Econometrics for Causal Inference

Master 1 Economics, Research track, Spring 2024

Course information:

- Office hours: by appointment
- Professors:
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This syllabus is subject to change at the discretion of the professors

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1. Course description

This course provides an overview of the main empirical methods used for causal inference. It defines causal effects and reviews causes for bias in their estimation. It then reviews a series of approaches commonly used to correct for such bias: randomized controlled trials, instrumental variables, difference-in-differences estimators, matching, and, time permitting, regression discontinuity designs. While the course will expose the concepts relevant concepts formally, emphasis will be given to practical assessment of these issues in applied settings.

2. Course material

Lecture notes will be posted after each lecture on Ametice. We will be using the following textbooks, loosely.

- Angrist, Joshua; Pischke, Jorn-Steffen. 2008. *Mostly Harmless Econometrics*. Princeton University Press.
- Cunningham, Scott. 2021. *Causal Inference: the Mixtape*. Oxford University Press.

The following references may also prove useful.

- Pear, Judea; Glymour, Madelyn; Jewell, Nicholas P. 2016. *Causal Inference in Statistics: a Primer*. Wiley.
- Wooldridge, Jeffrey. 2001. *Econometric Analysis of Cross Section and Panel Data*. MIT Press.

3. Tentative schedule

Week	Theme	Content	References
1	Introduction	The fundamental problem of causal inference	AP2, C3, C4
2	Experimental methods	Randomized experiments	AP2, 3
3		Common issues in experimental research (1): imperfect compliance	AP4
4		Common issues in experimental research (2): balance, power, ethics	
5	Non-experimental methods	Instrumental variables	AP4
6		Differences in differences	AP5
7		Regression discontinuity design	AP6
8		Matching and synthetic control	C5, C10

4. Learning outcomes

Upon completion of the course, students should be able to:

- Know the main empirical methods used in causal inference
- Apply these methods to practical research designs

5. Assignments and grades

This course is evaluated through a final exam (2 hours; 2/3 of the final grade) and a midterm exam (1 hour; 1/3 of the final grade).

6. Academic integrity

It is expected that students be aware of and respect the academic integrity norms as defined by Aix-Marseille Université. The « Charte relative à la lutte contre le plagiat de l'Université d'Aix-Marseille » (TX-DFD-40, https://procedures.univ-amu.fr/dfd/tx-dfd-40-charte-relative-a-lutte-contre-plagiat) reminds the University's commitment to the principles of academic integrity.

Alleged cases of fraud or plagiarism will be handled as per the PR-DAJI-101 procedure; « Section disciplinaire usagers », https://procedures.univ-amu.fr/daji/pr-daji-101-section-disciplinaire-usagers.

7. Student accessibility

The University is an open, universal environment that celebrates equality in rights and opportunities. As a public institution, its mission is to encourage everyone's insertion and success. The question of accessibility is integral to those values. Aix-Marseille Université is deeply committed to the question of accessibility.

In order to benefit from accommodations for your studies and/or exams, please contact your campus's disability office as soon as possible.

For further information, please refer to https://www.univ-amu.fr/fr/public/mission-handicap-amu