

Metodi quantitativi / Quantitative methods

Teacher: Dr. Rodolfo Metulini

Regression models and panel data (hours: 8)

Panel data contain many individual units (e.g., firms) that are observed at more than one point in time. Among the broad range of statistical techniques, panel data analysis using linear regression modelling has been used in many topics, going from macro- to micro-economics towards behavioral and political economy, since enable researchers and practitioners to study more complex phenomena with an increased precision in estimation if compared to statistical techniques for cross-sectional data. This short course will introduce students to cross-section and panel data analysis, guiding them through the comprehension of related modelling, estimation and testing techniques by mixing theoretical contents and practical applications (with the R programming language) to real micro-economic database.

Prerequisites

Students' knowledge of the basics of statistics and linear regression models represents a key prerequisite for the successful completion of the course.

For a guidance:

- S. Borra, A. Di Ciaccio, Statistica: metodologie per le scienze economiche e sociali, McGraw Hill Education, 2014, 3° ed. (cap. 8—14,16-17) (in Italian)
- B. Illowsky, D.A. College, S. Dean, D.A. College, Introductory Statistics, openstax, 2013 (cap. 3—6, 8—10, 12) (open access at <https://openstax.org/details/books/introductory-statistics?Book%20details>) (in english)

Course outline

- Panel data vs. cross sectional data: pros and cons
- The pooled ordinary least square (OLS) model for panel data

- The fixed effects model
- The random effects model
- Test of hypothesis for the model choice with panel data (if time permits)
- Examples and practical applications to economic issues with R

Textbooks

(Panel)

- Badi H. Baltagi, Econometric Analysis of Panel Data, 3rd ed., Chichester, UK: John Wiley & Sons, 2005; 4th ed., Wiley, 2008; 5th ed., Wiley, 2013
- <https://pdf-drive.com/pdf/Badi20H.20Baltagi20-20Econometric20Analysis20of20Panel20Data2028200529.pdf>

(Cross section)

- Greene, W. H. (2000). Econometric analysis 4th edition. International edition, New Jersey: Prentice Hall, 201-215.
- <https://spu.fem.uniag.sk/cvicenia/ksov/obtulovic/Mana%C5%BE.%20%C5%A1tatistika%20a%20ekonometria/EconometricsGREENE.pdf>

or

- Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data. MIT press.
- <http://www.microlinkcolleges.net/elib/files/undergraduate/Economics/EconometricAnalysisofCrossSectionandPanelData.pdf>

Software and dataset

plm package:

- <http://cran.r-project.org/web/packages/plm/>
- <https://hal.univ-reunion.fr/hal-01245304/document>
- Croissant, Y., & Millo, G. (2019). Panel data econometrics with R. Wiley.