THE UNIVERSITY OF CHICAGO
HARRIS SCHOOL OF PUBLIC POLICY

Applied Econometrics
Dr. Christopher Clapp
Syllabus, Fall 2023

Class
Meetings: 4:00pm-7:00pm AST
(8:00am-11:00am CDT)

Location: Zoom

Professor:
Chris Clapp (he/him)
Office Hours: by appointment

Email: cclapp@uchicago.edu
Location: Zoom

TAs:
Brian Curran (he/him)
Kisoo Kim (he/him)
Office Hours: 12:00pm-1:00pm
AST (4:00am-5:00am CDT)

Email: bcurran@uchicago.edu
Email: kisoo@uchicago.edu
Location: Zoom

Course Description

How do we know whether a policy or program delivers its promised results or falls short? If it delivers, how do we know whether it was by chance or a true result that would replicate in a similar setting? If it is a true result, will it scale if implemented more broadly? This class will teach you the tools that economists and other social scientists use to determine the causal effects of different interventions and make more informed decisions.

Learning Goals: "What's My Incentive for Taking This Course?"

Specifically, the purpose of the course is to introduce you to how econometric techniques are actually used and applied to inform policy-relevant issues, as well as to provide an overview of current issues and methods. The course is designed to make you good *consumers* of these techniques. This will allow you to use the results from applied analyses, select contractors to carry them out, and/or supervise the work of others. It may also springboard on your way to being a *producer* of clever evaluations that inform better policy and make the world a better place.

You'll also benefit from an increased understanding of how we use data and statistics to understand what's going on around us. Why does this matter? As journalist Clive Thompson once stated, "We live in a world where the thorniest policy issues increasingly boil down to arguments over what the data mean. If you don't understand statistics, you don't know what's going on - and you can't tell when you're being lied to."

Along the way you can expect to:

- Understand what to evaluate and why we should care about the impacts of interventions.
- Appreciate why the counterfactual outcomes problem makes program evaluation inherently difficult.
- Learn techniques designed to address that problem and inform the effects of different interventions.

- Recognize the limits of the tools covered, specifically, when they can and cannot be used to produce meaningful information.
- Gain fluency in the lingo of program evaluations and practice being critical, but not pessimistic, readers of actual program evaluations.
- Become comfortable using the results of program evaluations to inform decisions and make the world a better place!

Instruction, Assignments, and Evaluation: "How Will This Class Work?"

Instruction First, let me provide a quick overview of the structure of the class. Think of each class as being divided into two parts: theory and practice. For the theory component, I will introduce and explain the theoretical underpinnings of different program evaluation techniques. For the practice component, students will read papers that use the given technique, submit presentation slides that summarize how the papers applied the technique, and participate in a class discussion of those readings.

Presentation Slides The structure of the class requires active, attentive, inquisitive participation in class discussions.[1] As such, you are expected to have read and thought about the assigned paper(s) in advance of class. To help you with this, each class, you will submit presentation slides that you could use to present how the papers you read applied the given program evaluation technique.[2] Guidelines for how to prepare these presentations are included at the end of this syllabus. You should upload your presentations via the Gradescope application on Canvas before the start of class on the day they are due. Your presentations will be graded, and the lowest grades will be dropped.[3] You should form study groups of three students to discuss the readings with each other and create slides together. To ease TA grading responsibilities and ensure prompt feedback on assignments, you should submit one PDF of slides for your group, but everyone is expected to actively contribute to all parts of the slides.[4]

Evaluation Your final grade in this course will be determined by the quality of the presentation slides you submit. Given the fast-paced nature of this class, we will count the best four grades out of the seven presentation slide assignments you will submit.

Presentation Slides (4 of 7) 100%

Materials

Optional: *Mastering 'Metrics: The Path from Cause to Effect*, 1st Edition, by Joshua D. Angrist and Jörn-Steffen Pischke (ISBN-10: 0691152845)

- This book covers applied econometrics topics in a very accessible way and may be a useful supplement to the material I present in class, but it is not required.

[1] While class participation will not be explicitly graded, I reserve the right to amend this policy if there is not sufficient engagement with the class. I do not expect this to be a problem with DSC students!

[2] You will not be expected to present your slides. Due to time constraints, we will have a group discussion instead.

[3] You should create a PDF of your slides for submission.

