

Course Code: ECON 6101G
Course Title: Econometric Thinking for Business Strategists
Instructor: Dean He, Ph.D.
TA: Emily Chen
Email: deanhe@ust.hk
Office: LSK 6083A
Course Credit: 2-credit
Course Grading: Letter Grade

COURSE OVERVIEW

This course introduces the art and science of applying and understanding econometric models in the analysis of business strategy. It aims to equip business leaders and strategists to understand and interpret econometric analysis in business strategy analysis, and to provide them with an understanding of three widely used techniques in modern business econometrics: randomized control trials, regression discontinuity, and differences-in-differences.

Data analysis in economics, or “econometrics” as it is called by practitioners, has moved away from mathematical complexity and towards simpler tools that are accessible to businesses and can be applied easily to big data. After learning how these tools provide superior analytical results than traditional regression techniques in making inferences about the real world, business strategists will gain the practical knowledge to wield them successfully and make better business strategy decisions with real business data.

COURSE OBJECTIVES / LEARNING OUTCOMES

- Prepare students become skeptical about claims of cause & effect in business decision makings, make them realize when there are flaws in causal claims of business strategy and communicate specific reasons to be doubtful
- Prepare students understand why experimentation is the best method for solving the causal-inference problem in business strategy making and why randomization is key to experimentation, although it is costly and can be very unrealistic
- Prepare students understand when “natural” experiments become good substitutes and enable students be able to describe examples of successful experiments, why we feel confident in the results and the limits to what we learn from any experiment
- Prepare students able to design, pilot, and pitch your own experimental analysis with the primary focus on strategic thinking and experimental design, without going into the detailed math, spreadsheets or coding.

COURSE OUTLINE¹

Session	Date	Time	Topic	Required Readings and Notes ²
Section 1: Experimental Design				
Class 1	5/2	1:30pm to 4:50pm	<ul style="list-style-type: none"> Introduction Average Treatment Effects & Selection Bias 	<ul style="list-style-type: none"> “BEworks: Experimentation in Business” “Is Your Digital Advertising Campaign Working?” “Why Businesses Don't Experiment” “Do We Really Know What Makes Us Healthy?”
Class 2	12/2	1:30pm to 4:50pm	<ul style="list-style-type: none"> Precision and Power Randomization and Balance 	<ul style="list-style-type: none"> Running Randomized Evaluations Testing for Statistical Significance (Managerial Stats) Distribution of Problem Set 1 Pitch Idea due 15/9 by email
Section 2: Econometric Analysis and Natural Experiments				
Class 3	19/2	1:30pm to 4:50pm	<ul style="list-style-type: none"> Regression with Covariates Heterogeneous Effects 	<ul style="list-style-type: none"> HBS case: Advertising Experiments at Restaurant Grades Background on Bangladesh SC Experiment Discussion of Group Project Idea with the course instructor
Class 4	26/2	1:30pm to 4:50pm	<ul style="list-style-type: none"> Non-Compliance Placebo and Hawthorn Effects 	<ul style="list-style-type: none"> Problem Set 1 Due and Distribution of Problem 2 "Virgin Atlantic Tested 3 Ways to Change Employee Behavior"
Class 5	5/3	1:30pm to 4:50pm	<ul style="list-style-type: none"> Regression Discontinuity (RD) and its application: Uber 	<ul style="list-style-type: none"> "Using Big Data to Estimate Consumer Surplus: The Case of Uber" pp. 6-10 Problem Set 2 DUE before class
Class 6	12/3	1:30pm to 4:50pm	<ul style="list-style-type: none"> Difference-in-Difference (DID) and its application: Bargaining at Ebay 	<ul style="list-style-type: none"> Pitch Idea due Bargaining at Ebay Return of Problem Set 1
Class 7	19/3	1:30pm to 4:50pm	<ul style="list-style-type: none"> Sample Attrition 	<ul style="list-style-type: none"> "Does Working From Home Work?" (pp 176 - 183) Group Project Due
Class 8	26/3	1:30pm to 4:50pm	<ul style="list-style-type: none"> Group Presentation 	

¹ The course outline is subject to change until its final version before the launch of the class

² Note that the case readings are subject to change until its final version before the launch of the class

GRADING / ASSESSMENT

Assessment Method	Description	Weight	Additional Note
Class Participation	In-class discussions are an integral part of the course, and students are expected to contribute to the learning experience of the class by asking relevant questions, offering insights into the topic at hand, and generally behaving in a professional manner. Quality of contribution matters more than quantity. Class participation scores will also account for attendance and lateness	25%	The attendance requirement by HKUST MS program is that 1) absent for 25% of a course, 2 out of 8 classes, 1/3 grade deduction will be given (i.e., A- to B+); 2) absent for more than 25% of a course, an “F” grade will be given. Class Participation is graded at the individual level.
Problem Sets	There will be TWO problem sets for the course. the first one covering experimental methods and the second one covering analysis of natural experiments. They are written up and turned in as groups, but each group member shall contribute individually.	25%	
Group Project and Presentation	Students will work in teams (of 3-4 people) to develop a causal question related to a real business strategy, design a randomized experiment to test their question, run a pilot study to inform their design, and “pitch” a proposed design and implementation strategy (directed to the key decision maker in the company) during Class 8 (Presentation).	50%	Each group must submit an experimental idea (10% of project grade). Then each group must meet with course instructors to present an initial design plan and a revised version (10% of the project grade), pitch the idea (presentation) at a full-class session during Class 8 (20% of the project grade) and submit a written version of this pitch (60% of the project grade). All these elements are graded at the group level, except that presentation is graded at the individual level.

COURSE MATERIALS

(A) REQUIRED READING

- Thomke, S. H. (2020). *Experimentation works: The surprising power of business experiments*. Harvard Business Press.
- Huntington-Klein, N. (2021). *The effect: An introduction to research design and causality*. CRC Press. <https://theeffectbook.net/index.html>

(B) OPTIONAL READING

- Angrist, J. D., & Pischke, J. (2014). *Mastering 'Metrics: The path from cause to effect*. Princeton University Press.
- Cunningham, S. (2021). *Causal inference: The Mixtape*. Yale University Press.