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Office hours: by appointment
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Applied Econometrics
Sat-Mon 9:30-11:00
Class 4
Teaching Assistants:

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Course Description

The goal of this course is to prepare students for using micro-data both for micro and macro applications. I start with estimation methods such as OLS, MLE and GMM then I will cover a number of topics that are important in applied research: Logit, Probit, Hazard models, Cox model, RCTs, IV, DD, RDD, Quintile regression, Propensity Score Matching, linear panel modes and time permitting I will introduce bootstrap methods. Core methods of the course are divided into two categories: structural modeling and reduced form identification methods.

Homework is crucial part of the course for the sake of learning. This course is useless without overwhelming with micro data and real empirical questions. Therefore, for each part of the course a problem set is designed, relevant data will be provided and you are expected to use **STATA** to answer the problems. If you are not familiar with **STATA** yet, it is time to get this important task done. There will be a mandatory **STATA** workshop on the first two Wednesdays of the semester (Feb 7th and 14th).

Reading List

There is not a single textbook for this course. Bellow are the list of most relevant ones:

- Angrist, Joshua D., and Jörn-Steffen Pischke. *Mostly harmless econometrics: An empiricist's companion*. Princeton university press, 2008.
- Angrist, Joshua D., and Jörn-Steffen Pischke. *Mastering'metrics: The path from cause to effect*. Princeton University Press, 2014.
- Wooldridge, Jeffrey M. *Econometric analysis of cross section and panel data*. MIT press, 2010.
- Cameron, A. Colin, and Pravin K. Trivedi. *Microeconometrics: methods and applications*. Cambridge university press, 2005.
- Cleves, Mario. *An introduction to survival analysis using Stata*. Stata Press, 2016.

Requirement

I expect only dedicated students to register for this course as it will involve lots of empirical work. There will be at least 10 problem sets making 20% of your grade, a midterm and a final (take home) exam each worth 40% of your grade. There will be no project or term paper for this course. Midterm and final exam will be similar to the problem sets.

Registered students are expected to be familiar with basic econometrics tools such as regression, estimation, hypothesis testing, endogeneity problems and instrument variables.

Course Schedule

	Number of sessions
<u>Introduction to Estimation Methods</u>	2
• Ordinary Least Squares	.5
• Maximum Likelihood	.5
• Method of Moments and GMM	1
<u>Introduction to Structural Models</u>	13
• Discrete Choice Models:	
○ Logit, Probit, GEV	6
• Roy model and Heckman 2 step selection model	5
• Tobit and selection models	2
• Survival Analysis	
○ Hazard rate models	0
○ Censoring and Truncation	0
○ Cox Proportional Hazard Models	0
<u>Reduced Form Identification Methods</u>	17
• Linear Regression Models	.5
• Field Experiments and RCTs	1.5
• Instrument Variables	.5
• Diff in Diff	.5
• Regression Discontinuity Design	2
• Quantile Regressions	2
• Selection only on Observables: Propensity Score Matching	2
• Linear Panel Data Models	4
• Cluster Robust Standard Errors	1
• Machine Learning	2
<u>Bootstrap Methods</u>	1