[4] In order to facilitate grading of the slides, please be sure to include the names of the students in your group on your slide deck and add all group members to your submission via Gradescope's "Group Members" option.

- *Mostly Harmless Econometrics* is a more advanced text by the same authors that may be a useful companion.

In addition, we will read academic articles that are posted on Canvas.

~~Office~~ Student Hours

Office hours for this class are listed on the first page of the syllabus. The intent of office hours is part of the "hidden curriculum" for some students, so I want to clarify my expectations about how students should view and approach office hours. Those hours are for you, so please make use of them! You do not need to make an appointment to see the TAs during my office hours; just drop by (be it with questions about course material or readings, for a more detailed explanation of grading, or just to chat). The TAs will be available during those times.

Please make your best effort to attend during the posted times, but if you want to talk with me one-on-one, you are welcome to make an appointment for another time. The time difference makes finding times to meet difficult, but I am happy to meet with students outside of office hours. You can also use the Ed Discussion discussion board (available via Canvas) to post questions, answer classmate questions, and discuss the material covered in the lectures/readings. Again, the time difference may result in a delay in responses, but we will do our best to monitor the board and respond to questions promptly.

Course Policies

General

- There is no attendance requirement, but my expectation is that students will attend all classes. Regular attendance is necessary (but not sufficient!) to do well in the class.
- The class webpage is available through the Canvas portal. I will use it to post announcements, recorded lectures, assignments, and grades. Please check it regularly.
- Email is inefficient. If you have a question about the class or the material, others probably do too! Questions and answers (knowledge) are public goods, so post your question to the discussion board, and feel free to answer questions your classmates ask. We'll monitor and respond as well.

Assignments

- The goal of the assignments in this course is not just to demonstrate that you have read the articles, but to help you develop an understanding of complex concepts and associated critical thinking skills that can only come from grappling with the material (both alone and in discussion with peers). Because the use of artificial intelligence (AI) tools such as large language models (LLMs) inhibit the development of these skills, students are not allowed to use any AI-powered program, plugin, chatbox, or any similar tool (e.g., ChatGPT) to complete assignments in this course. Any submission found to be in violation of the policy will be reported and students will receive an automatic zero. If you are unclear if something is an AI tool, please check with us.

- We discuss the content of the slide decks in class, so no late assignments will be accepted for any reason, valid or otherwise.[5] Not turning in an assignment, handing it in late, or failing to turn it in before the link expires will result in a grade of zero. I understand that students sometimes have legitimate reasons for being unable to complete assignments on time or give their full effort, and this concern is magnified in a class with daily assignments. Dropping the lowest assignment grades is intended to cover ordinary illness and other emergencies.

Academic Integrity[6]

As a member of the Student Government Judicial Branch as an undergraduate and a graduate student at a university where any non-trivial act of lying, cheating or stealing resulted in expulsion, I take the Harris Academic Honesty and Plagiarism Policies (https://harris.uchicago.edu/student-life/dean-of-students-office/policies) very seriously. Among other things, this means that students shall not represent another's work or ideas as their own. If we find that you violate this policy, at a minimum, you will receive a zero on the assignment in question. A second infraction will result in a failing course grade. Here are specific expectations:

- For assignments, you may (and should!) work with other students, but it is expected that you will collaborate on all parts of the assignment (as opposed to the "divide and conquer" method).
- During the entire semester, it is expected that you will not access old problem sets, slides, exams, answer keys, student presentations, or any other class material at any time. Note that this applies both to class material obtained from other students and to material from websites that post solutions under the guise of tutoring. (These sites both facilitate cheating and steal the intellectual property of the author.)
- During the entire semester and thereafter, it is expected that you will neither post any class material on the internet nor share any class materials with other students through any other means. Furthermore, if you become aware that this has occurred, you are obligated to let me know immediately.

Syllabus Change Policy

Except for changes that substantially negatively affect students in the implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

Course Outline

The daily coverage might change as it depends on the progress of the class. "PS" is an abbreviation for "Presentation Slides."

[5] Additionally, because students from advantaged social backgrounds are more likely to request extensions, granting them on an individual basis is likely to increase educational inequality.

[6] I apologize for the heavy handed tone of this section. It is intended to protect the many honest students who take my class and academic integrity as a whole.

