GENEVA GRADUATE INSTITUTE

INSTITUT DE HAUTES ÉTUDES INTERNATIONALES ET DU DÉVELOPPEMENT

GRADUATE INSTITUTE OF INTERNATIONAL AND DEVELOPMENT STUDIES

International Economics

Academic year 2024-2025

Topics in Econometrics

EI137 - Autumn - 6 ECTS

Monday 16h15 - 18h00

Course Description

This course discusses further topics in econometrics, building on the foundational concepts introduced in the two compulsory econometrics courses for master students. It focuses on three distinct areas. First, the course treats causal inference and introduces the potential outcomes framework and concepts like Randomized Controlled Trial (RCT) and natural experiment. As part of this, it analyzes quasi-experimental empirical methods, such as Regression Discontinuity Design (RDD), Difference-in-Differences (DiD), matching methods and advanced Instrumental Variables (IV) methods. Second, the course deals with multivariate and nonlinear time series models. This includes Vector Autoregressions (VARs), Dynamic Factor Models (DFMs) and models with Time-Varying Parameters (TVPs) (like regime-switching-, stochastic volatility- and conditional heteroskedasticity-models). It also encompasses a discussion of cointegration. Third, the course introduces Machine Learning methods and nonparametric estimation. This includes Kernel Smoothing Methods, Regression Trees and Random Forests, Neural Networks and Classification Analysis. Assessment is based on bi-weekly problem sets and an individual project, where students apply a method from the course to their application of interest.

PROFESSOR

Marko Mlikota

Office hours

ASSISTANT

Office hours

IMPORTANT

Regular attendance is compulsory, and any absence must be promptly communicated to the teacher. In the event of missing more than two sessions, students are expected to provide well-documented justifications for unforeseeable circumstances (e.g. illness, accident, death of a relative), directly to the Direction of Studies. Failure to justify absences beyond two sessions will result in the assignment of code N.

Students are also reminded of the following legal rules:

Syllabus

Pre-requisites

Knowledge of statistics, probability and matrix algebra is required. Students must have taken and passed the *Maths Bootcamp* for incoming MIE students. It is assumed that students have taken at least one undergraduate-level course in econometrics and one in probability and statistics. Also, they must have taken the Master-level courses “Econometrics I” (EI035) and “Econometrics II” (EI062).

Textbooks

The course will not follow one specific textbook. Lecture notes will be provided as well as suggested further reading (textbooks, papers).

Grading

The final grade will be based on two equally weighted components: i) (bi-weekly) problem sets, ii) an individual project, where students apply a method of their choice (among the ones learned in the course) to a setting of their choice, the idea being to obtain a draft of the empirical part of a project (e.g. Master thesis).

Tutorials

The lectures will mainly focus on econometric theory and discuss the applicability of methods, with occasional illustrations.

Problem set solutions are based on the software R, but students are welcome to use any software of their choice. While Stata may be a good choice for applying off-the-shelf methods, it is of limited use for methods specifically tailored to one’s application as well as for simulation studies. More flexible software like R, Matlab, Python or Julia is more appropriate for most of the exercises in this course. Basics of R are discussed in the *Maths Bootcamp* for incoming MIE students. A document with useful R-commands is available at https://markomlikota.github.io/teaching/.