

Course Code: ECON 6110X

Course Title: Econometrics in Business: Strategy and Decision Making

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Course Credit: 2-credit

Course Grading: Letter Grade

COURSE OVERVIEW

In making business decisions, managers often need to understand how their strategic and tactical decisions (e.g., change of price) can casually affect outcomes of interest (e.g., revenues). Understanding the difference between correlation and causation is critical for making data-driven decisions in business strategy and decision making. The course provides a rigorous introduction to causal inference and applied econometrics, with a focus on intuition and application, in order to meet the business practitioners' needs for strategy and decision making in business.

The course is ideal for professionals and students in business, economics, sociology, political science, and related fields who seek to apply econometric methods to real-world challenges. Through a combination of theory and hands-on exercises, students will learn to apply causal inference techniques and models to real-world problems. More specifically, students will gain hands-on experience with the following techniques and concepts:

- Directed Acyclic Graphs (DAGs)
- Potential Outcome Framework
- Fixed Effects
- Regression Discontinuity Design (RDD)
- Instrumental Variables (IV)
- Panel Data and Difference-in-Differences (DiD)

Students does not need to develop practical skills in the use of statistical programming languages, such as Stata, R, or Python, to apply these methods directly to data. The focus is on understanding how it works, the intuition and application. Therefore, the teaching and learning of working knowledge of one of these statistical languages will be not be developed throughout the course. Students can choose to learn themselves, to prepare for future applications of the concepts and techniques to real-world data analysis tasks.

COURSE OBJECTIVES / LEARNING OUTCOMES

Upon successful completion of the course, students should be able to:

- Understand the motivations for causal reasoning in business strategy and decision making
- Formulate a problem in a business causal framework
- Estimate a causal effect in a variety of business contexts (hypotheses and inference)
- Evaluate the robustness and validity of the obtained conclusions.

COURSE MATERIALS

- Huntington-Klein, N. (2021). *The effect: An introduction to research design and causality*. CRC Press. <https://theeffectbook.net/index.html> **[REQUIRED]**
- Hernán MA, Robins JM (2020). *Causal Inference: What If*. Boca Raton: Chapman & Hall/CRC **[Recommended]**
- Angrist, J. D., & Pischke, J. (2014). *Mastering 'Metrics: The path from cause to effect*. Princeton University Press. **[Recommended]**
- Cunningham, S. (2021). *Causal inference: The Mixtape*. Yale University Press. **[Recommended]**

EVALUATION

Assessment Methods	Brief Description
1. Class Participation and Readings (20%)	Courses will be offered face to face, and no recording will be arranged. You should come to each class. The TA will take attendance before lecture starting, and record the engagement. Students are expected to have completed the required readings before coming to class, to contribute to these discussions.
2. Two Problem Sets (40%)	Students are required to form groups of four and work on two assignments throughout the semester.
3. In Class Quiz (teamwork) (20%)	A working group of two students work together on an in-class quiz and have one shared grade.
4. Group Presentation of an Empirical Paper (20%)	We intend to have an active discussion of research papers and develop students' presentation skills. Students are required to form groups of four and take turns in presenting the assigned research papers. Each group will present one paper from the reading list below. The target length of presentation is 10 mins. The structure of presentation should at least include: <ul style="list-style-type: none">• Research questions• Literature reviews• Contributions• Research design/Methodology (***)• Empirical results• Conclusion: any surprise? What do you learn from the paper?

COURSE OUTLINE

Session	Date	Time	Topic	Required Readings
Class #1	5/2	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Describing Data • Describing Relationships 	<ul style="list-style-type: none"> • The Effect Chapter 3 and 4
Class #2	6/2	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Causality and Identification • Causal Diagram 	<ul style="list-style-type: none"> • The Effect Chapter 5 and 6 and 7
Class #3	12/2	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Back Door • Front Door 	<ul style="list-style-type: none"> • The Effect Chapter 8 and 9 • Distribution of Problem Set #1 • Formulation of Groups
Class #4	13/2	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Treatment Effect • Regression 	<ul style="list-style-type: none"> • The Effect Chapter 10/13/16 • Group Research Paper Sign-Up
Class #5	19/2	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Fixed Effect I 	<ul style="list-style-type: none"> • The Effect Chapter 16 • Group Research Paper Discussion with Professor He
Class #6	20/2	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Fixed Effect II 	<ul style="list-style-type: none"> • The Effect Chapter 18
Class #7	26/2	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Difference-in-Difference I 	<ul style="list-style-type: none"> • The Effect Chapter 16 • Problem Set #1 DUE • Distribution of Problem Set #2
Class #8	27/2	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Difference-in-Difference II 	<ul style="list-style-type: none"> • The Effect Chapter 18 •
Class #9	5/3	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Regression Discontinuity I 	<ul style="list-style-type: none"> • The Effect Chapter 19
Class #10	6/3	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Regression Discontinuity II 	<ul style="list-style-type: none"> • The Effect Chapter 19 •
Class #11	12/3	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Instrumental Variable I 	<ul style="list-style-type: none"> • The Effect Chapter 20 •
Class #12	13/3	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Instrumental Variable II • In-Class Quiz 	<ul style="list-style-type: none"> • Problem Set #2 DUE
Class #13	19/3	6:00 pm to 8:50pm	<ul style="list-style-type: none"> • Class Presentations 	<ul style="list-style-type: none"> • Final Presentation Slides Due