Course Schedule			
Day	**Practice**	**Theory**	**Due**
1	Introduction	"Review" of Probability and Statistics	
2	Counterfactual Outcomes & Single-Dif. Est.	Treatment Parameters	
3	Single-Difference Estimators	"Review" of Regression & External Validity	PS 1
4	External Validity	Experiments	
5	Experiments	Instrumental Variables (IVs)	PS 2
6	IVs	Regression Discontinuity (RD)	PS 3
7	RD	Difference-in-Differences (DD)	PS 4
8	DD	Triple-Differences (DDD)	PS 5
9	DDD	Staggered DD	PS 6
10	Staggered DD	Class Review	PS 7

Notes: The "review" may contain some previously covered material and some new material. Consider it a "review/reference."

No slides are due for external validity due to the nature of the reading and to allow time for feedback on PS 1 before PS 2.

Readings

The following lists the readings that correspond to each section of the course. Aside from those from the Angrist and Pischke (2015) textbook, all readings will be posted on Canvas. The Angrist and Pischke (2015) readings are optional and are listed only for those looking to supplement the information in the lectures. Additional supplemental readings (that are not required) will be noted in the slides for those interested in further exploration of the topic.

- Day 1 - Introduction and "Review" of Probability, Statistics, & Regression
  - Practice: No reading required
  - Theory: Angrist and Pischke (2015), Appendix to Chapter 1 and Chapter 2
- Day 2 - Counterfactual Outcomes and Single-Difference Estimators & Treatment Parameters
  - Practice: Angrist and Pischke (2015), Chapter 1, pages 1-17
  - Theory: No reading required
- Day 3 - Single-Difference Estimators & External Validity
  - Practice: the Executive Summary (pages 2-8) of MVP (2010) and (all of) Pronyk et al. (2012)
  - Theory: No reading required
- Day 4 - External Validity & Experiments
  - Practice: List (2020)
  - Theory: Angrist and Pischke (2015), Chapter 1, pages 18-33
- Day 5 - Experiments & IVs
  - Practice: Samek and Longfield (2023)
  - Theory: Angrist and Pischke (2015), Chapter 3
- Day 6 - IVs & RD Designs

  - Practice: Chetty et al. (2016)
  - Theory: Angrist and Pischke (2015), Chapter 4
- Day 7 - RD Designs & DD
  - Practice: Barr et al. (2022)
  - Theory: Angrist and Pischke (2015), Chapter 5, Section 5.1 & Appendix
- Day 8 - DD & DDD
  - Practice: Homonoff et al. (2022)
  - Theory: Angrist and Pischke (2015), Chapter 5, Section 5.2
- Day 9 - DDD & Staggered DD
  - Practice: Chetty et al. (2009), Sections I, II & VI (skim "Placebo and Permutation Tests" in Section II & all of Section III)
  - Theory: No reading required
- Day 10 - Staggered DD & Class Review
  - Practice: Deshpande and Li (2019)
  - Theory: No reading required

References

Barr, Andrew, Jonathan Eggleston, and Alexander A. Smith, "Investing in Infants: the Lasting Effects of Cash Transfers to New Families," *The Quarterly Journal of Economics*, 04 2022, *137* (4), 2539–2583.

Chetty, Raj, Adam Looney, and Kory Kroft, "Salience and Taxation: Theory and Evidence," *The American Economic Review*, 2009, *99* (4), 1145–1177.

__ **, Nathaniel Hendren, and Lawrence F. Katz**, "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment," *American Economic Review*, April 2016, *106* (4), 855–902.

Deshpande, Manasi and Yue Li, "Who Is Screened Out? Application Costs and the Targeting of Disability Programs," *American Economic Journal: Economic Policy*, November 2019, *11* (4), 213–48.

Homonoff, Tatiana, Lee-Sien Kao, Javiera Selman, and Christina Seybolt, "Skipping the Bag: The Intended and Unintended Consequences of Disposable Bag Regulation," *Journal of Policy Analysis and Management*, 2022, *41* (1), 226–251.

List, John A, "Non est Disputandum de Generalizability? A Glimpse into The External Validity Trial," Working Paper 27535, National Bureau of Economic Research July 2020.

MVP, "Harvests of Development in Rural Africa: The Millennium Villages After Three Years," Technical Report, The Earth Institute at Columbia University and Millennium Promise 2010.

