ECON6120T Applied Micro-econometrics

2021/2022 Fall Semester

Department of Economics, Hong Kong University of Science and Technology

Instructor Information

Instructor	Email	Office Location & Office Hours
Kohei KAWAGUCHI (Lecturer)	kkawaguchi@ust.hk	LSK6070, appointment basis

Communication rule

- I set up a Slack workspace for communicating with students. I share the link to the workspace in the first lecture.

- I post teaching materials and communicate with students on the Slack workspace.

- Slack should be the primary way of contacting me. If you send me a message by email, I may not respond to you.

- I will be responsive during the day but will be slow in the evening and weekend.

- You can make an appointment to see me in the office or zoom.

General Information

Enrollment requirement

The prerequisite is ECON 5300 Econometrics. The students are also recommended to take ECON4274 Programming Econometrics with R.

Course objectives and intended learning outcomes

This course teaches classical and recent applied econometric methods in empirical microeconomics for Ph.D. students. The learning goal of this course is to be able to understand, design, and implement effective empirical strategies to support empirical claims, particularly causal claims, at the level required for professional researchers of empirical microeconomics. These empirical strategies include randomized experiments with and without compliance, regression discontinuity, the difference-in-difference, and recent techniques such as causal machine learning. In addition, I expect students to understand how to write code in R to perform simulation, estimation, and inference. Finally, I also expect students to learn how to read empirical microeconomics papers critically.

Teaching and leanrning activities

The course adopts the following approaches to meet the objectives:

1. Give lectures on concepts and methods, showcasing the methods with simulated and actual data.

2. Assign homework to replicate and extend analyses and read papers critically.

3. Request students to read and present related literature.

Class Time

Thu,15:00-18:50. Make sure to have lunch before the class because the school prohibits eating and drinking in the classroom.

Course Materials

I post all teaching materials on the Slack workspace.

Recommended Materials

I update the reference during the semester.

Econometrics
Randomized experiments

Guido W. Imbens and Donald B. Rubin, 2015, Causal Inference for Statistics, Social, and Biomedical Sciences, Cambridge University Press.

Athey, Susan, and Guido Imbens. 2016. "The Econometrics of Randomized Experiments." arXiv [stat.ME]. arXiv. http://arxiv.org/abs/1607.00698.

Duflo, Esther, Rachel Glennerster, and Michael Kremer. 2007. "Chapter 61 Using Randomization in Development Economics Research: A Toolkit." In Handbook of Development Economics, edited by T. Paul Schultz and John A. Strauss, 4:3895–3962. Elsevier.

Regression discontinuity

Cattaneo, Matias D., Nicolás Idrobo, and Rocío Titiunik. 2020. A Practical Introduction to Regression Discontinuity Designs: Foundations. Cambridge University Press.

Cattaneo, Matias D., Nicolas Idrobo, and Rocio Titiunik. 2020. A Practical Introduction to Regression Discontinuity Designs: Extension. Cambridge University Press.

Hahn, Jinyong, Petra Todd, and Wilbert Van der Klaauw. 2001. "Identification and Estimation of Treatment Effects with a Regression-Discontinuity Design." Econometrica: Journal of the Econometric Society 69 (1): 201–9.

Calonico, Sebastian, Matias D. Cattaneo, and Rocio Titiunik. 2014. "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs." Econometrica: Journal of the Econometric Society 82 (6): 2295–2326.

Difference-in-difference

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. 2004. "How Much Should We Trust Differences-In-Differences Estimates?" The Quarterly Journal of Economics 119 (1): 249–75.

Goodman-Bacon, Andrew. 2018. Difference-in-Differences with Variation in Treatment Timing. National Bureau of Economic Research.

Chaisemartin, Clément de, and Xavier D'Haultfœuille. 2020. "Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects." The American Economic Review, 110 (9): 2964–96.

Callaway, Brantly, and Pedro H. C. Sant'Anna. 2020. "Difference-in-Differences with Multiple Time Periods." Journal of Econometrics.

Athey, Susan, and Guido W. Imbens. 2021. "Design-Based Analysis in Difference-In-Differences Settings with Staggered Adoption." Journal of Econometrics, April.

