Econometrics of program evaluation and counterfactual causality

Dr. Giovanni Cerulli
7-11 July 2014
University of Rome III, Italy
Lecturer

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Short bio
Dr. Giovanni Cerulli is researcher at the Ceris-CNR, unit of Rome, Italy. He received a degree in Statistics and Economics and a PhD in Economics at the University of Rome “La Sapienza”. His research deals with the analysis of the effects of public policies based on counterfactual econometric modelling. Dr. Cerulli is also Editor-in-chief of the International Journal of Computational Economics and Econometrics.

When
7-11 July 2014

Where
University of Rome III, Faculty of Economics, Via S. D’Amico 77, 00145 Rome, Italy

Overall aims and purpose
This course will provide participants with the essential tools, both theoretical and applied, for a proper use of modern micro-econometric methods for policy evaluation and causal counterfactual modeling. The course will cover these approaches: Regression adjustment, Reweighting, Matching, Difference-in-differences, Instrumental-variables, Selection models and Regression Discontinuity Design.

Learning outcomes
After attending the course, the participant will be able to setting up and managing a correct evaluation design on his own: identification of the policy framework, collection and management of suitable datasets, use of appropriate econometric methods, interpretation of results. Potential applications are in different contexts of policy such as: finance and banking, the labor market, the investment activities of enterprises, education policy and regional cooperation, incentives for business research and development, etc., although they can be used in any further field of study aiming at estimating the ex-post impact of a given policy intervention on specific targets. The course will provide various instructional examples on real datasets.

Pre-requisites
Knowledge of basic econometrics: notion of conditional expectation and related properties; point and interval estimation; regression model and related properties; probit and logit regression. Basic knowledge of the Stata software.

Textbook
Recommended textbooks for this course are:


Program

Day 1

Session I: Introduction to the econometrics of program evaluation

• Background: conditional expectation, point estimation and related properties
• Concept of counterfactual causality, randomization and non-random sampling
• Non-random sampling: selection on observables and selection on unobservables
• Definition of treatment effects: types of effects and potential outcome
• Notation and working hypotheses: SUTVA, CIA and CMI

Session II: Methods based on "selection on observables"

• Regression Adjustment (parametric and nonparametric)
• Control-Function regression
• Matching estimator: covariate and propensity score method
• Reweighting estimator
• Double-robust estimator
• Summary of methods

Day 2

Session III: Applications using Stata

• Description and use of the Stata 13 treatment-effects estimation package tefects
• Presentation of DO-files and ADO-files provided by the teacher
• Application on real data of tefects subcommands: ra, psmatch, nnmatch, ipw, aipw.
• Extensions by Stata user-written commands: *ivtreatreg*, *pscore*, *psmatch2*, *treatrew*.

Session IV: Difference-in-differences (DID)

• DID: statistical setting and conceptualization
• DID with longitudinal data
• DID with repeated cross-section
• Description and use on real data of the Stata command: *diff*. DO-files and ADO files provided by the teacher

Day 3

Session V: Evaluation methods under selection on unobservables

• Unobservable selection and non-random sampling
• The notion of treatment exogeneity and treatment endogeneity
• Treatment endogeneity, identification and estimation
• *Instrumental-Variables*: definition and estimation
• *Heckman selection* model (Heckit) and *Structural models*

Session VI: Applications using stata

• Application, description and use on simulated and real data of the Stata commands: *ivregress*, *treatreg*, *ivtreatreg*. DO-files and ADO-files provided by the teacher

Day 4

Session VII: Regression discontinuity design (RDD)

• *Local Average Treatment Effect (LATE)*
• *RDD* as a local approximation of a natural experiment
• *Sharp RDD*: setting and estimation
• *Fuzzy RDD*: setting and estimation
• Application, description and use on simulated and real data of Stata command: *rd*. DO-files provided by the teacher

Session VIII: Policy evaluation in practice

• Ex-post policy evaluation: logical structure and statistical design
• The choice of the evaluation method
• Limitations and open questions

**Day 5**

**Session IX: Recent development of econometrics of program evaluation**

• Time-varying treatment
• Continuous treatment and dose-response models
• Multiple treatment
• Estimation under treatment interference

**Session X: Concluding remarks**

• Summing-up
• Questions & Doubts