Causal Inference from Observational Data: Propensity Score Matching in R

Block Seminar
Summer Term 2019
Isa Steinmann
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Short Description

The block seminar covers the following three content areas: (1) Causal inference from observational data, covering foundations of causal inference and different methodological approaches (regression, instrumental variables, regression discontinuity, differences-in-differences, and propensity score matching), (2) an introduction to the statistic software environment R, encompassing basic commands and handling data as well as descriptive and inferential statistics, and (3) propensity score matching in R, applying the package "MatchIt".

The seminar language is English. The course includes different teaching and learning formats, including lectures, plenary discussions, group exercises, and hands-on software exercises. By the end of the seminar, the participants (1) will be able to describe different methodological approaches including propensity score matching for deriving causal inference from observational data, (2) will be aware of the meaning and consequences of selection and omitted variable bias, (3) will be able to apply approaches like propensity score matching to own research questions, (4) will be able to use the software application R to prepare datasets and estimate basic descriptive and inferential statistics, and (5) will be able to apply the R package MatchIt for propensity score matching.

Target Groups

The participation does not require previous experience with the software environment R. A basic understanding of quantitative empirical social scientific research is however desirable. Please bring a laptop with installed R Studio (https://www.rstudio.com/products/rstudio/download/).

Master of Arts in Erziehungswissenschaft/Education at TU Dortmund University: Four semester hours per week are credited for the seminar. Passing the seminar requires (1) attendance and active participation on all five days and (2) a seminar input in the form of a short presentation. Further information on this short presentation will follow after registration at the beginning of the semester. Please register regularly via LSF and contact Isa Steinmann in case of further questions.

PhD students or postdoctoral fellows of TU Dortmund University, Ruhr University Bochum, and University of Duisburg-Essen: All interested fellows are welcome to participate in either all three or single parts of the seminar. PhD students at TU Dortmund University shall register regularly via LSF, others can register bindingly by email to Isa Steinmann.

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Schedule

Date	Time	Location	Content
11 June 2019	09:00-16:00	MSW[1] 13, Room 111a	**(1) Causal Inference** – Rubin's Causal Model – Experimental Designs – Regression
12 June 2019	09:00-16:00	MSW[1] 13, Room 111a	– Instrumental Variables – Regression Discontinuity – Differences-in-Differences – Propensity Score Matching
13 June 2019	09:00-16:00	MSW[1] 13, Room 111a	**(2) Introduction to R** – Basic Commands – Creating and Importing Data – Recoding Data
14 June 2019	09:00-16:00	MSW[1] 13, Room 111a	– Loops and Conditional Execution – Basic Descriptive Statistics – Basic Inferential Statistics – Plots
22 June 2019	09:00-16:00	MSW[1] 13, Room 111a	**(3) Propensity Score Matching in R** – Matching Methods – Balance Checks – Effect Estimation

[1]Martin-Schmeißer-Weg, 44227 Dortmund

Reading List

Angrist, J. & Pischke, J.-S. (2015). *Mastering `Metrics: The Path from Cause to Effect*. Princeton, Oxford: Princeton University Press.

Ho, D., Imai, K., King, G., & Stuart, E. (2011). MatchIt: Nonparametric preprocessing for parametric causal inference. Journal of Statistical Software. Retrieved from http://gking.harvard.edu/matchit.

Venables, W. N., Smith, D. M., & R Development Core Team (2013). *An Introduction to R*. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.462.8971&rep=rep1&type=pdf

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