



Week 2 (Regular course)

Duration: 12 hours

Format: In person and online

Instructor: Mar C. Espadafor

Course description:

The course aims to provide students with the necessary skills for critically understanding, managing, and analyzing data and designs that aim at causal identification. The course begins by introducing key concepts, benefits and pitfalls of longitudinal and panel data analysis, and an introduction to the counterfactual framework and selection bias.

The entire course is built upon intuition-based teaching and pays special emphasis on using real-world examples and data to introduce students to different concepts. This includes implementing two classical causal inference designs: regression discontinuity (RDD) and instrumental variable (IV) design. The course includes frontal classes and practical sessions to give students hands-on experience working with real-world data. This will provide students with practical guides to then be able to implement and critically assess causal inference designs. We will pay special attention not only to each design's assumptions but also to the different checks and threats that researchers should be implementing while using these designs.

This course is designed for researchers with a basic understanding of quantitative analysis but willing to deepen into the various statistical and econometric techniques related to causal inference analysis. By the end of the course researchers will be able to:

1. understand and critically engage with terminology and concepts behind causal identification.

2. understand and perform causal inference designs in Stata or R.

3. critically assess checks and threats of causal inference designs.

The class structure will be a lecture followed by a lab session covering the materials taught in the theoretical session. Lab sessions consist of solving hands-on exercises covering each day's topics. We will mainly replicate published papers on both sociology and political science and look at their caveats, but students are welcome to submit their data and work on that during the lab session. In fact, in the last lab session, students are welcome to submit and discuss their projects and we can cover practical extensions of other causal inference designs on demand.





Learning schedule:

Day 1	14.00-15.45	Introduction to the Potential Outcome Framework, selection bias and sharp Regression Discontinuity Design
		Break
	16.15-18.00	Guided lab session on sharp RDDs in STATA
Day 2	14.00-15.45	Introduction to Instrumental Variables
		Break
	16.15-18.00	Guided lab session on Instrumental Variables in STATA
Day 3	14.00-15.45	Introduction to fuzzy RDDs and extensions
		Break
	16.15-18.00	Guided lab session on fuzzy RDDs and extensions in STATA

Prerequisites: This course builds on ordinary least square (OLS) regression and extends it. Participants should be familiar with basic statistical concepts such as sample mean and sample variance and their properties. Participants should possess basic knowledge of regression analysis. Basic skills in Stata/R are also required.

Software: STATA/R

Readings:

Introduction to Causal Inference:

• Causality in the Time of Cholera: John Snow and the Process of Scientific Inquiry

(Coleman, Koschinsky & Black 2022)

Introductory chapters to RDDs and IVs:

• Chapters 4-5 from Angrist & Pischke 2014 (mandatory)

• Chapter 5-6 from Angrist & Pischke 2009 (this one is optional and more demanding in terms of maths)





• Intuition-based for RDDs (Valentim, Núñez, & Dinas 2021, optional but highly recommended)

• On IVs exclusion restriction (Mellon 2023, optional but highly recommended)

• On extensions of RDDs (Cattaneo, Idrobo & Titiunik 2023, optional but highly recommend, specially for R users)



Instructor short bio: Mar C. Espadafor is a postdoctoral researcher at the Sociology II Department in UNED (Madrid) and an INVEST fellow at the University of Turku (Finland). She has recently joined the <u>MapIneq project</u>, a Horizon Europe project aiming at investigating how causes of inequality differ across local, regional, and national levels, and lifetime and cohorts. Her previous appointments include positions as a visiting scholar in the Center for Demography and Ecology at the University of Wisconsin-Madison (USA) during the fall of 2021 and Université de Lausanne during the spring of 2024. She obtained a PhD in Sociology from the European University Institute (Italy) in 2023 with a thesis on

"Selection or Moderation? Three essays on education inequalities".

Her main research interests are in the areas of social stratification, sociology of education and social demography. From a substantive point of view, she is broadly interested in inequalities: how these are transmitted through generations or different institutional configurations. In her research, she uses quantitative methods and causal inference designs.

Personal Web page: https://marespadafor.github.io

Google Scholar: https://scholar.google.es/citations?user=ehRMwhQAAAAJ&hl=es&oi=ao