Prof. Regina T. Riphahn, Ph.D. Summer 2022

Master-Module
Microeconometrics and machine learning (5 ECTS)

for Master Arbeitsmarkt und Personal: Wahlpflichtbereich (2.FS)
for Master Economics: Elective compulsory subject
for Master in Management: Vertiefungsbereich
for Master Marketing: Wahlpflichtbereich der Modulgruppe „Statistik“
for Master Sozialökonomik: Pflichtbereich „Vertiefung Methoden“ or freier Vertiefungsbereich

Lecture: Tue. 8:00-9:30 (LG 0.225) Riphahn. Start: 26.04.2022
Exercise: Tue. 13:15-14:45 (FG 2.016) or 16:45-18:15 (LG 0.141) Sauer, the classes of 10.05. and 17.05. take place in the PC Lab (LG 0.422). Start: 03.05.2022
Office hours: Wed. 11-12 (Riphahn) and by appointment.
Mo. 14-15 (Sauer) and by appointment.

Many analyses rely on non-continuous dependent variables. As least squares estimation is often inappropriate for limited dependent variables, i.e., variables that may be discrete or categorical maximum likelihood procedures are introduced. This module builds on the content presented in introductory econometrics courses and introduces econometric methods that are appropriate for limited dependent variables in both cross-sectional and panel data settings. In addition, the module offers an introduction to the application of machine learning methods in economic research. The lecture presents empirical methods and focuses on example based applications. Students learn to critically assess the validity of empirical studies and to independently apply econometric methods. The exercise class introduces to the use of data based on STATA.

Content

1 Introduction
2 Maximum Likelihood estimation
3 Binary dependent variables
4 Multinomial and ordered dependent variables
5 Tobit models
6 Selection models
7 Duration models
8 Count data models
9 Applications of machine learning in economics

Exams and credits
The course is completed by passing an exam (60 minutes). It is possible to hand in a voluntary written empirical homework which can be prepared in groups of up to two students. The grade of the homework counts for up to 20 percent of the grade only in current summer semester if the exam is passed. The homework does not count for the grade in later semesters. Registration for the voluntary homework via StudOn is open until 13.05.2022. Topics are handed out starting 17.05.2022. The deadline for handing in the homework is 08.08.2022 at noon.

Literature and readings
The lecture uses slides that are available on StudOn. A course pack with reading materials is provided online. Recommended texts:
- Greene, William H., 2020, Econometric Analysis, 8. ed., Pearson
- Wooldridge, Jeffrey M., 2010, Econometric Analysis of Cross Section and Panel Data, 2nd. ed. MIT Press, Cambridge/Mass., London
- Cameron, C.A. and P.K. Trivedi, 2005, Microeconometrics. Methods and Applications, Cambridge University Press
- Athey, S. und G. Imbens, 2019, Machine Learning Methods Economists Should Know About, *mimeo*, https://arxiv.org/abs/1903.10075