University of Zurich **Spring Term 2025**
Department of Economics

ECONOMETRICS FOR RESEARCH STUDENTS, PART II

Lecturer: Prof. Rainer Winkelmann, TA: Lorenzo Maria Casale

This course, designed for doctoral students, is the second part of the first-year PhD sequence in econometrics, offering an in-depth focus on applied econometrics in both theory and practice.

The course begins with a review of the properties and limitations of linear regression, emphasizing the role of the conditional expectation function (CEF) and its importance when linear approximations are insufficient. Students will explore how non-linearity in models can arise, particularly with binary or non-negative dependent variables, and how these characteristics affect parameter interpretation and estimation.

Building on these concepts, the course introduces robust estimation techniques, including quasi-maximum likelihood, pseudo-maximum likelihood, and parametric and non-parametric methods for estimating treatment effects.

A significant portion of the course addresses selection and endogeneity challenges, with an emphasis on program evaluation and causal inference. Topics include selection-on-observables (e.g., Roy model), matching, inverse probability weighting, and double-robust estimators. These methods are framed within the context of counterfactual outcomes, equipping students to identify and mitigate biases in empirical research.

The latter part of the course focuses on the econometrics of panel data, covering both linear and non-linear models. It highlights applications in understanding unobserved heterogeneity and dynamic relationships. Topics include fixed and random effects estimators, variance decomposition, and methods to account for clustering and serial correlation. Advanced techniques such as correlated random effects and conditional maximum likelihood estimation are introduced, with applications to models like panel logit, Poisson, and the log-index function exponential (LIFE) model.

The course concludes by addressing challenges related to the credibility and reproducibility of empirical research. Students will critically examine issues such as replication, publication bias, and specification robustness, learning methods to enhance the validity of econometric studies.

Contact

	E-mail	*Office Hours*
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Prerequisites

Econometrics for Research Students, Part I

Recommended Literature

The main references are listed below. You can find a complete list of the relevant literature on OLAT.

- Wooldridge, J.M. (2002) *Econometric Analysis of Cross Section and Panel Data.* Cambridge, MA: MIT Press.
- Angrist, J.D. and J.S. Pischke (2009) *Mostly Harmless Econometrics: An Empiricist Companion.* Princeton University Press.
- Boes, S. and R. Winkelmann (2009) *Analysis of Microdata.* Berlin Heidelberg: Springer-Verlag.
- Hastie, T., R. Tibshirani and J. Friedman (2001) *The Elements of Statistical Learning*, Springer.
- Huber, M. (2023) *Causal analysis: Impact evaluation and Causal Machine Learning with applications in R*, MIT Press.

Problem Sets and Tutorials

Students are required to solve 6 problem sets. Problem sets will be posted on OLAT (see detailed schedule in the next page for deadlines). Every student has to hand his own solution. Problem sets may be discussed beforehand in small groups (3-4 students), in which case names of the 'discussion group' need to be stated on the solution.

Problem sets will be graded (plus, check, minus) and returned with corrections by email. Throughout tutorial sessions clarification questions can be asked and further details of the solution will be provided if necessary. We will not distribute written sample answers.

Exam and Grade

The final exam is scheduled for June 16, 2025, from 10:00 to 12:00 in room KOL-F-121. You are allowed to use two cheat sheets, (A4, two-sided, handwritten) in these exams. The final grade is based on your exam. Class participation and performance in problem sets will be taken into account, if the final exam grade is at the 'margin', i.e. either between two grades or between pass and fail.

Time and Place

Professor Winkelmann's lectures will be held in Room SOD-1-101 (Monday) and SOD-1-104 (Tuesday). Tutorials will take place in Room SOE-F-7. The location for the TA's office hours will be scheduled upon appointment, subject to the availability of SOF rooms.

