



Course «Spatial Demography: Concepts, Spatial Statistics, GIS and Cartographic Techniques»

19 October - 30 October 2015,

New Economic School, Moscow (Skolkovo), Russia

Instructor

[Dr. Sebastian Klüsener](#) (Max-Planck Institute for Demographic Research)

Course description

Researchers often work with geographically referenced data. In comparative social demographic research it is very common to contrast populations across countries or regions. One can represent this information in non-spatial tabular form and analyze it with standard statistical techniques that do not make use of the spatial information. However, by ignoring spatial information contained in the data, spatial relationships, spatial trends and spatial contextual effects on individual behavior remain unexplored. Analyzing spatial data, geographical maps can help to get a first understanding of the data. But patterns in geographical maps may often not be significant because they are simply the outcome of the intrinsic variability of a phenomenon. Significance tests are hence crucial before jumping to conclusions. Modeling geographical data, the exclusion of spatial information can even lead to biases in the statistical models where some of the basic modeling assumptions may be violated. Therefore, understanding the spatial processes underlying the relationships of interest can improve overall knowledge of demographic events as well as improve the usefulness and applicability of statistical models.

This course will give an introduction to spatial social theories and quantitative spatial analysis techniques. It will start with an overview of concepts and theories aiming to capture the role of space and spatial distance in shaping spatial variation in social and economic phenomena at the individual and aggregate population level. This is followed by an introduction to Geographical Information Systems (GIS), spatial data files, and the statistical software R including its spatial libraries. Course participants will then be getting an overview over tools of descriptive spatial analysis and cartographic presentation as well as basic and advanced spatial modeling techniques. Thereby, methods to analyze vector data (e.g. countries, regions), point data (e.g. count data of human individuals, centroids of regions) and raster data (e.g. climate information) are covered. Practical examples will include mortality and fertility analyses with a focus on the Post-Soviet space. Methods covered in the course are not limited to demographic outcome variables, but can also be applied in economic analyses. The course is of interest for students who would like to extend their toolset of quantitative methods by acquiring spatial analysis skills. Participants should be familiar with basic multivariate analysis techniques (linear and logistic regression, test of significance, confidence intervals). Prior knowledge of the statistical software R, Geographic Information Systems, spatial statistics and cartographic techniques is not required.

General readings

Anselin, L. (1988): *Spatial Econometrics: Methods and Models*. Dordrecht.

Anselin, L. (2005): *Exploring Spatial Data with GeoDa : A Workbook*. Urbana-Champaign.

Bivand, R.S., E. Pebesma, and V. Gómez-Rubio (2013): *Applied Spatial Data Analysis with R*. 2nd edition. New York.

Cressie, N. and C.K. Wike (2011): Statistics for Spatio-Temporal Data. New York.

Tobler, W. (1970) A computer movie simulating urban growth in the Detroit region. Economic Geography, 46(2): 234-240.

Voss, P.V. (2007): Demography as a Spatial Social Science. In: Population Research and Policy Review 26: 457-476.

Course material

Lecture notes, material and datasets will be made available during the course.

Software

We will use the following software packages: R, Geoda, QGIS. All of them are distributed free of charge (under GNU license).

Organization

This course will be a practical course composed of two lectures and ten lab sessions. In the first lab session an introduction to R will be given.

The course will be offered between **the 19th of October 2015 and the 30th of October 2015**. There will be six course days (Monday 19th, Wednesday 21st, Friday 23rd, Monday, 26th, Wednesday 28th, Friday 30th).

Each course day will include **two sessions (10:00 – 11:30, 12:00-13:30)** accompanied by time for consultation.

Please note that personal computers will be needed for the practical work during the lectures and lab sessions.

At the end of the course an certificate notifying a successful completion of the course will be issued.

Applications for the course should be completed [online](#) until **September 15, 2015**. The decision about the admission to the course will be sent out until to September 25.

Contact

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