FEEM
FONDAZIONE ENI
ENRICO MATTEI

Autumn School
Spatial Analysis and Policy Evaluation

Organized by
Fondazione Eni Enrico Mattei

October 2020
Thursday 8th and Friday 9th
Thursday 15th and Friday 16th

Course Description

Spatial statistics and econometrics include techniques and methods to model spatial data (or geo-refenced data) taking into account interaction (spatial spillover) effects and spatial heterogeneity. It is an active and fast-growing area of research, spurred by the increasing availability of spatial data. These techniques, many of which are still in their early development, use different analytic approaches and are applied in fields as different as economics, sociology, epidemiology and geology.

Spatial data are often used in policy evaluation or treatment effect analyses, based on quasi-experimental evaluation designs such as Propensity Score Matching, Difference-in-difference, and Regression Discontinuity Design. However, the role of spatial effects (spatial dependence and spatial heterogeneity) is widely neglected in this context. Nevertheless, these effects violate one of the main assumptions of treatment analysis, that is the so-called stable unit treatment value assumption (SUTVA).

The aim of the course is twofold. On the one side, it aims at getting acquaintance with the techniques of spatial statistics and econometrics. On the other side, it provides an overview of the recent attempts to account for spatial effects in policy evaluation analysis.

The course will be held online.

Learning Outcomes

Students participating in the course will gain an up-to-date and accessible overview of the relevant theory as well as exposure to empirical applications of spatial econometric and policy evaluation models. Every lectures will share a strongly applied component, showing empirical examples and providing statistical software (R) to analyze real-world cases.

Lecturers

Roberto Basile
Department of Industrial and Information Engineering and Economics, Università degli Studi dell'Aquila, L'Aquila, Italy

Marusca De Castris
Department of Political Sciences, Università degli Studi Roma Tre, Italy

Application

The ideal candidates for the Training School are PhD students interested in the analysis of spatial data with particular reference to policy evaluation.
The course is open to a maximum of 30 participants.
Applications should include a CV and a short motivational letter that specifies how participating in the school will be useful for their current research and future perspective (max 300 words).
Candidates should apply by sending an email with the above mentioned documents to: Enrico Lippo (**enrico.lippo@feem.it**) or Massimiliano Rizzati (**massimiliano.rizzati@feem.it**).
Applications should be submitted by **Tuesday 15 September, 2020**.
Applicants will receive a notification by the end of September.

Practical Informations

Software used: R (http://www.r-project.org/) and RStudio (https://rstudio.com): Install the complete version of R and RStudio on your laptop.

Prerequisite knowledge: statistics, econometrics, notions of regional economics

Venue: The School will be held online

Fees: No fees

Certificate: Participants will receive a certificate of attendance

For organizational issues and questions

Massimiliano Rizzati - Research Fellow, Fondazione Eni Enrico Mattei
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Enrico Lippo - Research Fellow, Fondazione Eni Enrico Mattei
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Program

a) Main issues in modelling spatial data
8 and 9 October: 9:30-13:30. Instructor: Prof. Roberto Basile

1. Notions of spatial dependence and spatial heterogeneity
2. Parametric Spatial Autoregressive Models
   i. Spatial autoregressive models for cross-sectional data
   ii. Static and dynamic spatial panel data models
   iii. Spatial autoregressive models for large panel data
3. Semiparametric spatial autoregressive models
   i. MGWR-SAR
   ii. P-Spline spatial autoregressive models
4. Notions of spatial statistics
5. Lab-class with R

b) Policy evaluation and treatment effects with spatial data
15 and 16 October: 9:30-13:30. Instructor: Prof. Marusca De Castris

1. The idea of counterfactual: treatment and control groups
2. Challenges of counterfactual evaluations: selection bias and common trend
3. Designs for counterfactual impact evaluation: randomized and Quasi-experimental data
4. Quasi-experimental evaluation designs
   i. Propensity score for panel data
   ii. Difference-in-differences (DiD) for panel data
   iii. RDD for cross-sectional data
5. SUTVA violations
   i. Spatial effects and propensity score
   ii. Spatial effects and DiD
   iii. Spatial effects and RDD
6. Lab-class with R

Main references

Basile R., Mìnguez, J.M. (2017), "Advances in spatial econometrics: parametric vs. semiparametric spatial autoregressive models", in Commendatore Pasquale, and Kubin Ingrid (Eds.), Springer De Castris M., Pellegrini G., (2012) "Evaluation of Spatial Effects of Capital Subsidies in the South of Italy". *Regional Studies* 46 (4), 525-538.

Dehejia, R. H., and S. Wahba. (2002) "Propensity Score-matching Methods for Nonexperimental Causal Studies." *Review of Economics and Statistics* 84:151–61.

Delgado, M. S., and R. J. G. M. Florax. (2015) "Difference-in-differences Techniques for Spatial Data: Local Autocorrelation and Spatial Interaction." *Economics Letters* 137: 123–26.

Elhorst, P. (2014), Spatial Econometrics: From Cross-sectional Data to Spatial Panels, Springer, London

Keele, L. J., and R. Titiunik. (2015) "Geographic Boundaries as Regression Discontinuities." *Political Analysis* 23:127–55.

Kolak M. and Anselin L. (2020) A Spatial Perspective on the Econometrics of Program Evaluation *International Regional Science Review*, Vol. 43(1-2) 128-153

LeSage J. and Pace R.K. (2009), Introduction to Spatial Econometrics, Taylor & Francis Group, LLC.

Pellegrini, G., Terribile, F., Tarola, O., Muccigrosso, T., & Busillo, F. (2013). Measuring the effects of European Regional Policy on economic growth: A regression discontinuity approach. *Papers in Regional Science*, 92(1), 217-233.