The Chinese University of Hong Kong Department of Economics Term 2, 2022-2023 Hongliang ZHANG hongliangzhang@cuhk.edu.hk Office hours: Mon 10:15-11:15am, ELB 1013

# ECONOMETRIC METHODS FOR POLICY EVALUATION (ECON5522)

#### Time and Venue

Tuesday 12:30-3:15pm

YIA LT3

#### Course Website

Class handouts (e.g., lecture notes, additional readings, problem sets and solutions, etc.) will be available on the Blackboard website (<u>https://blackboard.cuhk.edu.hk</u>) as the course proceeds.

#### **Course Description**

This course is an introduction to rigorous and policy-relevant impact evaluation strategies and techniques for postgraduate students in economics. The course's main emphasis is on empirical strategies to identify the causal effects of public policies and programs. The course has a strong focus on applications, although students will be expected to fully understand the conceptual underpinnings of each strategy. Topics include instrumental variables, fixed effects, differences-in-differences, experiments, and regression discontinuity design for policy evaluation.

#### **Learning Outcomes**

On completion of the course, students will:

- Understand the rationale of major program evaluation strategies.
- Understand empirical studies on policy evaluation and critically assess the validity of causal claims therein.
- Be able to determine the strengths and weaknesses of different strategies for policy evaluation.
- Be equipped to apply those strategies in a real-world setting with available data.
- Be able to use a statistical package to conduct quantitative policy analysis.

# **Required Textbooks**

Joshua D. Angrist & Jörn-Steffen Pischke (2019) Mostly Harmless Econometrics: An Empiricist's Companion, Princeton University Press.

Guido W. Imbens & Donald B. Rubin (2015) Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction, Cambridge University Press.

# **Optional Readings**

Joshua D. Angrist & Jörn-Steffen Pischke (2014) *Mastering' Metrics: The Path from Cause to Effect.* Princeton University Press.

Scott Cunningham (2021) Causal Inference: The Mixtape, Yale University Press.

(These are senior undergraduate level textbooks. They are useful self-studying materials for students who lack statistics and econometrics background.)

# **Course Evaluations:**

The final grade of the course will be calculated based on the following percentages:

- three problem sets (10% each),
- one project (30%)
- one examination (40%).

# Academic Honesty:

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

# **TENTATIVE SCHEDULE OF LECTURES**

Lecture 1 (Jan 10)	<ul> <li>Introduction</li> <li>Kleinberg, Jon, Jens Ludwig, Sendhil Mullainathan, and Ziad Obermeyer (2015) "Prediction Policy Problem," American Economic Review Papers and Proceedings, 105(5): 491-495.</li> <li>Athey, Susan and Guido Imbens (2017) "The State of Applied Econometrics: Causality and Policy Evaluation," Journal of Economic Perspectives, 31(2): 3-32.</li> <li>Imbens, Guido and Jeffrey Wooldridge (2009) "Recent Developments in the Econometrics of Program Evaluation," Journal of Economic Literature, 47(1): 5-86.</li> </ul>
Lectures 2 (Jan 17)	Rubin Causal Model Imbens & Rubin Chapter 1 Holland, Paul (1986) "Statistics and Causal Inference," <i>Journal of the American Statistical</i> <i>Association</i> , 81(396): 945-960.
<b>Lectures 3</b> (Jan 31)	Randomization and Causality Angrist & Pischke Chapter 2 Imbens & Rubin Chapter 4
Lectures 4, 5 (Feb 7, Feb 14)	Regression and Causality Angrist & Pischke Chapter 3
Lectures 6, 7 (Feb 21, Feb 28)	<ul> <li>Instrumental Variables Estimation Angrist &amp; Pischke Chapter 4 Angrist, Josh and Alan Krueger (2001) "Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiment," <i>Journal of Economic Perspectives</i>, 15(4): 69-84. </li> <li>Angrist, Josh, Guido Imbens, and Donald Rubin (1996) "Identification of Causal Effects Using Instrumental Variables," <i>Journal of the American Statistical Association</i>, 91(434): 444- 455. </li> <li>Zhang, Hongliang (2016) "Identification of Treatment Effect under Imperfect Matching with An Application to Chinese Elite Schools," <i>Journal of Public Economics</i>, 142: 56-82. </li> </ul>
Lecture 8 (Mar 7)	Exact and Propensity Score Matching Imbens & Rubin Chapter 13 Dale, Stacy and Alan Krueger (2002) "Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables," <i>Quarterly</i> <i>Journal of Economics</i> , 117(4): 1491-1527.
Lecture 9 (Mar 14)	Synthetic Control Methods 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, 105(490): 493-505.
Lecture 10 (Mar 21)	Difference-in-Differences Angrist & Pischke Chapter 5 Card, David and Alan Krueger (1994) "Minimum Wages and Employment: A Case Study of the Fast Food Industry in New Jersey and Pennsylvania," <i>American Economic Review</i> , 84(4): 772-784.
Lecture 11 (Mar 28)	<b>Two-way Fixed-effect Estimation with Heterogeneous Treatment Effects</b> De Chaisemartin, Clement and Xavier D'Haultfcoeuille (2020) "Two-way Fixed Effects Estimators with Heterogeneous Treatment Effects," <i>American Economic Review</i> , 110(9): 2964-2996.

	Callaway, Brantly and Pedro Sant'Anna (2021) "Difference-in-Differences with Multiple Time Periods," <i>Journal of Econometrics</i> , 225: 200-230.
Lecture 12 (Apr 4)	Regression Discontinuity Designs
	Lee, David and Thomas Lemieux (2010) "Regression Discontinuity Designs in Economics," Journal of Economic Perspectives, 48(2): 281-355.
Lecture 13	Prediction Policy Problem
(Apr 11)	Mullainathan, Sendhil and Jann Spiess (2017) "Machine Learning: An Applied Econometric
Last lecture	<ul> <li>Approach," Journal of Economic Perspectives, 31(2): 87-106.</li> <li>Einav, Liran, Amy Finkelstein, Sendhil Mullainathan, Ziad Obermeyer (2018) "Predictive Modeling of U.S. Health Care Spending in Late Life," Science, 360(6396): 1462-1465.</li> </ul>

Apr 25 Final Exam (Venue and Time: To be confirmed)