Welcome to Economic Inference from Data!

In this section of the quantitative methods sequence, you will learn the tools economists use to identify causal relationships and test hypotheses *in the wild*. This material is the bridge between theory and estimation. When properly applied to the right dataset, approaches such as instrumental variables, differences-in-differences or regression discontinuity can allow us to test a hypothesis and make causal claims about the relationship between variables. The curriculum for this course will cover the main estimation strategies used today in empirical economics.

In addition to the official curriculum, there is an equally important hidden curriculum that will primarily be learned through individual and group homework assignments. This hidden curriculum involves acquiring the coding and work flow skills necessary to conduct causal analysis whether you are working solo or as a team. This will primarily involve learning how to work in R, using GitHub and learning how to present your findings clearly and effectively.

If you exceptionally cannot attend class in person, inform me in advance and you may attend remotely:
Lecture: https://pitt.zoom.us/j/98028471993
Meeting ID: 98028471993
Passcode: mqe

Contact:

Claire Duquennois: Posvar 4912 E-mail: ced87@pitt.edu
Drop-in group office hours (for questions about course materials): Tuesday from 2:30-4:30pm.
Personal advising/discussion): Sign up on here https://sites.google.com/view/claireduquennois/teaching.

Reference Texts:

- Angrist, Joshua D and Pischke, J. *Mostly Harmless Econometrics.* Princeton University Press, 2008.

- Cunningham, Scott. *Causal Inference: The Mixtape.* Available online: www.scunning.com.

- Wooldridge, Jeffery. Introductory Econometrics: A modern Approach. (Any edition).

Supplemental readings will be assigned each week and are listed in the schedule below. Readings can be found on the course webpage.

Course Requirements:

This course will move quickly through a significant amount of material. In addition to lectures, you will need to spend a substantial amount of time outside of the classroom on individual and group homework assignment and readings. I expect you to come to class having done the work necessary to actively participate in scheduled class activities.

Each module covered will typically be introduced on Tuesday and related readings will be discussed on Thursday. The module's homework assignment will be due on the following Monday followed by a discussion of the assignment on Tuesday before moving on to the next module.

Grades in the course will be determined as follows:
Participation and class discussions: **10 %** =10 x 1 % each (3 discussion grades dropped)
Homework assignments: **55%** = 5 x 10%+1 x 5% (Best 5 count for 10% each, lowest only counts for 5%)

Midterm Quiz: **10%**
Final Exam: **25%**
Visuals Extra Credit: 1% per win

There is no fixed curve for this course dictating what share of students will receive what letter grade. It is theoretically possible for everyone to receive an A or everyone to receive a B. There is no preset or common scale whereby a certain number of points corresponds to a certain letter grade.

Class Discussions and Visuals Extra Credit:

Lectures will be broken up with time set aside each week for two discussion activities:

On Mondays (generally): Time will be set aside to discuss the module's readings. How to prepare for the discussion? A module's reading list will typically be composed of readings that explain the research design covered in the textbooks. These are reference reading to be read as needed. In addition the reading list will include several academic articles that employ or discuss the research design being studied. Discussions will typically focus on how the authors of the journal articles use the module's research design to answer the research question. Your reading of the articles should focus on answering the following questions unless other questions are specified:

1) What is the research question?
2) What research design(s) do the authors use to answer the research question?
3) Why do they choose this (these) research design(s)?
4) What are the key elements of the research design that is used in the article? In which tables/visuals are these elements displayed?
5) Do the authors face any important identifications challenges? What do they do to address these?
6) Are you convinced that the effects identified are causal? Why, why not?

During the discussion, small groups will be assigned in which you will synthesis your answers and communicate them with the entire class.

On Thursdays (generally): Time will be set aside to discuss one of the elements submitted on the homework assignments. The element could be a formatted table or a data visualization that was submitted. When I receive homework assignments, I will collect and anonimyze the particular element and we will discuss and review the submissions as a group. We will also vote on our preferred submission and the winner(s) will receive extra credit on their assignment.

If you do not want your individual submission to be discussed, even anonymously, please let me know, though I would encourage you to participate as you will receive good feedback on how to improve your presentation of data.

Homework Assignments:

Each module will be accompanied by a homework assignment. Homework assignments are designed to teach you the hidden curriculum. This is where you will practice working with data using R, Rmarkdown and GitHub.
Some of these assignments will be group assignments while others will be individual assignments. While you may seek assistance from your peers when stuck, submitted assignments may not be identical to each other and must be primarily the result of your group, or individual, efforts. Identical assignments will receive 0 grades.

All individuals must contribute to group assignments. Individual contributions will be checked on GitHub. Individuals who did not make significant contributions to the group assignment as recorded on GitHub will receive a lower grade then their group's grade.

Late Policy: Problem Sets must be submitted as directed on the problem set by the indicated due **date and time**. 2 points will be deducted for each day late. Late problem sets will not be eligible to receive extra credit or be discussed in the group discussion.

Regrade Policy: If you believe a **substantial** mistake was made in the grading process (i.e. an entire page was missed), please submit a regrade request via gradescope within a week of having received the graded assignment. Please refrain from requesting regrades for minor point deductions that will not impact your final grade. Remember, if the marginal benefit is 0 because it does not change your

final grade, while the marginal cost is my time and mental bandwith, a regrade request is not worth it. Of course, if you are struggling to understand why you may have made a mistake, you are welcome to come to office hours.

