

The Chinese University of Hong Kong, Fall 2021
ECON5121: Econometric Theory and Applications

Lecture time B: 09:30- 12:15, Wong Foo Yuan Bldg LT4 (FYB LT4)

Lecture time C: 14:30-17:15, Wong Foo Yuan Bldg LT4 (FYB LT4)

Instructor:

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Teaching Assistant:

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Teaching Mode:

Lecture 1 (Sep 11) Introduction, causality

Lecture 2 (Sep 18) Linear multiple regression model, Basic asymptotic theory

Lecture 3 (Sep 25) Nonlinear models

Lecture 4 (Oct 2) Empirical case studies

Lecture 5 (Oct 9) Maximum likelihood estimation

Lecture 6 (Oct 16) Difference in difference and treatment effect

Lecture 7 (Oct 23) Synthetic control method

Lecture 8 (Oct 30) Midterm exam

Lecture 9 (Nov 6) Instrumental variable

Lecture 10 (Nov 13) Instrumental variable

Lecture 11 (Nov 20) Empirical case studies

Lecture 12 (Nov 27) Discrete choice and censored regression

Lecture 13 (Dec 4) Empirical case studies

Final Exam: TBC

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 nine 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 eleven 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.

Assessment:

- Attendance (classroom 5%, tutorial 5%)
- Homework Assignment (10%)
- Midterm Exam (40%):
- Final Exam (40%): time **TBC**

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/>.