Pronyk, Paul M, Maria Muniz, Ben Nemser, Marie-Andrée Somers, Lucy McClellan, Cheryl A Palm, Uyen Kim Huynh, Yanis Ben Amor, Belay Begashaw, John W McArthur, Amadou Niang, Sonia Ehrlich Sachs, Prabhjot Singh, Awash Teklehaimanot, and Jeffrey D Sachs, "The Effect of an Integrated Multisector Model for Achieving the Millennium Development Goals and Improving Child Survival in Rural sub-Saharan Africa: A Non-Randomised Controlled Assessment," *The Lancet*, 2012, *379* (9832), 2179–2188.

Samek, Anya and Chuck Longfield, "Do Thank-You Calls Increase Charitable Giving? Expert Forecasts and Field Experimental Evidence," *American Economic Journal: Applied Economics*, April 2023, *15* (2), 103–24.

Presentation Slides: Guidelines

These guidelines explain how you should prepare the content of your presentations based on the assigned readings and the details of completing/submitting the assignments.

Regarding the completion/submission details, you should work in groups of three students to discuss the readings with each other and create slides together. To ease TA grading responsibilities and ensure prompt feedback on assignments, you should submit one PDF of slides for your group, but everyone is expected to actively contribute to all parts of the slides. Please upload your presentation in PDF format via the Gradescope application on Canvas before the start of class.[7]

Regarding content, your presentations should summarize, explain, and critique how the paper(s) you read apply the given program evaluation technique(s) we cover in class. In other words, you should demonstrate your understanding of the methods we cover in lecture by discussing them in the specific context of the paper. In doing so, you should address the following six main points.[8]

- Motivation: Identify the key outcomes, interventions, and research questions studied in the paper. Explain why they are important/interesting/policy relevant.
- Data: Briefly describe the data used to estimate the model.
- Empirics & Internal Validity: Describe the empirical model, parameters to be estimated, and estimation strategy. Explain the identification strategy and the identifying assumptions.[9] Discuss whether or not you think the authors credibly identify the parameters of interest.
- Results: Explain the results and discuss the main findings. In doing so, be sure to demonstrate that you understand and can explain how to interpret the main estimates being presented.[10]
- Robustness & External Validity: Explain whether the authors establish that their results are not particular to a narrow set of modeling assumptions (robustness). Also explain whether the authors establish that their findings are likely to be generalizable to other settings (external validity).[11]
- Critique: Critique the analysis. Discuss the strengths and weaknesses. State whether you would be comfortable making policy based on the study. If so, explain why. If not, explain what you would recommend the authors do to make the study more convincing.

Your presentations should be aimed at intelligent individuals who are interested in the policy being evaluated, but who don't necessarily have a background in statistics, econometrics, or policy evaluation. In other words, you should be sure to explain all technical/statistical concepts in your own words.

[7] In order to facilitate grading of the slides, please be sure to include the names of the students in your group on your slide deck and add all group members to your submission via Gradescope's "Group Members" option.

[8] While your presentations do not need to address these points in order or explicitly label each slide (e.g., slide titles of "Motivation," "Data", etc.), please tag the sections in Gradescope to facilitate grading.

[9] The empirical model is the model of how the data is generated (e.g., a linear model). The estimation strategy is how you will estimate this model (e.g., an ordinary least squares regression). Internal validity is the extent to which the evidence provided by a particular study establishes cause and effect. Internal validity is often discussed in terms of an identification strategy or the identification of a parameter. That is, whether the estimator you construct and data you use actually recover or "identify" the (usually causal) parameter you are interested in for policy reasons (e.g., an experimental or difference-in-differences identification strategy). This generally requires evaluating whether a set of identifying assumptions are met in the particular context. Note that as part of addressing this point, it is often helpful to contrast the authors' approach with a "naive" analog and explain why such an approach would be problematic.

[10] You do not need to do this for every estimate or set of estimates! Instead, pick the main or a representative estimate from the tables/figures and say what that number means.

[11] External validity is the extent to which conclusions from a particular study can be applied in other contexts (that might include different samples, individuals, locations, situations, interventions, and/or time periods).

Please note that there are no slide or word count limitations, so you can address each point in as much or as little detail as you want. With that said, you should feel free to be concise. I'm asking you to create presentations for a reason. I'm not expecting you to write an essay and paste a paragraph on each slide. Be complete, but succinct. You may also feel free to include tables, figures, and other visuals from the readings (or anywhere else that's useful), but be sure to explain what they tell us.