Freyaldenhoven, Simon, Christian Hansen, and Jesse M. Shapiro. 2019. "Pre-Event Trends in the Panel Event-Study Design." The American Economic Review 109 (9): 3307–38.

Sun, Liyang, and Sarah Abraham. 2020. "Estimating Dynamic Treatment Effects in Event Studies with Heterogeneous Treatment Effects." Journal of Econometrics, December.

Chaisemartin, C. de, and X. D'HaultfŒuille. 2018. "Fuzzy Differences-in-Differences." The Review of Economic Studies 85 (2): 999–1028.n-Differences Estimates?" The Quarterly Journal of Economics 119 (1): 249–75.

Other topics

Abadie, Alberto, Alexis Diamond, and Jens Hainmueller. 2010. "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program.", Journal of the American Statistical Association.

Colin Cameron, A., and Douglas L. Miller. 2015. "A Practitioner's Guide to Cluster-Robust Inference." The Journal of Human Resources 50 (2): 317–72.

Anderson, Michael L. 2008. "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." Journal of the American Statistical Association 103 (484): 1481–95.

Young, Alwyn. 2019. "Channeling Fisher: Randomization Tests and the Statistical Insignificance of Seemingly Significant Experimental Results." The Quarterly Journal of Economics 134 (2): 557–98.

Wager, Stefan, and Susan Athey. 2018. "Estimation and Inference of Heterogeneous Treatment Effects Using Random Forests." Journal of the American Statistical Association 113 (523): 1228–42.

R

Garrett Grolemund, Hands-on Programming with R. https://rstudio-education.github.io/hopr/

Hadley Wickham and Garrett Grolemund, R for Data Science. https://r4ds.had.co.nz/

Hadley Wickham, R Packages. https://r-pkgs.org/

Required Software

R with RStudio

Evaluation

Students in Hong Kong are not allowed to attend the class online. Only students outside Hong Kong who got the approval in advance can do so. The online students have to voice up to ask questions and participate in the classroom discussion. I treat in-class and online students equally in the evaluation. Because the contribution to the classroom discussion shares a substantial portion of the evaluation, I recommend online students to do their best to actively participate in the classroom discussion.

Approximately A range for >= 90, B range for >= 80, and C range for >= 50.

1. **Assignment 70%**: I will assign at least ten homework. Students have to write the solution in Rmarkdown and submit the original Rmd file and the compiled HTML file. I share the submitted solutions with the other students for their reference.

2. **Participation 20%**: Every time you ask a question during the class, you will earn 1 point up to 20 points. To claim a point, you have to note the question and answer in the designated channel of the Slack workspace.

3. **Presentation 10%**: Each student picks up an empirical microeconomics paper published in the top 5 journals since 2010 and discusses the article in the classroom. The student summarizes the motivation, questions, and findings of the paper. Then, the student lists up the empirical claims and explains the methods the authors used to support the claims, the assumptions made for the methods, and the arguments to justify the assumptions. Finally, the student critically evaluates the authors' arguments. The time for each presentation depends on the classroom size.

Schedule

The weekly schedule is tentative and may change.

- Potential outcome: Week 1
- Assignment mechanism: Week 2
- Classical randomized experiments
    - Completely randomized experiment: Week 3
    - Stratified randomized experiment: Week 4
    - Clustered randomized experiment: Week 5
- Regular assignment mechanism
    - Without noncompliers: Week 6
    - With noncompliers: Week 7
- Regression discontinuity
    - Basics: Week 8
    - Advanced: Week 9
- Difference-in-difference
    - Basics: Week 10
    - Advanced: Week 11
- Other topics
    - Multiple testing: Week 12
    - Heterogeneous treatment effects: Week 13
- Presentations and discussions: Week 14-15

Academic Integrity

Without academic integrity, there is no serious learning. Thus, you are expected to hold the highest standard of academic integrity in the course. You are encouraged to study and do homework in groups. However, no cheating, plagiarism will be tolerated. Anyone caught cheating, plagiarism will fail the course. Please make sure adhere to the HKUST Academic Honor Code at all time (see http://www.ust.hk/vpaao/integrity/).