ECONOMETRICS Manuel Arellano CEMFI, 2024-2025

Lectures: Mon 9:30-11:00, Wed 9:30-11:00 Exercises and workshop sessions: Wed 11:30-13:00

Grades will be based on written assignments (15%), presentations (15%), and a final exam (70%)

Course outline

Part I: Regression

1. Least squares

- 1.1 Asymptotic properties of linear predictors
- 1.2 Weighted least squares
- 1.3 Cluster-robust standard errors
- 1.4 Panel regression with fixed effects

2. Quantile methods

- 2.1 Medians, quantiles and optimal predictors
- 2.2 Quantile regression
- 2.3 Asymptotic results
- 2.4 Counterfactual decompositions

Part II: Likelihood methods

3. Maximum likelihood and large sample testing

- 3.1 Likelihood models
- 3.2 Examples: Binary regression and duration models
- 3.3 Consistency and asymptotic normality
- 3.4 Estimation subject to constraints

4. Bootstrap methods

- 4.1 Nonparametric bootstrap
- 4.2 Asymptotic properties
- 4.3 Confidence intervals
- 4.4 Dependent samples

5. Bayesian inference

- 5.1 Bayesian analysis
- 5.2 Specifying prior distributions
- 5.3 Large-sample Bayesian inference
- 5.4 Markov chain Monte Carlo methods

Part III: Time series

6. Stochastic processes

- 6.1 Stationarity and ergodicity
- 6.2 Autoregressive and moving average models
- 6.3 Asymptotics with dependent observations
- 6.4 Nonstationary processes
- 6.5 Panel autoregression with fixed effects

Part IV: Beyond exogeneity

7. Instrumental variables

- 7.1 Measurement error
- 7.2 Two-stage least squares
- 7.3 Testing overidentifying restrictions
- 7.4 Panel regression under sequential exogeneity

8. Treatment effects

- 8.1 Potential outcomes
- 8.2 Matching methods
- 8.3 Self-selected treatment
- 8.4 Local average treatment effects

Textbooks

Bruce Hansen, Econometrics, Princeton University Press, 2022.

J. Angrist and J.-S. Pischke, Mostly Harmless Econometrics, Princeton University Press, 2009.

- M. Arellano, Panel Data Econometrics, Oxford University Press, 2003.
- C. Cameron and P. Trivedi, Microeconometrics, Cambridge University Press, 2005
- C. Gourieroux and A. Monfort, Statistics and Econometric Models, Cambridge U.P., 1995.
- J. D. Hamilton, Time Series Analysis, Princeton University Press, 1994.
- F. Hayashi, Econometrics, Princeton University Press, 2000.
- R. Koenker, Quantile Regression, Cambridge University Press 2005.
- J. Stock and M. Watson, Introduction to Econometrics, Pearson Education, 2nd edition, 2007.
- J. Wooldridge, Econometric Analysis of Cross Section and Panel Data, MIT Press, 2010.