Econometrics III: Advanced Econometrics and Machine Learning (only PhD)  
(formerly, Topics in Applied Econometrics)

Course instructor

Prof. Dr. Helmut Farbmacher  
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Office hours: by arrangement

Lecture: March 21-25, 2022 (9am to 4pm); Z534/Z536

Prerequisites: Econometrics I and II (TUM) or equivalently solid introductory courses in econometrics. Preferably some basic knowledge of R and Python. Participants should bring their own laptop with R and/or Python installed. The target audience are PhD students.

Grading: Successful participation; details below (4SWS / 6 ECTS points)

Course outline:

The course covers a selection of state-of-the-art methods in econometrics and machine learning. It aims to provide students with a sound understanding of the methods discussed, such that they are able to do research using modern econometric techniques, as well as critically assess existing studies.

In particular, the course will cover the following topics:

- Regression Shrinkage Methods (Ridge, Lasso, Elastic Net)
- Adaptive Lasso Regression
- Classifier-Lasso Regression
- Double Machine Learning

1st part of the week:

In the morning sessions, we will discuss the econometric methods and/or machine learning techniques (including some applications to illustrate them). Students will then apply these methods and will replicate recent research papers in the afternoon sessions.

2nd part of the week:

The second part of the week will be a reading course in which we will discuss selected papers. I will assign a (replication) project to each student at the organizational meeting, which (s)he will present. All participants are expected to read the papers before the meetings. The presentation (roughly 30 minutes) together with a short report that summarizes the assigned paper (roughly 5 pages w/o figures, tables and references) will be relevant for the grading. There will be an organizational meeting roughly four weeks before the lectures start (via Zoom).

Recommended textbooks:


Papers you definitely should read:


Papers you could read if you have plenty of time:


**Timetable:**

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In lecture 1 I will briefly recap the basics in OLS, 2SLS and GMM. If you have already heard about these methods, feel free to arrive on Monday 11am.

*Project Work*: In this slot you are supposed to work on your application. I will be available for individual questions and discussions in my office or via Zoom.