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# Microeconometrics

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## Course Objectives

This course will introduce students to modern econometric techniques that constitute an essential toolkit for an applied economist. We start with the analysis of experiments, blending old ideas with recent advances. We then discuss observational cross-sectional data, focusing on modern approaches to regression discontinuity designs, instrumental variables, and sample selection. We close with panel data, discussing recent advances in two-way methods and factor models. Time permitting, we will discuss different approaches to inference.

## Prerequisites

First-year statistical and econometric courses should be sufficient.

## Literature

### Textbooks

Lecture notes will be distributed. There is no textbook for the course but the references below can be useful:

- Econometrics textbook by Bruce Hansen (can be downloaded [here](#));
- “Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction”, by Guido W. Imbens and Donald B. Rubin;
- Stefan Wager’s lecture notes for STATS 361 (available on his website)
- “Mostly Harmless Econometrics” by Joshua D. Angrist & Jorn-Steffen Pischke;

## Papers

Lecture notes will be partially based on the papers below (the list will be updated throughout the course).

## References

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- M. Arellano and S. Bonhomme. Quantile selection models with an application to understanding changes in wage inequality. *Econometrica*, 85(1):1–28, 2017.
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- S. Athey, M. Bayati, N. Doudchenko, G. Imbens, and K. Khosravi. Matrix completion methods for causal panel data models. *arXiv preprint arXiv:1710.10251*, 2017.
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- M. Bertrand, E. Duflo, and S. Mullainathan. How much should we trust differences-in-differences estimates? *The Quarterly journal of economics*, 119(1):249–275, 2004.
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- V. Chernozhukov, W. Newey, and J. Robins. Double/de-biased machine learning using regularized riesz representers. *arXiv preprint arXiv:1802.08667*, 2018.

- M. Das, W. K. Newey, and F. Vella. Nonparametric estimation of sample selection models. *The Review of Economic Studies*, 70(1):33–58, 2003.
- D. A. Hirshberg and S. Wager. Balancing out regression error: efficient treatment effect estimation without smooth propensities. *arXiv preprint arXiv:1712.00038*, 2017.
- G. Imbens and S. Wager. Optimized regression discontinuity designs. *arXiv preprint arXiv:1705.01677*, 2017.
- S. Wager, W. Du, J. Taylor, and R. J. Tibshirani. High-dimensional regression adjustments in randomized experiments. *Proceedings of the National Academy of Sciences*, 113(45):12673–12678, 2016.