Estimation of Treatment Effects

Instructor:

Prof. Bernd Fitzenberger, Ph.D.

Lectures:

Tue, 8.30-10, SPA 1, 22
Tue, 14-16, SPA 1, 22

Description of Course:

This course presents nonparametric and semiparametric regression techniques and modern microeconometric methods for treatment effects estimation. The treatment focuses on the potential outcome approach, and students learn various methods to account for selection based on observables (regression, matching, inverse probability weighting) and for selection based on unobservables (Heckman selection correction, difference-in-differences, panel regression, instrumental variable regression, regression discontinuity design). These methods are used for cross-section data and longitudinal data, both repeated cross-sections and panel data. Students will familiarize themselves with applying the methods to real empirical data using Stata.

Course Outline:

0. Introductory material: Linear Regression Model, Conditional Expectation, and Causal Interpretation

References: WO Chapters 1-4

1. Nonparametric and Semiparametric Methods

References: PU, HL

2. Estimation of Treatment Effects, Potential Outcome Approach, and Methods building on Selection upon Observables

Reference: WO Chapters 21,

3. Methods allowing for Selection upon Unobservables

3.1 Difference-in-Differences, Fixed Effects Panel Regression

3.2 Instrumental Variable Methods: Wald Estimator, LATE, MTE, Local IV, Control Function Approaches

Reference: WO Chapters 6 + 21, AP

4. Regression Discontinuity Design (RDD)

4.1   RDD: Sharp Version

4.2   RDD: Fuzzy Version

Reference: WO Chapters 21, CT Chapter 25.6, AP Chapter 6

5. Causal Analysis with Quantile Regression

5.1. IV Estimation for Quantile Regression

5.2. Quantile Treatment Effects

6. Presentations by Participants in Course

Main References:

- **AP: Angrist, J. D. and J.-S. Pischke** (2009): Mostly Harmless Econometrics – An Empiricist's Companion, Princeton University Press.
- **CT: Cameron, A. C. and P. K. Trivedi** (2005): Microeconometrics – Methods and Applications, Cambridge University Press.
- **GR: Greene, W.** (2008): Econometric Analysis, 6th ed., International Edition, Prentice Hall.
- **HL: Härdle, W. and O. Linton** (1994): "Applied Nonparametric Methods", in: Handbook of Econometrics, Vol. 4, R. F. Engle und O. F. McFadden, (eds.), Elsevier Science.
- **KO: Koenker, R.** (2005) Quantile Regression. Econometric Society Monograph, Cambridge University Press, Cambridge.
- **PU: Pagan, A. and A. Ullah** (1999): Nonparametric Econometrics, Cambridge University Press.
- **WO: Wooldridge, J. M.** (2010): Econometric Analysis of Cross Section and Panel Data. 2nd edition, Cambridge, MA: MIT Press (see also: http://mitpress.mit.edu/books/econometric-analysis-cross-section-and-panel-data).

Further references, particularly regarding the application of the methods, will be given in the course.

Exam: written exam (90 min), two exam dates

Requirements: Knowledge of econometrics at the level of the courses "Econometric Methods" (First Master course) or "Econometrics I" (BDPEMS) and Advanced Econometrics (Econometrics II, BDPEMS).

Further Information:

The first part of the course,will involve lectures on the topics outlined above under parts 1 to 5. In the second part of the course, participants will present research papers or they will illustrate how to implement the methods in Stata. A list of topics for presentations will be announced in the second week of the course. A presentation during the second part of the course is mandatory for Ph.D. students. It is voluntary but highly recommended for Master students.