PAPERS FOR GROUP PRESENTATIONS

Topic I: Causal Inference, Randomized Trial and (Semi-)Natural Experiment

Bursztyn, Leonardo, Thomas Fujiwara, and Amanda Pallais. 2017. “‘Acting Wife’: Marriage Market Incentives and Labor Market Investments.” *American Economic Review* 107(11): 3288-3319. (*)

Chodorow-Reich, Gabriel, Gita Gopinath, Prachi Mishra, and Abhinav Narayanan. 2019. “Cash and the Economy: Evidence from India’s Demonetization.” *Quarterly Journal of Economics* 135(1): 57-103.

Cai, Jing, and Adam Szeidl. 2018. “Interfirm Relations and Business Performance.” *Quarterly Journal of Economics* 133(3): 1229-1282.

Durante, Ruben, Paolo Pinotti, and Andrea Tesei. 2019. “The Political Legacy of Entertainment TV.” *American Economic Review* 109(7): 2497-2530.

Topic II: IV/2SLS

Acemoglu, Daron, Simon Johnson, and James Robinson. 2001. “Colonial Origins of Comparative Development: An Empirical Investigation.” *American Economic Review* 91(5): 1369-1401.

Pascali, Luigi. 2016. “The Wind of Change: Maritime Technology, Trade and Economic Development.” *American Economic Review* 107(9): 2821-2854.

Allcott, Hunt, Luca Braghieri, Sarah Eichmeyer, and Matthew Gentzkow. 2020. “The Welfare Effects of Social Media.” *American Economic Review* 110(3): 629-676.

Topic III: Fixed Effects

Bertrand, Marianne, and Antoinette Schoar. 2003. “Managing with Style: The Effect of Managers on Firm Policies.” *Quarterly Journal of Economics* 118(4): 1169-1208. (#)

Agarwal, Sumit, David Lucca, Amit Seru, and Francesco Trebbi. 2014. “Inconsistent Regulators: Evidence from Banking.” *Quarterly Journal of Economics* 129(2): 889-938.

Storeygard, Adam. 2016. “Farther on Down the Road: Transport Costs, Trade and Urban Growth in Sub-Saharan Africa.” *Review of Economic Studies* 83: 1263-1295

Topic IV: Differences-in-Differences

Bertrand, Marianne, Esther Duflo and Sendhil Mullainathan. 2004. “How Much Should We Trust Differences-in-Differences Estimates?” *Quarterly Journal of Economics* 119(1): 249-275.

Giroud, Xavier. 2013. “Proximity and Investment: Evidence From Plant-Level Data.” *Quarterly Journal of Economics* 128(2): 861-915.

Greenstone, Michael, Richard Hornbeck, and Enrico Moretti. 2010. “Identifying Agglomeration Spillovers: Evidence from Winners and Losers of Large Plant Openings” *Journal of Political Economy* 118(3): 536-598.

Patrick, Kline, Neviana Petkova, Heidi Williams, and Owen Zidar. 2019. "Who Profits From Patents? Rent-Sharing at Innovative Firms." *Quarterly Journal of Economics* 134(3): 1343-1404.

Topic V: Regression Discontinuity

Lee, David S., Thomas Lemieux. 2010. "Regression Discontinuity Designs in Economics." *Journal of Economic Literature* 48(2): 281-355.

Campante, Filipe, and David Yanagizawa-Drott. 2017. "Long-Range Growth: Economic Development in the Global Network of Air Links." *Quarterly Journal of Economics* 133(3):1395-1458.

Asher, Sam, and Paul Novosad. 2020. "Rural Roads and Local Economic Development." *American Economic Review* 110(3):797-823.