Midterm Quiz and Final Exam: Exact instructions are TBD. The quizz and exam will test your conceptual understanding of the course material. They will be written, timed, "traditional", exams that do not involve writing code (though you may be asked to interpret it).

COVID-19 Accommodations:

During this pandemic, it is extremely important that you abide by the public health regulations, the University of Pittsburgh's health standards and guidelines, and Pitt's Health Rules. These rules have been developed to protect the health and safety of all of us. Universal face covering is required in all classrooms and in every building on campus, without exceptions, regardless of vaccination status. This means you must wear a face covering that properly covers your nose and mouth when you are in the classroom. If you do not comply, you will be asked to leave class. It is your responsibility have the required face covering when entering a university building or classroom. For the most up-to-date information and guidance, please visit coronavirus.pitt.edu and check your Pitt email for updates before each class.

If you are required to isolate or quarantine, become sick, or are unable to come to class, contact me as soon as possible to discuss arrangements.

Course Schedule:

Thursday Oct 21th: Course Introduction and Omitted Variable Bias
Readings for Discussion:

- Spriggs, William. "Is now a teachable moment for economists?"

Monday Oct 25th: Omitted Variable Bias and Fixed Effects
Readings for Discussion:

- Washington, Ebonya L. "Female socialization: how daughters affect their legislator fathers." American Economic Review 98.1 (2008): 311-32.
- Arceneaux, Kevin, Alan S. Gerber, and Donald P. Green. "Comparing experimental and matching methods using a large-scale voter mobilization experiment." Political Analysis (2006): 37-62.

Wednesday Oct 27th 5pm: <u>Homework 1: Getting started</u> **Due**

Thursday Oct 28th: Fixed Effects

Monday Nov 1st: Fixed Effects and Instrumental Variables
Readings for Discussion:

- Ananat, Elizabeth Oltmans. "The wrong side (s) of the tracks: The causal effects of racial segregation on urban poverty and inequality." American economic journal: applied economics 3.2 (2011): 34-66.
- Aizer, Anna, and Joseph J. Doyle Jr. "Juvenile incarceration, human capital, and future crime: Evidence from randomly assigned judges." The Quarterly Journal of Economics 130.2 (2015): 759-803.

Wednesday Nov 3rd 5pm: <u>Homework 2: Omitted Variable Bias and Fixed Effects</u> **Due**

Thursday Nov 4th: Instrumental Variables

Monday Nov 8th: Instrumental Variables and Randomized Control Trials

Readings for Discussion:

- Bryan, Gharad, Shyamal Chowdhury, and Ahmed Mushfiq Mobarak. "Underinvestment in a profitable technology: The case of seasonal migration in Bangladesh." Econometrica 82.5 (2014): 1671-1748.
- Bryan, Kevin "What randomisation can and cannot do: The 2019 Nobel Prize." https://voxeu.org/article/what-randomisation-can-and-cannot-do-2019-nobel-prize
- Piper, Kelsey"A charity just admitted that its program wasn't working.That's a big deal." https://www.vox.com/2 charity-randomized-controlled-trial-evidence-action
- Look at the other articles and work related to this project: https://faculty.som.yale.edu/mushfiqmobarak/the-effect-of-seasonal-migration-on-households-during-food-shortages-in-bangladesh/

Wednesday Nov 10th 5pm: <u>Homework 3: Instrumental Variables</u> Due

Thursday Nov 11th: Randomized Control Trials

Monday Nov 15th: <u>30 min Midterm Quiz</u> and Difference-in-Differences

Thursday Nov 18th: Difference-in-Differences
Readings for Discussion:

- Davis, Lucas W. "The effect of health risk on housing values: Evidence from a cancer cluster." American Economic Review 94.5 (2004): 1693-1704.
- Duflo, Esther. "Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment." American economic review 91.4 (2001): 795-813.

Monday Nov 22nd 11pm: <u>Homework 4: Randomized Control Trials</u> Due

Monday Nov 29th: Regression Discontinuities
Readings for Discussion:

- Manacorda, Marco, Edward Miguel, and Andrea Vigorito. "Government transfers and political support." American Economic Journal: Applied Economics 3.3 (2011): 1-28.
- Lucas, Adrienne M., and Isaac M. Mbiti. "Effects of school quality on student achievement: Discontinuity evidence from Kenya." American Economic Journal: Applied Economics 6.3 (2014): 234-63.

Wednesday Dec 1st 5pm: <u>Homework 5: Differences-in-Differences</u> Due

Thursday Dec 2nd: Regression Discontinuities

Monday Dec 6th: Extra Stuff: Non-standard standard errors and power calculations

Wednesday Dec 8th 5pm: <u>Homework 6: Regression Discontinuities</u> Due

Thursday Dec 9th: Catch up and review

Monday Dec 13th: Final Exam

Special Accommodations:

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347, as early as possible in the term. DRS will verify your

disability and determine reasonable accommodations for this course.

Academic Honesty:

As a University of Pittsburgh student, you have agreed to abide by the University's academic integrity code. Take time to read the information on "Academic Integrity" and be sure that you understand your responsibilities under the guidelines set out for The Dietrich School of Arts and Sciences, which are spelled out in full at (https://www.as.pitt.edu/faculty/policies-and-procedures/academic-integrity-code). All graded work submitted in this course should be representative of your, or your groups, efforts, according to the directions specified for the assignment. Any use of unauthorized assistance, or providing unauthorized assistance will affect your performance in this course and further disciplinary action.