

## Ph.D. in “Life Course Research” – Socio-demographic curriculum

Academic Year 2024-2025

### Random effects models for multilevel and longitudinal data

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#### Objectives

The course introduces the theory and practice of random effects (mixed-effects) models for the analysis of multilevel data in both cross-sectional and longitudinal settings. Emphasis is placed on model specification and interpretation. The course covers random effects models for continuous responses and for categorical responses.

#### Program

*Monday 27/01/2025 10:00-13:00* (Instructor: Leonardo Grilli and Carla Rampichini):

- Basics of multilevel analysis
- The two-level linear model: specification and estimation

*Tuesday 28/01/2025 10:00-13:00* (Instructor: Leonardo Grilli and Carla Rampichini):

- Within, between and contextual effects
- Fixed vs random effects

*Wednesday 29/01/2025 10:00-13:00* (Instructor: Leonardo Grilli and Carla Rampichini):

- Complex multilevel structures
- The random effects logit model: specification and interpretation

*Thursday 30/01/2025 10:00-13:00* (Instructor: Leonardo Grilli and Carla Rampichini):

- The random effects logit model: estimation and prediction
- Multilevel models for longitudinal data

#### Suggested readings

- Grilli L., Rampichini C. (2018). A handful of critical choices in multilevel modelling. *Boletín de Estadística e Investigación Operativa*, 34 (1).
- Hox J.J., Moerbeek M. and van de Schoot R. (2017). *Multilevel Analysis: Techniques and Applications*, Third edition, Routledge
- Rabe-Hesketh S. and Skrondal A. (2022). *Multilevel and longitudinal modeling using Stata*, Fourth edition, Stata Corp.
- Snijders T.A.B. and Bosker R.J. (2012). *Multilevel Analysis: An introduction to basic and advanced multilevel modeling*, Second edition, Sage.

#### Requirements

Basic knowledge of statistical inference, linear regression and logistic regression. Knowledge of Stata is helpful but not necessary (files with commands are always provided).