UNIVERSITÀ DEGLI STUDI DI CAGLIARI

HR EXCELLENCE IN RESEARCH

Dipartimento di Scienze Economiche ed Aziendali
Direttore: Prof. Patrizio Monfardini
Dottorato in Scienze Economiche e Aziendali
Doctoral Program in Economics and Business
Coordinatrice: Prof.ssa Francesca Cabiddu

Econometric Analysis

Academic Year 2025-26 – cycle XLI

Course leader: Emanuela Marrocu
Instructors: Rinaldo Brau and Emanuela Marrocu

Aims of the course

The course aims to develop students' ability to understand, critically assess and carry out econometric analysis at an advanced level.

Organization of the course

The course consists of 36 hours of lectures (9 CFU) divided into a module of 24 hours and a module of 12 hours.
Lectures will run in-person and will be complemented by lab classes during which students will get familiar with statistical and econometric software to be used in applied analyses.
The relevant materials can be found in the *Teams class* "PhD Programme in Economics and Business" following this path: Documenti/General/Class Materials/Econometric Analysis.
First year PhD students are made members by using their UniCa email account. Students can access the *Teams* application by using the same account.

Learning outcomes and competences

At the end of the course students will have acquired knowledge of the core econometric methods and the ability to critically understand the relevant economic literature. Students will have also acquired practice with software packages and the ability to develop empirical strategies to be applied in their own research work.

Pre-requisites

The course assumes that students have already acquired the knowledge and skills taught in postgraduate-level courses of Statistics, Mathematics and Econometrics. Students are expected to be familiar with the concepts related to (all pre-requisites are essential):

- linear algebra
- probability theory
- how to draw inference on the population from sample evidence
- linear regression model and Ordinary Least Squares estimation method
- linear restrictions, how to deal with violations of the assumptions of classical linear regression model

Moreover, it is also assumed that students are already familiar with basic data management procedures and the use of spreadsheet applications (e.g. Excel).

Course contents and syllabus

Module A – instructor Rinaldo Brau	
Topic A – A brief refresh of Panel data	
Week 1 – 2-4 February Monday 2 February: 11.00-13.00 Aula 8 Wednesday 4 February: 11.00-13.00 Aula 8 Total hours: 4	*What are panel data:* • Fixed-effects models, random effects models, two-way effects models • Cluster-robust inference Applications with Stata
Topic B – Introduction to causal methods in econometrics	
Week 2 – 9-11 February Monday 9 February: 11.00-14.00 Aula 8 Wednesday 11 February: 11.00-14.00 Aula 8 Thursday 12 February: 12-14 Total hours: 8	*Estimating a treatment effect:* • Potential outcomes causal model • Experimental data and RCT • A brief recall of basic difference-in-differences designs • Regression discontinuity designs Applications using Stata
Module B – instructor Rinaldo Brau	
Advanced topics 1	
Week 3 – 17, 20 February Tuesday 17 February: 11.00-13.30 Aula 8 Friday 20 February: 11.00-13.30 Aula 8 Total hours: 5	*The Identification concept in econometrics* • "Identifying" Identification • Common Reasons for Failure of Point Identification • Solutions to Point Identification • Causal Reduced Form vs Structural Model Identification • DiD designs with multiple groups and time periods Applications using Stata
Advanced topics 2 – Discrete choice methods	
Week 4– 23, 24, 27 February Monday 23 February: 11.00-13.30 Aula 8 Tuesday 24 February: 11.00-13.30 Aula 8 Friday 27 February: 11.00-13.30 Aula 8 Total hours: 7	*Program Evaluation Designs:* • The Mc Fadden Conditional Logit Model • The Mixed Logit Model • Finite Mixtures and the Latent Class Logit • Demand Estimation with aggregate market shares and the BLP Model Applications using Stata and other softwares.

Module C – instructor Emanuela Marrocu	
Weeks 5 – 2, 5 March Monday 2 March: 10.00-13.00 Aula 8 Thursday 5 March: 10.00-13.00 Aula 8 Total hours: 6	*Spatial econometrics:* • Spatial dependence and spatial spillovers • The Spatial weight matrix • Spatial models for cross-section data: from the linear to the general spatial nesting model • Model selection and estimation methods • Direct, indirect and total effects • The Spatial weight matrix
Weeks 6 – 9, 11 March Monday 9 March: 10.00-13.00 Aula 8 Wednesday 11 March: 10.00-13.00 Aula 8 Total hours: 6	*Spatial econometrics (continued):* • Spatial models for panel data • Recent advancement in spatial econometrics Applications using Stata

Assessment methods
The assessment is based on a paper assignment (50%) and a written exam (50%).

Reading list

- Cameron-Trivedi, Microeconometrics Using Stata, 2nd edition, 2010.
- Baker A, Callaway B., Cunningham S., Goodman-Bacopn A. and Sant'Anna P.H.C. Difference-in-Differences Designs: A Practitioner's Guide, Journal of Economic Literature, forthcoming.
- Cunningham, S., Causal Inference: The Mixtape, Yale University Press, 2025.
- Huntington-Klein, N. (2023) The Effect: An Introduction to Research Design and Causality, Chapmann&Hall, CRC Press
- Elhorst J. P. (2014), Spatial econometrics. From cross-sectional data to spatial panels. Heidelberg: Springer
- Greene W. (2012). Econometric Analysis. Prentice Hall. Boston
- LeSage, J. P. and Pace, R. K. (2009) Introduction to Spatial Econometrics, Boca Raton, CRC.
- Lewbel A. (2019). The Identification Zoo: Meanings of Identification in Econometrics, Journal of Economic Literature 2019, 57(4), 835–903
- Train, K. (2009). Discrete Choice Methods with Simulation, 2nd edition. New York: Cambridge University Press
- Yoon H (2020). Lclogit2: An enhanced command to fit latent class conditional logit models. The Stata JournalVolume 20, Issue 2, June 2020, Pages 405-425.

For reviewing pre-requisites notions:

- Stock J.H. and M. Watson, Introduction to Econometrics, fourth edition, Pearson, 2019.