Summer School in Advanced Economics

University of Ioannina & University of Piraeus

5th Summer School
in Advanced Economics

July 3 to 7, 2023

at Spetses Island Greece

"Causal Inference, Potential Outcomes, and Modern Difference-in-Differences"

Jeffrey M. Wooldridge,
Distinguished Professor at Michigan State University, will be the main instructor

https://summer-school.edu.gr/course/

Economists are increasingly seeking to estimate the causal effects of economic policies, programs, and reforms. Many methods have been developed over recent years. The present course is on estimating causal effects under unconfoundedness and with instrumental variables – including some recent developments on doubly robust estimation. And a current treatment of difference-in-differences with panel data.

At the end of this course the participants will be able to:

- Identify cases of natural experiments
- Understand the underlying assumptions of each method
- Draw causal inference from the data
- Apply all methods using Stata

There is a fee of 450€ that covers:

- The teaching material (lecture notes)
- All coffee breaks
- All lunch breaks (one every day)
- Farewell Dinner
- Certificate of Participation

Important Dates

Application opening: November 14, 2022
Application deadline: April 21, 2023
Early Notification of Acceptance: January 13, 2023
Final Notification of Acceptance: April 25, 2023
Deadline for early payment of fees: May 8, 2023
Deadline for late payment of fees: June 12, 2023

Certificate & ECTS Credits

Students participating and successfully completing the Summer School can earn **4 ECTS** Credits. A certificate of attendance will be issued at the end of the Summer School stating the ECTS credits earned. Participants should check with their European Institutions whether these ECTS credits are transferable.

Basic Outline

This course covers causal inference for cross-section and panel data using the potential outcomes framework. We will cover identification of key treatment effects assuming unconfoundedness, and then study various estimators: regression adjustment, inverse probability weighting, combinations thereof (to achieve double robustness), and matching methods. More recent methods using covariate balancing to obtain the propensity score also will be covered. We will then study identification of the local average treatment effect (LATE) and the local average treatment effect on the treated (LATT) and cover recent doubly robust methods for estimating these parameters when one has covariates in the instrument propensity score. Control function methods can be used to allow heterogeneity when functional forms are imposed on the conditional mean functions.
We then turn to difference-in-differences methods for panel data, starting with a review of the two-period analysis. Regression-based methods, propensity score methods, and doubly robust estimators will be covered. With common timing but multiple control and treatment periods, different effects can be estimated using regression methods or combining regression with inverse probability weighting. We will also discuss how to test and correct for the parallel trends assumption.

The main topics that will be covered are as follows:

- Potential outcomes and parameters of interest. Randomization. Unconfoundedness and overlap. Identification. Regression adjustment, inverse probability weighting, normalized weights. Covariate balancing propensity score estimation. Matching and doubly robust estimators. Improved efficiency under randomized controlled trials. Multiple treatments.
- Potential treatment status. Constant effect model. Compliers and defiers. One-sided non-compliance. Identification of LATE and LATT. Including covariates for LATE and LATT estimation. Control function methods. Regression discontinuity (if time permits).
- Two-period difference-in-differences; no anticipation and parallel trends; controlling for covariates via regression adjustment and propensity score methods. General common timing case and heterogeneous effects.
- Staggered interventions. Parameters of interest. Parallel trends. Shortcomings of the constant effect model. Regression-based methods. Two-period difference-in-differences; no anticipation and parallel trends; controlling for covariates via regression adjustment and propensity score methods. Repeated cross sections.
- Parallel trends in nonlinear models. Nonlinear DiD with two periods. Staggered interventions. Adding covariates. Binary, fractional, and nonnegative responses (count, corner). Imputation estimates. Pooled quasi-maximum likelihood estimation. Estimation with a canonical link function. Repeated cross-sections

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