

Econometrics for Behavioral Economics

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Course description

In this specialization course, we discuss study designs and econometric methods that are useful for students with an interest in behavioral economics and applied microeconometrics. Departing from a general treatment effects framework, we proceed in three parts. In the first part we will make an introduction to the potential outcomes framework. The second part will revolve around the implementation and evaluation of experiments (field/lab/lab-in-the-field experiments). We will then explore quasi-experimental methods to identify causal effects used on observational data such as regression discontinuity designs and differences-in-differences.

The aim of this class is to understand which statistical/econometric considerations should be taken into account when conducting an economic study with a field experiment or observational data. This includes choosing appropriate estimators to tackle questions in behavioral economics and more generally the question of how to evaluate societally relevant policies. Apart from providing methodological guidance to students that are starting to work on their own (behavioral) economic research, the class should enable young researchers to judge and evaluate empirical papers in behavioral economics and beyond.

Throughout the semester, the class will consist of a 90-minute lecture per week and 90 minutes of exercise sessions. During the lecture, we will cover basic econometric concepts, methods, and tools. The exercise sessions will serve as a platform for students to present and discuss homework in the form of papers, code, or econometric analysis (30 min presentation including the discussion and the Q&A). Depending on the number of participants, each student will give one or two homework presentations. Active participation in each

week's exercise sessions is an important component of the class. Towards the end of the semester, each student is expected to write a research proposal that involves discussing the concepts/ideas we have covered throughout the course.

Target Audience

Students with research interests in behavioral economics, development economics, labor economics, education economics, applied microeconometrics, experimental methods, and anyone else who is interested.

Grading

The final grade will be a weighted average of (the quality of) i) the presentations (20%+20%), ii) the research proposal (50%), and iii) regular and active participation (10%). Deadline for the research proposal submission is to be determined.

Software

In some of the exercise sessions, you will need to get your hands dirty with some data sets. Please make sure that you have a working Stata version or R or Python on your computer.

General readings

Throughout this course, you can benefit from the following material:

- Abadie, A., & Cattaneo, M. D. (2018). Econometric methods for program evaluation. *Annual Review of Economics*, 10, 465-503.
- Angrist, J. D., & Pischke, J. S. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton university press.
- Athey, S., & Imbens, G. W. (2017). The econometrics of randomized experiments. In *Handbook of economic field experiments* (Vol. 1, pp. 73-140). North-Holland.

- Athey, S., & Imbens, G. W. (2017). The state of applied econometrics: Causality and policy evaluation. *Journal of Economic Perspectives*, 31(2), 3-32.
- Cunningham, S. (2021). Causal inference. In *Causal Inference*. Yale University Press.
- Duflo, E., Glennerster, R., & Kremer, M. (2007). Using randomization in development economics research: A toolkit. *Handbook of development economics*, 4, 3895-3962.
- Imbens, G. W., & Rubin, D. B. (2015). *Causal inference in statistics, social, and biomedical sciences*. Cambridge University Press.

WEEKLY PLAN

Week 1: 04.04.2022

Lecture: Course logistics, OLS overview

Lecture: Introduction, problem of causal inference, potential outcomes framework

Week 2: 11.04.2022

Lecture: Random assignment and causality within regression framework

Exercise session:

1. What was Leamer's critique? How did the profession respond to it? Read and present the following papers:

- Leamer, E. E. (1983). Let's take the con out of econometrics. *The American Economic Review*, 73(1), 31-43.
- Angrist, Joshua D., and Jörn-Steffen Pischke. 2010. "The Credibility Revolution in Empirical Economics: How Better Research Design Is Taking the Con out of Econometrics." *Journal of Economic Perspectives*, 24 (2): 3-30.

2. Experiments or econometric evaluations? The origins of doing RCTs. Please present the following paper(s):

- LaLonde, R. J. (1986). Evaluating the econometric evaluations of training programs with experimental data. *The American Economic Review*, 604-620.

Week 3: HOLIDAY

Week 4: 25.04.2022

Lecture: Treatment assignment mechanisms, planning, power calculations (part 1)

Exercise session:

1. The case AGAINST (field) experiments. Imagine you are an advocate arguing against (field) experiments. Give a flamboyant speech and convince us of their many flaws. To prepare please read these papers by two Nobel laureates (additional papers if you wish):
 - Deaton, A., & Cartwright, N. (2018). Understanding and misunderstanding randomized controlled trials. *Social Science Medicine*, 210, 2-21.
 - Deaton, (2019). Randomization in the tropics revisited, a theme and eleven variations, working paper December 2019.
 - Heckman, J. J. (2020). Randomization and Social Policy Evaluation Revisited. IZA working paper.

