



JOINT PROGRAM IN SURVEY METHODOLOGY

Statistical Methods for Microsimulation

Joint Program in Survey Methodology, University of Maryland

January 17 -19, 2024

The instructor

Ralf Münnich is full professor for Economic and Social Statistics at Trier University, Germany. He is specialized in survey statistics, especially sampling, calibration, variance estimation, and small area estimation. Ralf was coordinating several national and international projects. Currently, he is spokesperson of the MikroSim Research Unit FOR 2559 funded by German Research Foundation. Further, since 2020, he is spokesperson of the German Statistical Society.

Course Objectives

Microsimulations are powerful tools to generate microdata sets and project populations that allow scenario-based analyses. Dynamic models, a subclass of microsimulation, are used to produce realistic life trajectories of individuals and households and project populations into the future. However, many different types of microsimulation tools exist. Hence, microsimulations can be seen an ideal methodology bridging the gap between data and policy integrating a vast amount of (survey) statistics.

Within this course, the aim is to provide an overview of different microsimulation methods. Since the data sources for microsimulations are nowadays essential, special emphasis will be placed on microsimulation data and synthetic but realistic data generation for microsimulations. Finally, a set of examples will be given, including the German MikroSim model that allows to simulate the entire geo-coded population.

Outline of the lecture

- First examples and historic notes on microsimulation methods
- Classification of microsimulation methods
 - o Static and dynamic models
 - o Discrete and continuous modelling
 - o Open and closed models
- Data for microsimulations
- Prediction models for generating synthetic microsimulation data
- The MikroSim model and relevant modules
- Alignment and regionalization
- Uncertainty
- Summary including further examples



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Selected Reading

Recommended:

Münnich, R., R. Schnell, H. Brenzel, H. Dieckmann, S. Dräger, J. Emmenegger, P. Höcker, J. Kopp, H. Merkle, K. Neufang, M. Obersneider, J. Reinhold, J. Schaller, S. Schmaus, and P. Stein (2021): “A population based regional dynamic microsimulation of Germany: the mikrosim model”. In: methods, data, analyses 15.2, pp. 241–264. DOI: 10.12758/mda.2021.03.

Further reading:

Lovelace, R.; Dumont, M. (2016): Spatial Microsimulation with R. CRC Press.

Orcutt, G.H. (1957): A New Type of Socio-Economic System. Review of Economics and Statistics, 39(2), pp. 116-123.

O’Donoghue, C. (Edt.) (2014): Handbook of Microsimulation Modelling. Contributions to Economic Analysis, Volume 293. Emerald Publishing.

Rahman, A.; Harding, A. (2019): Small Area Estimation and Microsimulation Modeling. CRC Press

Mandatory Daily Online Meetings

Wednesday, Jan 17 – Friday, Jan 19, 2024

Class meets daily from 9:00 am – 1:00 pm, EST. There will be one or two breaks each day.