Econometrics II – Spring 2025 – part 2
Uppsala University

Instructor: Luca Repetto

Outline and readings

Textbooks (* = required)

*Hansen B (2022), *Econometrics*, Princeton University Press.

Arellano, Manuel (2003). Panel data econometrics. OUP Oxford.

Imbens GW & Rubin DB (2015), *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction*. Cambridge University Press.

Angrist, J.D. and J-S. Pischke (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press. Princeton.

Cameron, C and P. Trivedi (2005), *Microeconometrics*, Cambridge University Press.

Plan of contents

Weeks 13-14 Time Series (6h)

- Part I: Univariate time series – stationarity and ergodicity; Ergodic theorem and CLT; simple univariate processes (AR, MA, ARMA). Impulse-response functions. Identification. Estimation and inference: HAC. Model selection (Akaike etc.). Nonstationary time series.
- Part II: Multivariate time series – extensions of the above to multivariate processes. VAR and impulse-response functions. Local projections. Identification and estimation issues with VAR models. Factor models.

- Key readings:
    - For part I: Hansen (ch. 14; ch.16 – parts); for part II: Hansen (ch.15)

Week 15-16 Static and dynamic panel data analysis (4h)

Pooled OLS. Error component representation. Random and fixed effects models. Estimation of static panel data models. Inference. Dynamic panel data model. Estimation (Arellano-Bond).

- Key readings:
    - Hansen, ch. 17.
- Supplementary readings
    - Arellano (2003): ch. 2-7 (parts).

Week 16-18 Diff-in-diffs (2h)

- 2x2 DiD model. Examples. Identification and estimation. Extension to multiple units and -periods. Validation checks.
- DiD with staggered adoption. Estimation and validation. Recent developments on pre-trend testing.

- Key readings:
    - Hansen, ch. 18.
    - Goodman-Bacon, Andrew (2021), "Difference-in-Differences with Variation in Treatment Timing", Journal of Econometrics.
    - Callaway, Brantly and Pedro H. C. Sant'Anna (2021), "Difference-in-Differences with Multiple Time Periods," Journal of Econometrics.
    - Roth, Jonathan, Pedro H. C. Sant'Anna, Alyssa Bilinski, and John Poe (2023) "What's Trending in Difference-in-Differences? A Synthesis of the Recent Econometrics Literature," Journal of Econometrics,.

Week 18 Synthetic control and extensions (2h)

Connection to diff-in-diffs and potential outcomes notation. Synthetic control model estimation and inference. Extensions.

- Key readings:
    - Abadie, Alberto, and Javier Gardeazabal. "The economic costs of conflict: A case study of the Basque Country." American economic review 93.1 (2003): 113-132.

- Supplementary readings
    - Angrist and Pischke ch. 2, 5.
    - Abadie, Alberto, Alexis Diamond, and Jens Hainmueller. (2015) "Comparative politics and the synthetic control method." American Journal of Political Science
    - Alberto Abadie, Alexis Diamond, and Jens Hainmueller (2010): "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program", Journal of the American Statistical Association.

Week 19 Nonparametric methods (2h)

Nonparametric and semiparametric models: advantages and drawbacks. Kernels.
Problems with multivariate extensions. Nonparametric regression. Local linear regression.
Dimension reduction techniques (Lasso, Ridge).

- Key readings:
    - Hansen ch. 19.
- Supplementary readings
    - Cameron and Trivedi, ch. 11.

Week 20 Regression discontinuity design (2h)

Regression-discontinuity as an empirical design; assumptions; estimation; advantages and caveats; validation. Fuzzy RDD. Regression kink design.

- Key readings:
  - Hansen ch. 21.
  - David S. Lee and Thomas Lemieux (2010). "Regression Discontinuity Designs in Economics", Journal of Economic Literature.
  - Imbens, Guido W., and Thomas Lemieux (2008). "Regression discontinuity designs: A guide to practice." Journal of Econometrics

Week 21 Inference topics I: non-iid inference (clustering; bootstrap) (2h)

Clustered data and standard errors. Two-way clustering and panel data. Few clusters. Bootstrap and bootstrapped s.e.

- Key readings:
  - Cameron and D. Miller (2015), "A Practitioners Guide to Cluster-Robust Inference", Journal of Human Resources.
  - Angrist and Pischke, ch. 8
- Supplementary readings
  - Hansen, ch. 10 (Bootstrap)
  - Cameron and Trivedi, ch. 11.
  - MacKinnon, James G., Morten Ørregaard Nielsen, and Matthew D. Webb (2023), "Cluster-robust inference: A guide to empirical practice." Journal of Econometrics.

Week 22 Inference topics II: model vs. design-based inference (2h)

Design-based inference. Model-based inference. Merging the two approaches.

- Key readings:
  - Abadie, Alberto, et al. (2020) "Sampling – based versus design – based uncertainty in regression analysis." Econometrica
- Supplementary readings
  - Abadie, Alberto, et al. (2023), "When should you adjust standard errors for clustering?" The Quarterly Journal of Economics.