

Microeconometrics

Module 4, Academic Year 2022-2023

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Course description

In order to make strategic decisions, and policy advice people, businesses, and governments need to know how these decisions affect their utility, profits, well-being. Causal inference is what can get those insights from the data. In this course we will start with the experimental ideal (A/B testing). Since it is not always possible to actively experiment and one has to use pre-existing observational data to draw conclusions, we will look at most popular alternative strategies that allow for causal identification. The aim of the course is to help you understand modern applied econometric methods, to learn understanding and critically assessing empirical papers, and to foster the skills needed to plan and conduct your own data science projects. I will assume that you already have a sufficient knowledge of the basic econometric theory.

Course requirements, grading, and attendance policies

Evaluation:

The grade for the course will be based on home assignments (40% in total) and a final test (60%) + up to 5 bonus points for active class participation. The exam will contain questions on an empirical paper handed out in advance (see the Sample Tasks section below).

Home assignments policy:

The home assignments are to be uploaded electronically to my.nes.ru. The grades for the problem sets submitted after the deadline are discounted 10% per day (I strongly discourage submitting late since there will be a lot of work during the module and it will be hard to pick up).

Some home assignments will be individual and some – group ones. The individual assignments are to be done independently without help of any form from others. However, you are free to discuss the group assignments both within and across groups. To do the group assignments you should form a group of 4-5 people by the second week of class and send to the TA an email listing members of your group. Choose your team members carefully – you do not want to get free-riders.

Miscellaneous:

Attitude is everything. Bring a mature, professional attitude to class. Attendance on-time is proper business etiquette and being regularly late is unprofessional. Coming in late interrupts the class – respect your colleagues. Some of our session will be held online, please make sure that you turn on your camera and mute your microphone if not speaking.

Finally, I will post all the important information (including lectures and assignments) to my.nes.ru. You should be able to check it on a regular basis.

Course contents

Each topic will comprise of both lectures and interactive discussions (e.g. when a student must read a paper before class and we will talk about it in class). The reading list will be uploaded separately and updated continuously throughout the course.

The tentative list of topics for the course is the following:

1. Research design. Causality. Potential outcomes approach. Randomized Experiments. *Externalities. *Randomized inference.
AP 1, 2; MW 1, 2; CT 2, 25; W 18
2. Regression: agnostic and causal. Selection on observables. Omitted variable bias and bad controls. (Briefly:) Matching. Propensity score methods.
AP 3; MW 4, 5; CT 25; W 18
3. Measurement error in cross-section and in panel. Panel data. Fixed-effects and First-differences estimators. Fixed effects vs Random effects. *Incidental parameters problem. Difference-in-differences estimator. Non-standard standard errors.
AP 5, 8; MW 9.3; CT 16, 21, 22, 23; W 10, 15.8
4. Instrumental Variables. Heterogeneity and Local Average Treatment Effect.
AP 4; MW 7; CT 4, 25; W 5, 18
5. Regression discontinuity design. Sharp vs Fuzzy. Interpretation as IV.
AP 6; MW 9.2; CT 25.

(* if time permits)

Description of course methodology

Lectures + TA sessions

Sample tasks for course evaluation

The questions relate to the paper handed in a few days before exam:

(a) The basics:

- (i) What is the main research question in the paper? Is it important/interesting and why?
- (ii) What are the main findings of the paper?
- (iii) What is the type of data used in the paper (cross-section, time-series, panel, repeated cross-section, etc)?

(b) Consider the difference-in-differences strategy (regression specification (1) and Tables 2 and 3):

(i) Consider the DiD coefficient of 0.027*** reported in Table 2. Write down the regression specification that you could run to uncover this particular estimate.

(ii) How would the authors interpret this estimate? Is it economically large?

(iii) What is the reason for including control variables X into specification (1)?

(iv) Now consider the DiD coefficients reported in Table 3 columns 1 to 4 (0.019** to 0.009*). Why are linear and/or quadratic trends not included into these specifications?

(v) What do authors report in brackets below the coefficients?

(c) Identification assumptions of DiD:

(i) What is the identifying assumption behind this estimation strategy? How do authors corroborate this assumption?

(ii) Suppose there is an unobserved difference between the cohorts of 21 year-olds and 22 year-olds (e.g. the latter are more likely to have graduated from college than the former), and it directly affects emancipation. Would this invalidate the use of the DiD setup?

(iii) Suppose there is another government policy that coincides in time with the rental subsidy policy and applies to all individuals 22-29 years old, but is not observed by the authors. Would this affect the interpretation of the findings?

(iv) Based on the eligibility criteria reported on pages 4 and 5, what kind of placebo test one could run to rule out this concern?

Course materials

Required textbooks and materials

(AP) Angrist, J. and Pischke, J-S. "Mostly Harmless Econometrics: An Empiricist's Companion", 2009, Princeton

(MW) Morgan S. and Winship C. "Counterfactuals and Causal Inference", 2007, Cambridge University Press

(W) Wooldridge, J. "Econometric Analysis of Cross Section and Panel Data", 2002, 1e, MIT Press

(CT) Cameron, C. and Trivedi, P. "Microeconometrics: Methods and Applications", 2005, Cambridge University Press

Angrist J., Imbens G., and D.B. Rubin (1996), "Identification of Causal Effects Using Instrumental Variables," (with discussion) Journal of the American Statistical Association, 91, 444-472.

Athey S. and Imbens G. (2017), "The Econometrics of Randomized Experiments" in Handbook of Economic Field Experiments, vol.1, 73-140.

Bertrand, M., Duflo, E. and Mullainathan, S. (2004) "How Much Should We Trust Difference in Differences Estimates?" Quarterly Journal of Economics 119, 249-275.

Bowen D., L. Fresard, J. Taillard (2017), "What's your Identification Strategy? Innovation in Corporate Finance Research", Management Science 63, 2529-2548.

Imbens, G. and J. Wooldridge (2009), "Recent developments in the econometrics of program evaluation," *Journal of Economic Literature*, 47 (1), 5–86.

Imbens G., and Lemieux T. (2008), "Regression discontinuity designs: A guide to practice", *Journal of Econometrics*, 142(2), 615–635.

Imbens G. (2015), "Matching Methods in Practice: Three Examples", *Journal of Human Resources*, 50(2), 373-419.

Additional materials

Cameron, C. and Trivedi, P. "Microeconometrics Using Stata", 2009, Cambridge University Press

The reading list will be uploaded separately and updated continuously throughout the course.

Academic integrity policy

Read the NES Honor Code. You must not cheat on the problem sets and final and must report any violations to me. We may also make random copies of exams.

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.