Date	***Time***	***Teacher***	***Session***	***Important Dates***
Mon, 17 Feb 2025	10:15 - 12:00	RW	Lecture	
Tue, 18 Feb 2025	10:15 - 12:00	RW	Lecture	PS1 Out
Thu, 20 Feb 2025	14:00 - 15:45	LMC	Office Hours	
Mon, 24 Feb 2025	10:15 - 12:00	RW	Lecture	
Tue, 25 Feb 2025	10:15 - 12:00	RW	Lecture	
Thu, 27 Feb 2025	14:00 - 15:45	LMC	Office Hours	
Mon, 3 Mar 2025	10:15 - 12:00	RW	Lecture	
Tue, 4 Mar 2025	10:15 - 12:00	RW	Lecture	PS1 Due, PS2 Out
Thu, 6 Mar 2025	14:00 - 15:45	LMC	Tutorial	Discussion PS1
Mon, 10 Mar 2025	10:15 - 12:00	RW	Lecture	
Tue, 11 Mar 2025	10:15 - 12:00	RW	Lecture	
Thu, 13 Mar 2025	14:00 - 15:45	LMC	Office Hours	
Mon, 17 Mar 2025	10:15 - 12:00	RW	Lecture	
Tue, 18 Mar 2025	10:15 - 12:00	RW	Lecture	PS2 Due, PS3 Out
Thu, 20 Mar 2025	14:00 - 15:45	LMC	Tutorial	Discussion PS2
Mon, 24 Mar 2025	10:15 - 12:00	RW	Lecture	
Tue, 25 Mar 2025	10:15 - 12:00	RW	Lecture	
Thu, 27 Mar 2025	14:00 - 15:45	LMC	Office Hours	
Mon, 31 Mar 2025	10:15 - 12:00	RW	Lecture	
Tue, 1 Apr 2025	10:15 - 12:00	RW	Lecture	PS3 Due, PS4 Out
Thu, 3 Apr 2025	14:00 - 15:45	LMC	Tutorial	Discussion PS3
Mon, 7 Apr 2025	10:15 - 12:00	RW	Lecture	
Tue, 8 Apr 2025	10:15 - 12:00	RW	Lecture	
Thu, 10 Apr 2025	14:00 - 15:45	LMC	Office Hours	
Mon, 14 Apr 2025	10:15 - 12:00	RW	Lecture	
Mon, 15 Apr 2025	10:15 - 12:00	RW	Lecture	PS4 Due, PS5 Out
Thu, 17 Apr 2025	14:00 - 15:45	LMC	Tutorial	Discussion PS4
Mon, 21 Apr 2025			Easter Break	
Tue, 22 Apr 2025			Easter Break	
Thu, 24 Apr 2025			Easter Break	
Mon, 28 Apr 2025	10:15 - 12:00	RW	Lecture	
Tue, 29 Apr 2025	10:15 - 12:00	RW	Lecture	
Thu, 1 May 2025			Labor Day	
Mon, 5 May 2025	10:15 - 12:00	RW	Lecture	
Tue, 6 May 2025	10:15 - 12:00	RW	Lecture	PS5 Due, PS6 Out
Thu, 8 May 2025	14:00 - 15:45	LMC	Tutorial	Discussion PS5
Mon, 12 May 2025	10:15 - 12:00	RW	Lecture	
Tue, 13 May 2025	10:15 - 12:00	RW	Lecture	
Thu, 15 May 2025	14:00 - 15:45	LMC	Office Hours	
Mon, 19 May 2025	10:15 - 12:00	RW	Lecture	
Tue, 20 May 2025	10:15 - 12:00	RW	Lecture	PS6 Due
Thu, 22 May 2025	14:00 - 15:45	LMC	Tutorial	Discussion PS6
Mon, 26 May 2025	10:15 - 12:00	RW	Lecture	
Tue, 27 May 2025	10:15 - 12:00	RW	Lecture	
Thu, 29 May 2025			Ascension Day	
Mon, 16 June 2025	10:00 - 12:00		Final Exam	

RW = Rainer Winkelmann LMC = Lorenzo Maria Casale