The Chinese University of Hong Kong, Fall 2022

ECON 5121B: Econometric Theory and Applications

Lecture time: 08:30- 11:15, classroom: Humanities Bldg 12 (NAH 12 G/F)

Instructor:
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Teaching Assistant for tutorials:
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Teaching Mode: Lecture, in person (subject to university policy)

Lecture 1 (Sep 8) Introduction, causality

Lecture 2 (Sep 15) Linear multiple regression model, Basic asymptotic theory

Lecture 3 (Sep 22) Nonlinear models

Lecture 4 (Sep 29) Empirical case studies

Lecture 5 (Oct 6) Instrumental variable

Lecture 6 (Oct 13) Instrumental variable

Lecture 7 (Oct 20) Empirical case studies

Lecture 8 (Oct 27) Midterm exam, no lecture on this day

Lecture 9 (Nov 3) Panel data, premiere

Lecture 10 (Nov 10) Difference in difference and treatment effect

Lecture 11 (Nov 17) Synthetic control method, Discrete choice and censored regression

Lecture 12 (Nov 24) Empirical case studies

Lecture 13 (Dec 1) Final project

Final Exam: Dec 3, TBA

Topics (tentative):

This is a graduate econometrics course designed for the MSc program. Knowledge of multivariate calculus, linear algebra, mathematical statistics and econometrics/regression analysis at the undergraduate level is prerequisite. In this course you will learn basic econometric theories and practical skills to conduct empirical economic studies using real data. We will discuss the theoretical background of linear regression models, nonlinear models, panel data models, time series models and other selected topics. Students will use popular software such as R (but students can also use STATA, which is the textbook main data resource, and Matlab, Python or any other software that they would prefer) to replicate some case studies prepared by the instructor.

- Causality, randomized controlled trials
- Conditional expectation and linear projection
- Classical multiple regression model
- Least squares estimator
- Basic asymptotic theory
- Hypothesis testing and statistical inference
- Estimating systems of equations
- Endogeneity and instrumental variable
- Generalized method of moments
- Panel data models
- Difference in difference
- Synthetic matching method
- Maximum likelihood methods
- Discrete choice and censored regression
- Empirical case studies

Expected Learning Outcomes:

After finishing this course, students are expected to

1. have a comprehensive understanding of empirical econometric methods.
2. acquire sufficient knowledge to read academic papers and technical policy reports.
3. equip with programming skills in R, STATA, etc.
4. be capable of conducting empirical analysis using real data.

Recommended References:

Notice the following textbooks are not required but they are recommended for readings. For the case studies, I will send the papers and codes to the class.

Econometric Analysis of Cross Section and Panel Data, Second Edition, Jeffery M. Wooldridge, The MIT Press, 2010

Mostly Harmless Econometrics, Joshua Angrist and Jorn-Steffen Pischke, Princeton University Press, 2008

The Elements of Statistical Learning, Second Edition, Trevor Hastie, Robert Tibshirani, Jerome Friedman, Springer, 2009

Homework assignment

There will be about eight assignments (each assignment may take roughly 2-3 hours to finish) for the whole semester. In principle there will be no assignments in the exam weeks. Homework is due on class of the due date (the next lecture date) via the Blackboard. Late homework will be discounted 50%.

Tutorials:

- Tutorials will be held at XXX Bldg XXX.
- There are eight tutorials in total.
- You will receive full credit (5%) from attending ALL tutorials. Missing one tutorial will earn 4%. Missing two will earn 2%. No credits for missing more than two tutorials.

Final Project

Student can opt for final project in this class (the deadline for deciding on final project option is October 10th). If they wish to, students can form study groups of up to four people voluntarily and work on the project together. In the end of the semester, the students will present a final project which they choose (with the guidance and formal approval of the instructor). For the project, the students need to collect data by their own (more credit will be given for self-collected data and innovative topics). In the presentation, each study group has to make PPT slides and explain the economic model (if there is one), the econometric model, the empirical results (and data description) and the explanation of these results. While one group is presenting, the instructor and the rest of the class will be the 'referees' to ask questions about the project. Each group will need to submit the final term paper, PPT and replication code in the end of the semester for full evaluation of project credits.

Assessment:

- Attendance (10%, of which classroom 5%, tutorial another 5%)
- Homework Assignment (15%)
- Midterm Exam (45%): Time: 6:30-9:15 PM, Oct 27, Venue: TYW_LT
- Final Project (30%, no final exam if this is chosen)

- Final Exam (30%, if opt for no-final-project): Dec 3. Time, location **TBA**

Academic Honesty:

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at http://www.cuhk.edu.hk/policy/academichonesty/.