

IWH-DPE/CGDE

## Advanced Econometrics

**Work load:** 150 hours / 6 ECTS

**Lecture:** Bi-weekly, 15 x 90 minutes / lecture format tba

**Begin:** 11.10.2021

**Time:** Mondays 09:30–11:00 and 11:30–13:00 / **17.12.2021 (Friday)** 09:30–11:00 and 11:30–13:00

### I. Introduction (Day 1)

1. Review of Linear Models and Asymptotic Theory

**Date:** 11.10.2021

**Time:** 09:30–11:30

**Lecturer:** Dr André Diegmann, IWH

### II. Estimation Methods for Non-linear Models (Day 2)

2. Maximum-likelihood Estimation
3. Bayesian Estimation and Inference

**Date:** 25.10.2021

**Lecturer:** Professor Dr Christoph Wunder, Martin Luther University Halle-Wittenberg

### III. Binary, Categorical and Limited Dependent Outcomes (Day 3)

4. Models for Binary and Categorical Outcomes
5. Models for Limited Dependent Variables

**Date:** 08.11.2021

**Lecturer:** Professor Dr Christoph Wunder, Martin Luther University Halle-Wittenberg

### IV. Causal Inference (Day 4 and Day 5)

6. Instrumental Variables
7. Regression Discontinuity

**Date:** 22.11.2021

**Lecturer:** Dr Matthias Mertens, IWH

8. Matching

**Date:** 06.12.2021

**Time:** 09:30–11:00

**Lecturer:** Professor Xiang Li, PhD, IWH and Martin Luther University Halle-Wittenberg

9. Differences-in-Differences

**Date:** 06.12.2021

**Time:** 11:30–13:00

**Lecturer:** Professor Dr Felix Noth, IWH and Otto von Guericke University Magdeburg

**V. Time Series (Day 6 and Day 7)**

10. Univariate Time Series Models and Non-stationary Data

11. Dynamic Regression and (Vector) Error-correction Models

**Date:** 17.12.2021 (**Friday**)

**Lecturer:** Professor Boreum Kwak, PhD, IWH and Martin Luther University Halle-Wittenberg

12. Vector Autoregressions and Local Projections

13. Structural Vector Autoregressions

**Date:** 17.01.2022

**Lecturer:** Professor Boreum Kwak, PhD, IWH and Martin Luther University Halle-Wittenberg

**VI. Special Topics (Day 8)**

14. Empirical Methods in Lab and Field Experiments

**Date:** 31.01.2022

**Time:** 09:30–11:00

**Lecturer:** Professor Dr Sabrina Jeworrek, IWH and Otto von Guericke University Magdeburg

15. Machine Learning Methods for Economics and Finance

**Date:** 31.01.2022

**Time:** 11:30–13:00

**Lecturer:** Professor Dr Melina Ludolph, IWH and Otto von Guericke University Magdeburg

## Venue

Halle Institute for Economic Research (IWH) – Member of the Leibniz Association, Kleine Märkerstrasse 8, 06108 Halle (Saale), conference room (ground floor) or online via Zoom (depending on the COVID-19 regulations in place).

## Problem sets

There will be eight assignments throughout the term. At the end of each day, the lecturer will post assignments, which are due on the day before the next lecture (11.59 pm). In order to complete the course, six problem sets (at least one from every block indicated by Roman numbers) will have to be successfully passed.

## Selected Literature

Althey, S.; Imbens, G. W. (2019): Machine Learning Methods that Economists Should Know About. *Annual Review of Economics* 11, 685-729.

Angrist, J. D.; Pischke, J.-S. (2015): *Mastering Metrics*. Princeton University Press.

Angrist, J. D.; Pischke, J.-S. (2009): *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.

Cameron, A.C.; Trivedi, P.K. (2005): *Microeconometrics, Methods and Applications*, Cambridge University Press.

Gelman, A.; Carlin, J. B.; Stern, H. S.; Dunson, D. B.; Vehtari, A.; Rubin, D. B. (2013): *Bayesian Data Analysis, Third Edition*. Chapman & Hall/CRC Press.

Greene, W.H. (2017): *Econometric Analysis, 8th edition*, Pearson.

Imbens, G. W.; Rubin, D. B. (2015): *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction*. Cambridge University Press.

Kilian, L.; Lütkepohl, H. (2017): *Structural Vector Autoregressive Analysis*, Cambridge University Press, 2017.

McElreath, R. (2020): *Statistical Rethinking. A Bayesian Course with Examples in R and Stan*. Chapman & Hall/CRC Press.

Winkelmann, R.; Boes, S. (2006): *Analysis of Microdata*. Springer.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. MIT press.

**Additional literature to prepare for every dates will be announced.**