Syllabus

Master Of Business Research (MBR): Quantitative Methods

Munich School of Management LMU

Prof. Dr. Ralf Elsas (07/2024)

Course Overview:

This PhD course in econometrics is designed to provide a deep understanding of foundational concepts and methods in econometrics, in particular understanding inference testing, problems and solutions arising from violations of standard OLS assumptions and using foundational methods like panel regressions or limited dependent variable methods.

Students will delve deep into data analysis, program econometric estimators, and execute Monte Carlo simulations, ensuring both theoretical knowledge and practical skills are honed. Additional readings and datasets will be provided throughout the course.

Course Outline:

Topic 1: Introduction and Overview

- Course objectives and design.
- Brief introduction to MATLAB.

Topic 2: Ordinary Least Squares (OLS)

- Basics of OLS estimation and interpreting results.
- Hands-on: Programming OLS estimation in MATLAB.
- Simulation, interpretation, and diagnostic tests.
- Robust standard errors: White and Newey-West

Topic 3: Challenges in Econometric Analyses

- Partial correlation
- P-Hacking
- Bayes-p-Value

Topic 4: Instrumental Variables (IV) Estimation

- The inherent problem with endogeneity and the role of IV.
- Introduction to IV and 2SLS estimators.
- Case: Weak instruments problem.
- Hands-on: Application on seatbelt usage and fatality prevention.

Topic 5: Panel Methods (Part 1)

- Understanding pooled, fixed effects (FE), and random effects (RE) estimators.
- Properties of FE estimators.
- Hands-on: Estimation of a FE model.

Topic 6: Panel Methods (Part 2)

- Introduction to dynamic panel estimators.
- Application: Arellano/Bond simulations.

Topic 7: Differences-in-Differences Analysis of Causality

1. Fundamental principles and application.
2. Hands-on: Establishing causality using DiD in a case study.

Topic 8: Limited Dependent Variables (Part 1)

- Introduction to methods: Logit/Probit estimator.
- Maximum likelihood estimation for the logit model.
- Hands-on: Programming MLE Logit estimation in MATLAB.
- Understanding and calculating marginal effects for the logit estimator.
- Hands-on: Calculating marginal effects using MATLAB.

Assessment:

- Grading will be based on an assignment, where students are asked to replicate a paper from their area of research and conduct a robustness test, analyzing the paper's results validity by using a Bayesian p-value analysis.

Required Software: MATLAB (prior familiarity recommended).

- The recommended solution is to acquire a student version of Matlab, which has unlimited functionality, can comprise several toolboxes from Mathworks and costs about €90.
- Matlab is a base version installed in FIT computer labs.
- A limited set of licenses is available from the Institute for Finance & Banking
- Students with a Matlab account can use the "Matlab Playground", and ChatGPT users the "Matlab GPT" for coding support.

Prerequisites

- Mathworks offers a 2h tutorial which shows the basics in Matlab:

  https://de.mathworks.com/learn/tutorials/matlab-onramp.html

- If you do not have any experience with Matlab, please work your way through the tutorial. The very basics of Matlab will not be introduced in the MBR course.

Reference Texts:

1. Johnston / di Nardo (1997): Econometric Methods, 4th ed., McGraw-Hill.
2. Greene (2008): Econometric Analysis, 6th ed., Prentice Hall.