Impact Evaluation: Policy Applications with R

Winter 2023

Class meetings: Mondays 13.30 - 15.10 & Wednesdays 15.40 - 17.20 (QS D212) Hybrid, Zoom link
12 sessions: Jan. 9th 2023 - 15th February 2023

Course Number: DOPP5078

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Course overview

Evidence based policy making relies on the ability to combine causal methods and work with data. The course introduces the key causal inference methods used to evaluate programs and policies, using the statistical software R. Case studies will be used to emphasize the methods presented. The course will focus on practical applications of evaluation techniques.

We begin with a gentle introduction to R followed by the potential outcomes and causal graph framework to build understanding of cause. Topics include experiments (RCTs), difference-in-difference, co-variate adjustment via regressions and matching.

Session format: Short lecture on the concepts followed by lab work with R

Prerequisites: Adequate training in statistics or econometrics (at the minimum must have completed introductory courses and be familiar with OLS models)

Course goals

1. Understand and implement basic methods used in impact evaluation
2. Become critical consumers of development policies and programs
3. Use R to analyze and evaluate policies and graph data

Course methods and materials

Program and policy evaluation requires practice. The in-class lab work, homework assignments, group project and exam are designed to help students master the techniques. The concepts will be presented via lectures and case studies, while the lab work with R aims building data skills. Students are encouraged to work in groups on the assignments. Class attendance and participation is highly encouraged and unjustified absences will be noted.

Students are required to prepare for class with the assigned readings. Additional materials (available as e-books in the CEU library) for those interested include:

1. Mastering 'Metrics: The Path from Cause to Effect (2014) by Joshua Angrist and Jörn Steffen Pischke.
2. Causal Inference: The Mix Tape (2021) by Scott Cunningham
3. Impact Evaluation in Practice (2016) by Paul Gertler, Sebastian Martinez, Patrick Premand, Laura B. Rawlings, and Christel M. J. Vermeersch. Washington, D.C.: World Bank Publications
4. Dayal, V., 2015. An introduction to R for quantitative economics. SpringerBriefs in Economics. (introduction to R and a good chapter on causal inference with R)
5. Huntington-Klein, N., 2021. The effect: An introduction to research design and causality.

Course deliverables

- 2 Assignments (40%)
- Discussion forum (10%)
- Group project (15%)
- Final exam (35%)

Assignments solely carries the most weight as it is a learning-by-doing course, followed by assessments: besides the final exam, you could have up to four short in-class quizzes/tests. To actively engage discussion in the course, students are required to interact with questions and comments in the online discussion forum. Each student is required to contribute and participate in at least 8 sessions with brief (but precise) questions or responses related to the session.

Grading scale

96	$\leq$	A	$\leq$	100
88	$\leq$	A –	$<$	96
80	$\leq$	B +	$<$	88
71	$\leq$	B	$<$	80
63	$\leq$	B –	$<$	71
58	$\leq$	C +	$<$	63
0	$\leq$	F	$<$	58

Outline of sessions

1. Overview and Introduction to R
    - Install R and RStudio on your laptop before coming to the session (see Get Set for details)
    - Gertler et al. (2016), Impact Evaluation in Practice (Ch 1 & Ch. 3, pp. 3 - 9, pp. 47 - 61, recommended reading)
    - *Demystifying Causal Inference: ingredients of a recipe* (2020) by Dayal and Murugesan (p. 1-10, supplementary reading)

- The Effect, Ch. 1 and 2 (supplementary reading)

2. Statistics review

   - Kosuke Imai, Quantitative Social Science, Ch. 3 (Bivariate relationships, pp. 104 - 113)
   - Omitted variable bias (a 2-page note, required reading)
   - Woolridge, Ch. 2 (OLS)
   - Woolridge, Ch. 3 (Multivariate regressions)
   - The Effect, Ch. 4 and 13 (supplementary reading)

3. Causal inference: Research questions and causal graphs

   - Cunningham Scott (2018) Causal Inference: The Mixed Tape. Ch: Directed Acyclic Graphs (required reading)
   - The Effect, Ch. 6 (supplementary reading)

4. Inference with Experiments (+ R session)

   - Dayal and Murugesan (2021) Experiments (p. 1 - 14, required reading)
   - Mastering 'Metrics: The Path from Cause to Effect (Ch. 1) [see readings folder in Week 1, supplementary reading]
   - The Effect, Ch. 9 (supplementary reading)

   Assignment 1 released (on the Wednesday after session 4)

5. Matching

   - Cunningham (2021) The Mixed Tape Ch. 5 - 5.1.3 on Matching (required)
   - Matching: a short note (required)
   - Mastering 'Metrics. Ch. 2 on regression (suggested reading)
   - The Effect, Ch. 13 (supplementary reading)

6. More matching techniques (+ R session)

   - Cunningham (2021) The Mixed Tape Ch. 5 on Matching (required)
   - LaLonde (1986) Evaluating the econometric evaluations of training programs with experimental data. The American Economic Review (Classic)
   - Gary King explaining Matching Methods (A guru speaks: clear as Austrian spring water / or a better metaphor here)
   - The Effect, Ch. 14 (supplementary reading)

   Assignment 2 due Friday noon after session 10

7. Review and R Session

8. Difference-in-difference (+ R session)

- Mastering 'Metrics: The Path from Cause to Effect (Ch. 5)
- Card & Krueger (1994). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania. American Economic Review 84:4, 772-793.
- The Effect, Ch. 18 (supplementary reading)

Assignment 1 due (on the Friday noon after session 6)

9. Difference-in-Differences II (+ R session)

   - Woolridge, Ch. 13 (Simple Panel data) pp. 448-463 (required, skip Chow Test)
   - Gertler et al. (2016), Impact Evaluation in Practice, Ch. 7 (required)
   - The Effect, Ch. 16 (supplementary reading)
   - Duflo, E. (2001). Schooling and labor market consequences of school construction in Indonesia: Evidence from an Unusual Policy Experiment. American Economic Review, 91(4), 795– 813

10. Panel data and Two-Way Fixed Effects

    - Woolridge, Ch. 14 (Advanced Panel data)
    - Manski, C.F. and Pepper, J.V., 2018. How do right-to-carry laws affect crime rates? Coping with ambiguity using bounded-variation assumptions. Review of Economics and Statistics, 100(2), pp.232-244. *[Supplementary reading, useful in going from incredible certitude (point estimates) to informative uncertainty (bounds) when making policy inferences]*

    Assignment 2 released (on the Wednesday after session 8)

11. Team presentations

    Applying Impact Evaluation to Policy (Group exercise)

12. **Class Test, TBA**

    - 80 minutes in-class test