Doctoral Program in Economics

Academic year 2024/25
Estimation of Causal Effects

Period:

IV TERM

Course hours:

20h (10h Prof. Razzolinin+10h Prof. Ferrini)

Teachers:

Tiziano Razzolini (responsible of the course)
Silvia Ferrini

Exam methods:

written exam and assignments.

Prerequisites:

A basic understanding of statistical inference, ordinary least square estimation (classical OLS estimations and violation of assumptions thereof), IV regression, maximum likelihood theory and qualitative, binary and limited dependent models is required. Students are recommended to revise using: Greene Econometric Analysis, 7th edition. Prentice Hall, Edition.

Program

Module on identification of causal effects:
This module explores the problem of identifying causal effects by introducing the notation based on potential outcomes. The topics will show some of the estimation techniques that can eliminate the selection bias in the estimation of the Average Treatment Effect (ATT) and the estimation of the Average Treatment Effects on the Treated (ATET).   The topics covered are:

1. Treatment effect approach and Rubin causal model,

2. OLS regression,

3. Conditional Independence Assumption,

4. DAG, Matching and Subclassification,

5. Instrumental variable and Local Average Treatment Effect (LATE), Difference-in-Difference,

6. Regression discontinuity (Sharp and Fuzzy)

Module on discrete choices:
The module presents methods for individual discrete choice data in theory and practice. A very brief review of linear probability model and binary choice models will be provided. The core part of the course is

dedicated to model and test binary choice data and multinomial/conditional logit model within the random utility theory. Examples and a laboratory class will be held during the module.

Educational objectives

The aim of the first module is to teach to the students i) how to construct a clear research design, ii) how to identify the population of interest in an empirical analysis iii) and how to use the appropriate estimation techniques.

The secondo module focuses primarily on the empirical application of discrete choice models.

The students will familiarize with the random utility theory and discrete choice methods to analyse individual/group choices.

Bibliographical references

Module on identification of causal effects:

- Scott Cunningham. Causal Inference: The Mixtape, available at:

  https://www.scunning.com/mixtape.html

- Angrist, Joshua D.; Pischke, Jörn-Steffen. Mostly harmless econometrics: An empiricist's companion. Princeton university press, 2008

- Angrist, J. D., Pischke, J. S. (2014). Mastering metrics: The path from cause to effect. Princeton University Press.

- Rubin, Donald B. "Estimating causal effects of treatments in randomized and nonrandomized studies." Journal of educational Psychology 66.5 (1974): 688

- Krueger, Alan B. Experimental estimates of education production functions, The quarterly journal of economics 114.2 (1999): 497-532.

- Heckman, James J., Robert J. LaLonde, and Jeffrey A. Smith. "The economics and econometrics of active labor market programs." Handbook of labor economics. Vol. 3. Elsevier, 1999. 1865-2097

- Angrist, Joshua D., and Alan B. Krueger. "Empirical strategies in labor economics." Handbook of labor economics. Vol. 3. Elsevier, 1999. 1277-1366.

- LaLonde, R. J. (1986). Evaluating the econometric evaluations of training programs with experimental data. The American economic review, 604-620.

Module on discrete choices:

Main book:
- Train Kenneth E., 2003, *Discrete choice methods with simulation*, Cambridge University Press [http://elsa.berkeley.edu/books/choice2.html].

Suggested supporting readings:
- Hensher D., Rose J., Greene, D., (2005) *Applied Choice Analysis* Cambridge University Press, 2005

- Greene W.H. (2008), *Econometric Analysis*, 7th edition. Prentice Hall,Edition.

- Agresti, Alan. 2002, Categorical Data Analysis. New York: Wiley

- Cramer, J. S., 2003, Logit Models from Economics and Other Fields, Cambridge University Press

- Long, J. Scott and Freese, Jeremy. 2003. Regression Models for Categorical Dependent Variables Using Stata, Revised Edition. Stata Press: College Stata, TX.