

PhD course in Econometrics II - Spring 2024

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Course Program (Updated 18/5/24)

1. Diff-in-diffs and Synthetic control methods

For diff-in-diff recap: AP, ch. 2,5. For synthetic control: papers.

- 1.1 Recap on diff-in-diffs and potential outcomes notation.
- 1.2 Synthetic control.

2. Design- and model-based inference

Papers.

- 2.1 Design-based inference.
- 2.2 Model-based inference.
- 2.3 Merging the two approaches.

3. Inference with clustered data

Paper by CM; additional references: AP ch. 8. CT ch. 11

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

4. Shift-share instrumental variables

Reference: papers.

- 4.1 What is a shift-share IV? Examples
- 4.2 Identification by share exogeneity.
- 4.3 Identification by shocks exogeneity.
- 4.4 Practical issues and inference.

5. Nonparametric and semiparametric estimation

CT, ch. 9

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

6. Regression-discontinuity design

Papers

6.1 Regression-discontinuity as an empirical design; assumptions; estimation; advantages and caveats; validation.

6.2 Fuzzy RDD.

7. Bayesian econometrics

TL, ch. 1 (full); ch. 3 and 4 (parts); additional reference: **CT**, ch. 13

7.1 Bayes' rule; likelihoods, priors, and posteriors. Applications.

7.2 Monte Carlo methods for posteriors: Gibbs sampling; Metropolis-Hastings.

List of useful books

1. **CT** : **C. Cameron and P. Trivedi**, *Microeconometrics* (Cambridge University Press, 2005)
2. **AP**: **J. Angrist and J.S. Pischke**, *Mostly Harmless Econometrics* (Princeton University Press, 2008).
3. **TL**: **T. Lancaster**, *An Introduction to modern Bayesian econometrics* (Blackwell Publishing, 2004)
4. **W**: **J. Wooldridge**, *Econometric Analysis of Cross Section and Panel Data* (MIT Press 2nd ed. 2010)
5. **S. Cunningham**, *Causal inference: The mixtape* (Yale university press, 2021).

List of papers (* marks recommended reading)

1. Synthetic control

- *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.
- *Abadie, Alberto, Alexis Diamond, and Jens Hainmueller "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program", *Journal of the American Statistical Association*, 105:490, (2010) 493-505.
- Abadie, Alberto, Alexis Diamond, and Jens Hainmueller. "Comparative politics and the synthetic control method." *American Journal of Political Science* 59.2 (2015): 495-510.
- Abadie, Alberto. "Using synthetic controls: Feasibility, data requirements, and methodological aspects." *Journal of Economic Literature* 59.2 (2021): 391-425.

2. Design- and model- based inference

- *Abadie, Alberto, et al. "Sampling – based versus design – based uncertainty in regression analysis." *Econometrica* 88.1 (2020): 265-296.

- *Abadie, Alberto, et al. "When should you adjust standard errors for clustering?" *The Quarterly Journal of Economics* 138.1 (2023): 1-35.

3. Inference with clustered data

- *C. Cameron and D. Miller (2015), *A Practitioner's Guide to Cluster-Robust Inference*, *Journal of Human Resources*.
- MacKinnon, James G., Morten Ørregaard Nielsen, and Matthew D. Webb. "Cluster-robust inference: A guide to empirical practice." *Journal of Econometrics* 232.2 (2023): 272-299.
- Hagemann, Andreas. "Inference with a single treated cluster." arXiv preprint arXiv:2010.04076 (2020).

4. Shift-share instrumental variables

- *Borusyak, Kirill, Peter Hull, and Xavier Jaravel. "Quasi-experimental shift-share research designs." *The Review of Economic Studies* 89.1 (2022): 181-213.
- *Goldsmith-Pinkham, Paul, Isaac Sorkin, and Henry Swift. "Bartik instruments: What, when, why, and how." *American Economic Review* 110.8 (2020): 2586-2624.

6. RDD

- *David S. Lee and Thomas Lemieux (2010). *Regression Discontinuity Designs in Economics*, *Journal of Economic Literature* 48 (June 2010): 281355
- Imbens, Guido W., and Thomas Lemieux (2008). "Regression discontinuity designs: A guide to practice." *Journal of Econometrics* 142.2: 615-635.
- Hahn, Jinyong, Petra Todd, and Wilbert Van der Klaauw (2001). "Identification and estimation of treatment effects with a regression-discontinuity design." *Econometrica* 69.1: 201-209.