

Applied Causal Inference

University of Hamburg | Spring 2024

Instructor

Prof. Dr. Max Schaub, University of Hamburg, Allende-Platz 1, Room 405, 20146 Hamburg, +49 (0)40 42838 2549, max.schaub@uni-hamburg.de

Synopsis

The course introduces students to methods for studying causal relations using statistical tools. We will discuss and apply various strategies commonly used to establish causality in the social sciences, including matching, instrumental variables, difference-in-differences, and regression discontinuity designs. The course will introduce students to the theoretical framework underlying these types of analyses. Students will then apply these techniques to their own data and present their ideas during a concluding workshop session. In order to fully profit from the course, students should have prior knowledge of linear regression modelling using statistical software such as Stata or R.

Course dates

24.04.2024 15:00 – 17:00 (Intro and overview)
07.05.2024 10:00 – 16:00 (Seminar)
08.05.2024 10:00 – 16:00 (Seminar and workshop)

Course requirement

As the main course requirement, students are required to write a short paper of 5 pages length, where they apply one of the canonical causal inference methods to their own PhD topic. The short paper should include:

1. a short introduction to your research question and underlying theory,
2. a directed acyclic graph (DAG) illustrating the logic of your argument,
3. a description of the data sources, and
4. a precise statement of how a canonical CI method could be addressed to answer your research question.

Given time restrictions, no analyses have to be presented. Rather, the focus is on precisely describing a causal design. A selection of these short papers will be presented during the short workshop that concludes the course.

Course textbooks

We will mainly draw on the following two textbooks. You are expected you familiarize yourself with these books before the main seminar.

Angrist, Joshua David, and Jörn-Steffen Pischke. *Mastering 'metrics: The Path from Cause to Effect*. New Jersey: Princeton University Press, 2015.

Huntington-Klein, N. (2021). *The Effect: An Introduction to Research Design and Causality*. <https://theeffectbook.net/index.html>. Excellent youtube tutorials are available, first episode here <https://www.youtube.com/watch?v=yQXqdmenc6M>

Resources

Below you can find further resources that you will find useful during your work on this course. Many more resources can be found by googling (on websites such as stackexchange) or on YouTube; ChatGPT has become a great tool to help with coding problems. As for the choice of statistical software, I highly recommend you are using R (even though I mostly use Stata because this is what I trained on): there is lots of support online, it's continuously getting better, and it's free.

Other text books

Bauer, P. (2020) Applied causal analysis. <https://bookdown.org/paul/applied-causal-analysis/>

Cunningham, Scott. Causal Inference: The Mixtape. Yale University Press, 2021.

<https://mixtape.scunning.com/>

Gelman, Andrew, and Jennifer Hill. *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge University Press, 2007.

Hernán, Miguel, and James M Robins. *Causal Inference*, 2021.

<https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/>

Imai, K. (2018). *Quantitative social science: An introduction*. Princeton University Press.

Using R

Tjaden, J. D. (2021) Intro to R for Social Scientists. <https://jaspertjaden.github.io/course-intro2r/>

Wuttke, Schroeder, and Kiemes (2023), R for Social Scientists, <https://adp-cvk.quarto.pub/r-for-social-science-data-analysis/>

Gahner Larsen, E., & Fazekas, Z. (2021). Quantitative Politics with R. <http://qpplr.com/>

Aydin, B., Algina, J., Leite, W. L., & Atilgan, H. (2018). An R Companion: A Compact Introduction for Social Scientists. Ankara: ANI Publishing. <https://bookdown.org/burak2358/SARP-EN/>

Wickham, H. & Golemund, G. (2020). R for Data Science. <https://r4ds.had.co.nz/>

Huynh, Y.W. (2019). R for graduate students. https://bookdown.org/yih_huynh/Guide-to-R-Book/

Ansell, B. (2020). Introduction to R – tidyverse.

https://bookdown.org/ansellbr/WEHI_tidyR_course_book/