2. The case FOR (field) experiments. Convince us that (field) experiments are indeed a great tool to uncover causal relationships. As an example, you may want to read the following papers:
 - Banerjee, A. V., & Duflo, E. (2009). The experimental approach to development economics. *Annu. Rev. Econ.*, 1(1), 151-178.
 - Imbens, G. W. (2010). Better LATE than nothing: Some comments on Deaton (2009) and Heckman and Urzua (2009). *Journal of Economic Literature*, 48(2), 399-423. (especially sections 3 and 4)
 - Falk, A., & Heckman, J. J. (2009). Lab experiments are a major source of knowledge in the social sciences. *Science*, 326(5952), 535-538.

Week 5: 02.05.2022

Lecture: Power calculations (part 2), preparing for practical pitfalls (noncompliance, attrition, poor data quality, data collection), pre-analysis plan, p-hacking, scientific conduct in applied economics

Exercise session:

1. What if randomization did not work. Should we re-randomize? Please summarize the evidence/arguments from:
 - Banerjee, A. V., Chassang, S., Montero, S., & Snowberg, E. (2019). A Theory of Experimenters: Robustness, Randomization, and Balance. *American Economic Review*.
2. Study and present the paper:
 - Brodeur, A., Lé, M., Sangnier, M., & Zylberberg, Y. (2016). Star wars: The empirics strike back. *American Economic Journal: Applied Economics*, 8(1), 1-32.

Week 6: 09.05.2022

Lecture: Nonparametric analysis of randomized experiments, analysis of stratified and paired randomized experiments

Exercise session:

1. Please study the following papers, take a look at online-registries (e.g. <https://www.socialscisearch.org>) and best-practice work. Then, provide us with a presentation of “how to write a pre-analysis plan”. Give an example/blueprint of a pre-analysis plan that your fellow students can use as an example for their own work:
 - Olken, B. A. (2015). Promises and perils of pre-analysis plans. *Journal of Economic Perspectives*, 29(3), 61-80.
 - Christensen, G., & Miguel, E. (2018). Transparency, reproducibility, and the credibility of economics research. *Journal of Economic Literature*, 56(3), 920-80.
 - Duflo, E., Abhijit Banerjee, Amy Finkelstein, Lawrence F. Katz, Benjamin A. Olken, Anja Sautmann (2020). In Praise of Moderation: Suggestions for the Scope and Use of Pre-Analysis Plans for RCTs in Economics, NBER Working Paper 26993.
2. Power calculation exercise in Stata/R (more details will follow):

Please provide us with a simple example of a power calculation for a fully randomized experiment. Come up with an example for a reasonable RCT you would be interested in running (with a treatment and a control group and a binary treatment). Assume you are interested in the ATET and that this can be computed using a simple comparison of means. What is a reasonable effect size (consult the literature)? Consider two scenarios (i) A scenario where you are interested in the minimum detectable effect size (MDE), (ii) A scenario where you are interested in detecting the appropriate sample size. Provide us with a “how to” guide of how to implement these power calculations. Possible extensions:

- Provide a plot of sample size for different significance levels and power values.
- How do you deal with clustering?

Week 7: 16.05.2022

Lecture: Randomization inference for average treatment effects, Quantile treatment effects, non-compliance: IV

Exercise session:

1. Study and present the following paper:

- Heß, S. (2017). Randomization inference with Stata: A guide and software. *The Stata Journal*, 17(3), 630-651.

2. Study and present the following paper:

- Bruhn, M., & McKenzie, D. (2009). In pursuit of balance: Randomization in practice in development field experiments. *American economic journal: applied economics*, 1(4), 200-232.

Week 8: 23.05.2022

Lecture: Selective attrition, weighting, multiple hypothesis testing.

Exercise session:

1. Study and present the following paper:

- Jha, S., & Shayo, M. (2019). Valuing peace: the effects of financial market exposure on votes and political attitudes. *Econometrica*, 87(5), 1561-1588.

2. Study and present the following paper:

- Alan, S., Boneva, T., & Ertac, S. (2019). Ever failed, try again, succeed better: Results from a randomized educational intervention on grit. *The Quarterly Journal of Economics*, 134(3), 1121-1162.

Week 9: 30.05.2022

Lecture: Matching

Exercise session:

1. Study and present the following paper:

- Dehejia, R. H., & Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and statistics*, 84(1), 151-161.

