particular, the agreement permits the use, distribution and reproduction of the published material in any medium, provided the work is properly attributed back to the original author and publisher. The adoption of this copyright agreement naturally fits with the open access, non-commercial nature of the journal, and safeguards the right the journal is most interested into, that is the right to be appropriately cited as the original source of publication.

I am also proud to announce the inclusion of the IJM in Scopus, a large abstract and citation database of peer-reviewed literature (owned by Elsevier). This completes the list of major databases where the journal is now included (the others being EBSCOhost, EconLit and RePEc).

[1] Also, all models are developed in the same language and run on the same platform (Dynare, a Matlab/Octave plugin). This is more problematic in microsimulation modelling, as no convergence has so far occurred on the use of common languages and platforms. As long as the code is available, however, porting into different platforms becomes a much easier task.

Microsimulation is ultimately a methodology that rests on two tenets: a focus on individual, heterogeneous (micro-) behaviour, and the use of computers to dynamically solve the models, and analyse the evolution of an initial population in terms of its aggregate (macro-) and distributional characteristics. These features are shared by a closely related methodology, agent-based modelling, whose three roots are the literature on complex adaptive systems, evolutionary economics, and …. dynamic microsimulation itself, in particular the work of Barbara Bergmann (Bergmann, 1974) and Gunnar Eliasson (Eliasson, 1977). The main difference between dynamic microsimulation and agent-based modelling is the incorporation of more data into the first approach, and more interaction between agents and agent-types in the latter. Bergmann and Eliasson were the first to incorporate explicitly the interaction between the supply and demand for labour in a dynamic microsimulation model, a feature that is now becoming increasingly common in microsimulation (see Peichl and Siegloch, 2013). At the same time, agent-based modelling are becoming more data-driven (Richiardi, 2013). A convergence of the two approaches is hence under way, and this explains why I am keen to open the journal to contributions from the agent-based modelling community, as well as to other literatures that share a micro perspective, and a simulation approach.

Suggestions for further readings.

In addition to the book reviewed by Jinjing Li (*Spatial Microsimulation: A Reference Guide for Users*, edited by Robert Tanton and Kimberley L. Edwards), the Editors have a few suggestions of books and papers that might be of interest to readers of this journal. Sophie Pennec recommends the volume by Bierlaire *et al.* (2015), which describes the implementation of an improved, UrbanSim-based platform for three European cities: Brussels, Paris, and Zürich. Venky Shankar recommends two readings related to the use of big data and the rapidly evolving world of simulation based statistics: a paper (Taylor and Tibshirani, 2015) and a book (Hastie *et al.*, 2015). He also suggests a paper by Pesaran and Smith (2012), dealing with the crucial issue of counterfactual policy analysis which is at the hearth of many microsimulation models. Deborah Schofield recommends two papers which are directly relevant to microsimulation modelling. The first paper (Lim *et al.*, 2012) presents a large scale application of modelling of burden of disease across multiple countries. Practitioners in the burden of disease field often use aggregated data but some are now using microsimulation models: this is an area in which we can expect to see microsimulation increasingly used. The second paper (Simpson *et al.*, 2009) is an interesting comparison of the traditional Markov model used for cost effectiveness studies –which relies on aggregation of patient data to model transitions between health states and related costs– with a model using individual patient

level data. The paper highlights the advantages and disadvantages of each approach and is an example of the increasing application of micrsimulation modelling for cost effectiveness analysis. In this case the application was cost effectiveness of a drug to treat HIV based on data from a clinical trial. Finally, for those readers interested in agent-based modelling, I would recommend the book by Gilbert and Hamill (2015), which provides a well-informed discussion of the features of the agent-based approach, and a review of some areas of application.

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