Causal Inference and Public Policy in Europe
MA Seminar, Summer 2024
SM Applied Theories and Methods Political Science I
Pre-semester version (30.01.2024)
Readings and Deadlines will be added before the beginning of the term.

Classes: Wednesdays 14:00 – 15:30, all semester. On 12th and 26th June there are double sessions with the Lab directly after the lecture. The subsequent weeks are then free.

Instructor:
Dr. Jens Wäckerle
Cologne Center for Comparative Politics (CCCP)
Email: jens.waeckerle@uni-koeln.de
Zoom Office hours: By appointment through the link on ILIAS

Course Description

Social Sciences have undergone a "causal revolution" in the last few decades. The need to find reliable answers for important questions such as "Do higher minimum wages increase unemployment?" or "Do violent protests reduce support for a social movement?" has led researchers to develop a rigorous toolkit of methods and techniques to understand the causal relation between X and Y. As such, the course builds on introductory courses in quantitative methods and allows students to further develop their skills.

This course starts with the main contemporary theoretical framework behind current causal analysis in social sciences, the potential outcomes framework. We talk about how causal relations are understood in terms of counterfactuals, and the assumptions necessary to identify causal effects, as well as common challenges and pitfalls. The course focuses on statistical inference for the analysis of public policy across a wide range of contexts, and covers issues related to the design, implementation, and evaluation of policy changes. Technical aspects will focus on computational approaches and real-world challenges.

The course is split in substantive weeks and lab weeks, the latter applying the principles that are discussed in the former. Students are expected to work through the underlying principles of causal inference methods, critically engage with research applying them, and learn to conduct their own analyses.

Learning Objectives/General Skills:

- Students develop an understanding of how to model cause-and-effect relationships and develop counterfactual scenarios.
- Students gain experience using computational methods to evaluate and predict the impacts of policies, interventions, and events, while learning to avoid common pitfalls.

- Students expand on their knowledge built in the introduction to quantitative methods course and learn to apply advanced quantitative techniques.
- Students are prepared to complete their own research projects autonomously with the help of the software R.
- Students learn to present their conclusions to policy-makers and develop an understanding of how to translate academic findings into actionable conclusions and recommendations.

Prerequisites

Students are expected to be familiar with basic statistical methods for analysis and inference (i.e., run and interpret a linear regression). You should have taken Introduction to Quantitative Methods or a similar course before starting this. Students have to have a basic familiarity with R. If you need a refresher, you can work through the self-learning tutorials on R provided in the context of the Introduction to Quantitative Methods class: https://github.com/jenswaeckerle/IntroRUzK

Software
All students have to have R and RStudio installed on their computers before the first class.

Course Requirements

Students will be assessed based on the following exercises:

- Two reaction papers (10 points each). In most of the weeks during the semester, there are some readings that apply the causal inference methods covered in that week. During the semester, each student should pick any two sessions/topics and write a reaction paper for each. Not all readings are eligible for this, the ones that are are marked with an asterisk. The paper should be a critical evaluation of that reading, based on the lecture and other readings, focusing on questions such as: are the assumptions met? Is the method properly used, and the right one to test that theory? Are the results correctly interpreted? Are the conclusions valid, given the analyses? What parts of the analysis could be improved? The deadline for uploading the reaction paper is an hour before the next class (i.e., the reaction paper for the extra readings for week 2 is due an hour before our week 3 class). Each reaction paper should be no longer than one page.
- One of two take-home assignments (20 points). Two take-home exercises will be posted during the semester, on May 15 and June 5 with two weeks to complete each of them – deadlines on TBD, and TBD. Students will be given a dataset and asked to perform analyses in accordance to methods covered in the class thus far. The length of assignments should not exceed five pages. Each student should do only one of the two.
- Final course project (50 points). For the final project, students should find data that was not used in class and use one of the methods discussed in the course to analyze it, in order to evaluate a given policy – i.e., what was the causal effect of a policy or event on an outcome? Results should be presented as an infographic, targeted at a

lay audience (and not academic), with an accompanying 2-page technical memo on the data and analyses performed. The final infographics should be uploaded by TBD.

- Presentation of the final course project (10 points). In the last week of the course, all students should give a brief presentation of their infographic idea for the final course project.

Total number of points and final grade

Points	Grade
0 - 49	5,0
50 - 54,5	4,0
55 - 59,5	3,7
60 - 64,5	3,3
65 - 69,5	3,0
70 - 74,5	2,7
75 - 79,5	2,3
80 - 84,5	2,0
85 - 89,5	1,7
90 - 94,5	1,3
95 - 100	1,0

A Note on Professional Presentation

For the one take-home assignment, I recommend you use RMarkdown. RStudio comes with a powerful authoring format called R Markdown. R Markdown documents look like a mix of a text document and R code. They enable easy creation of data analysis reports directly from R. Rather than copying and pasting into Word, your report is created automatically. R Markdown combines the core syntax of markdown (an easy-to-write plain text format) with embedded R code chunks that are run so their output can be included in the final document. R Markdown documents are fully reproducible (they can be automatically regenerated whenever underlying R code or data changes). Markdown is simple to use as it enables the use of a syntax like plain-text.

Schedule

Week 1: Causality and the Experimental Gold Standard

10 April 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Mandatory readings:

- Imbens, Guido W., and Donald B. Rubin. 2015. *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction.* Cambridge: Cambridge University Press, Chapter 1.
- Duflo, Esther (2020). Field Experiments and the Practice of Policy. *American Economic Review*, 110(7), 1952–1973.

Week 2: What to do when we can't experiment? Introduction to matching

17 April 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 3: Lab for Matching

24 April 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 4: Regression Discontinuity

08 May 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 5: Lab for Regression Discontinuity

15 May 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 6: Differences-in-Differences

29 May 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 7: Lab for Differences-in-Differences

05 June 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 8: Synthetic Controls

12 June 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 9: Lab for Synthetic Controls

12 June 2024, 16:00 – 17:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 10: Instrumental Variables

26 June 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 11: Lab for Instrumental Variables

26 June 2024, 16:00 – 17:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 12: Natural Experiments

10 July 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)

Week 13: Wrap Up and Discussion of Final Projects

17 July 2024, 14:00 – 15:30, Room 3.40, Building 211 (IBW Building, Herbert-Lewin-Str. 2, 3rd floor)