2. Study and present one of the following papers:

- Imai, K., Tingley, D., & Yamamoto, T. (2013). Experimental designs for identifying causal mechanisms. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 176(1), 5-51.
- Card, D., DellaVigna, S., & Malmendier, U. (2011). The role of theory in field experiments. *Journal of Economic Perspectives*, 25(3), 39-62.

Week 10: HOLIDAY

Week 11: 13.06.2022

Lecture: LATE, Traditional IV, modern IV, weak instruments

Exercise session:

1. Study and present the following paper:

- Deaton, A. S. (2009). Instruments of development: Randomization in the tropics, and the search for the elusive keys to economic development (No. w14690). National Bureau of Economic Research.

2. Study and present the following paper:

- Imbens, G. W. (2010). Better LATE than nothing: Some comments on Deaton (2009) and Heckman and Urzua (2009). *Journal of Economic literature*, 48(2), 399-423.

3. Study and present the one of the following IV papers:

- Nunn, N., & Wantchekon, L. (2011). The slave trade and the origins of mistrust in Africa. *American Economic Review*, 101(7), 3221-52.
- Manacorda, M., & Tesei, A. (2020). Liberation technology: Mobile phones and political mobilization in Africa. *Econometrica*, 88(2), 533-567.

Week 12: 20.06.2022

Lecture: Sharp RDD

Exercise session:

1. Study and present the following paper:

- Lee, D. S., & Lemieux, T. (2010). Regression discontinuity designs in economics. *Journal of economic literature*, 48(2), 281-355.

2. Study and present the following paper:

- Gelman, A., & Imbens, G. (2019). Why high-order polynomials should not be used in regression discontinuity designs. *Journal of Business Economic Statistics*, 37(3), 447-456.

Week 13: 27.06.2022

Lecture: Diff-in-Diff

Exercise session:

1. Study and present the following paper:

- De Chaisemartin, C., & D’Haultfoeuille, X. (2022). Two-way fixed effects and differences-in-differences with heterogeneous treatment effects: A survey (No. w29691). National Bureau of Economic Research.

2. Study and present one of the following Diff-in-Diff papers:

- Havnes, T., & Mogstad, M. (2011). No child left behind: Subsidized child care and children’s long-run outcomes. *American Economic Journal: Economic Policy*, 3(2), 97-129.
- Cengiz, D., Dube, A., Lindner, A., & Zipperer, B. (2019). The effect of minimum wages on low-wage jobs. *The Quarterly Journal of Economics*, 134(3), 1405-1454.

Week 14: 04.07.2022

Lecture: Synthetic Control, or How to write a referee report, or both

Exercise session:

1. Study and present one of the following Synthetic Control papers:

- Abadie, A., Diamond, A., & Hainmueller, J. (2010). Synthetic control methods for comparative case studies: Estimating the effect of California’s tobacco control program. *Journal of the American statistical Association*, 105(490), 493-505.
- Abadie, A., & Gardeazabal, J. (2003). The economic costs of conflict: A case study of the Basque Country. *American economic review*, 93(1), 113-132.

2. Study and present one of the following RDD papers:

- Fujiwara, T. (2015). Voting technology, political responsiveness, and infant health: Evidence from Brazil. *Econometrica*, 83(2), 423-464.
- Dell, M. (2010). The persistent effects of Peru’s mining mita. *Econometrica*, 78(6), 1863-1903.
- Lundqvist, H., Dahlberg, M., & Mörk, E. (2014). Stimulating local public employment: Do general grants work?. *American Economic Journal: Economic Policy*, 6(1), 167-92.

- Bleemer, Z., & Mehta, A. (2021). Will studying economics make you rich? A regression discontinuity analysis of the returns to college major. *American Economic Journal: Applied Economics*. Forthcoming.
- Dell, M., & Querubin, P. (2018). Nation building through foreign intervention: Evidence from discontinuities in military strategies. *The Quarterly Journal of Economics*, 133(2), 701-764.

Week 15: 11.07.2022

Exercise session:

1. Present the following paper:

- Imbens, G. W. (2021). Statistical significance, p-values, and the reporting of uncertainty. *Journal of Economic Perspectives*, 35(3), 157-74.

2. Present the following paper:

- Athey, S., & Imbens, G. W. (2019). Machine learning methods that economists should know about. *Annual Review of Economics*, 11, 685-725.
- Fernández-Loría, C., & Provost, F. (2022). Causal decision making and causal effect estimation are not the same... and why it matters. *INFORMS Journal on Data Science*. (ADDED ON AUG 2022)

3. We include additional papers & presentations depending on the number of course participants.