

Microeconometrics

Description

In this module, we will discuss key modeling techniques for the analysis of cross-section and panel data on microeconomic units such as persons, households, firms or regions. After a review and extension of key concepts in statistics and basic econometrics, we will cover linear models for panel data that allow the analyst to incorporate unobserved unit specific effects. The final part of the lecture will focus on estimation methods for Big Data involving machine learning. In particular, we will discuss how to obtain sparse regression models from high-dimensional data. While the focus of this module is on the theory and implementation of microeconomic methods, we will also discuss selected economic applications such as the gravity equation of international trade, the economics of crime, and the return to education.

The course consists of lectures and exercises worth six credits in total (2+2 SWS). The lectures take place twice a week, from the first week of the semester until mid-May. The exercises take place once a week, from the second until the last week of the semester.

Target Audience and Prerequisites

The module is designed for Master (and doctoral) students who want to become familiar with modern econometric methods for the analysis of cross-section and panel data. Participants are expected to have attended the module 'Introductory Econometrics' at the Master level and to have knowledge of statistics and regression models at the level of Verbeek (2012) or Wooldridge (2013).

Verbeek, Marno (2012): *A Guide to Modern Econometrics*, Chichester: John Wiley, fourth edition.

Wooldridge, Jeffrey M. (2013). *Introductory Econometrics: A Modern Approach*, Cincinnati (OH): Thomson South-Western, fifth edition.

Assessment

Grading will be based on a written final exam covering topics of the lectures and exercises. Parts of the exam may require you to interpret Stata-output and to comment on tables showing empirical results.

Overview of Topics

1. Introduction

- Specific Aspects of Microeconometrics
- Course Outline
- Review and Extension of Key Concepts in Statistics and Basic Econometrics

2. Linear Panel Data Models and Generalized Methods of Moments (GMM)

- Generalized Least Squares (GLS) and Random Effects Models
- Fixed Effects and First Difference Models
- Dynamic Unobserved Effects Models and GMM

3. Microeconometrics with Big Data

- Challenges when Modeling Big Data
- Causal Inference with Machine Learning Methods
- Approximately Sparse Regression

Course Materials and Background Readings

All lecture notes, problem sets, and additional materials will be posted on the ILIAS platform. The lecture notes summarize the key points covered in class. For a deeper understanding of the material, you may in addition study the corresponding chapters of the textbooks indicated below. Additional references will be given in class.

Cameron, A. Colin and Pravin K. Trivedi (2005). *Microeconometrics: Methods and Applications*, Cambridge: Cambridge University Press.

Greene, William H. (2011). *Econometric Analysis*, Upper Saddle River (NJ): Prentice Hall, seventh edition.

James, Gareth, Daniela Witten, Trevor Hastie, and Robert Tibshirani (2021). *An Introduction to Statistical Learning*, New York: Springer. Retrieved March 15, 2025 from <https://www.statlearning.com/>.

Wooldridge, Jeffrey M. (2010): *Econometric Analysis of Cross Section and Panel Data*, Cambridge (MA): MIT Press, second edition.

You may also work with previous editions of the textbooks.