Policy Analysis and Program Evaluation for Education
EDUC 2360
Fall 2021

Logistics

Lectures: Thursdays, 4:00 to 6:30 pm
Smith-Buonanno Hall 206

Instructor: John Papay
Associate Professor of Education and Economics
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Office hours: Fridays, 1-3 pm, or by appointment
164 Angell St., Room 215

Please note that I very much enjoy meeting with students and you should come to office hours to discuss any topics, course-related or otherwise. Don't feel as if you have to have a specific question. I am happy to meet with you at other times if these times don't work.

TA: Drew Milligan
drew@drewmilligan.com

Website: https://canvas.brown.edu/courses/1086079
Please check the course website frequently for important announcements, readings and assignments.

Description and Objectives

In order for policymakers to make sound decisions about which programs or policies to adopt, they must have a strong understanding of how these interventions will affect students, teachers, and schools. For a variety of reasons, though, measuring the *causal effects* of interventions on educational outcomes remains a difficult challenge. Fortunately, ongoing advances in data collection and research methods provide unprecedented opportunities to develop the type of knowledge that can improve policy and practice in urban education.

This course provides an overview of methods that enable researchers to answer such questions, focusing on those approaches that provide accurate information about the *causal effects* of interventions on educational outcomes. The course has four main goals:

1. Help students recognize the importance of high-quality quantitative evaluation research and to identify the ways in which studies exceed or fall short of this standard.

2. Help students understand the key insights and intuition behind a range of data-analytic methods to make them critical consumers of program evaluation research.

3. Help students develop a tool-kit of methods – including increased familiarity with STATA – so they can design and carry out their own quantitative research.

4. Expose students to high-quality quantitative research on important education policy questions.

Course Overview

In course meetings, we will examine a range of approaches, including randomized controlled trials, differences-in-differences techniques, regression-discontinuity designs, propensity score matching, and instrumental variables methods. We will also read and discuss papers that use advanced research methods to draw causal conclusions about important education policy questions. Discussions will focus largely on the methodological issues raised in the papers, although we will explore briefly the substantive implications. Class assignments will require students to demonstrate understanding of the course's key concepts and an ability to apply their knowledge to analyze data.

Prerequisites

This course is designed primarily for students in the Urban Education Policy master's program and builds on the material covered in EDUC2320. It is also open, at the professor's discretion, to other students who have completed an approved course in introductory statistics and would like an advanced course in education policy analysis. **Students are expected to arrive in class with a solid understanding of how to conduct Ordinary Least Squares (OLS) regression (including multiple regression) and how to interpret the results**. We will review very briefly inferential statistics and regression analysis, but this review will not be sufficient for students who do not already have a strong background in these areas. **A basic familiarity with the statistical software package STATA is strongly recommended**.

Course Structure and Readings

I firmly believe that the best way to learn this material is through multiple and different exposures to the content and through application. As a result, for each topic (with minor exception), we will:

(a) read a textbook description of the method,
(b) examine the methods together in class,
(c) read an article that applies the method,
(d) discuss the article in class,
(e) do a practice problem set that requires you to use the method,
(f) discuss the practice problem set, and
(g) (for most topics), complete a problem set that requires you to use the method

I believe that each of these steps is critical to your learning in the course.

As a result of this sequence, we will cover the topic a week and follow a consistent general structure. Each week, I will introduce a topic or method. You will then critically examine a research article and, the following week, we will discuss the specific method or approach the article uses. Then, you will complete a practice problem set to apply the method.

Thus, class readings fall into two categories. First, you should read more technical presentations of a method, explaining how it is used. You should read these materials before class to help you understand and engage in the lecture. Then, I would recommend returning to the readings for more detail after class. I recommend using the book *Methods Matter* by Richard Murnane and John Willett.

Second, we will read and discuss a scholarly paper in which researchers apply the method we are discussing. There may be parts of these papers that you do not fully understand and the authors may extend their approaches in ways that we have not discussed. Don't worry about these sections, but try to read the paper as an informed consumer. For each reading, I will post a set of questions. **You should read the article VERY carefully and develop responses to these questions before you come to class.**

I will also post a practice problem set nearly every week. You should work through this problem set either on your own or with a study group.

Texts/Course Materials

While there is no specific textbook required for the class, you ARE required to read about each method before we discuss it in class. The course builds heavily on *Methods Matter* by Richard Murnane and John Willett. As such, I strongly recommend that students purchase the book, and I have referenced relevant chapters in the syllabus. The book is available on-line or at the Brown University Bookstore.

> Murnane, R.J. & Willett, J.B. (2011). *Methods Matter: Improving Causal Inference in Educational and Social Science Research.* New York: Oxford University Press. $81.00 New from the Brown Bookstore.

However, some students might find different presentations of the material more useful. Many authors from a variety of disciplines have written books on program evaluation methods. Each takes a somewhat different approach and writes in a slightly different way. You should find a book that examines these subjects in a manner that makes sense to you. You should feel no obligation to purchase these books, but you might want to browse through them to see if they treat the material in a helpful way for you. Several of these books go into more detail than *Methods Matter*. They should all be available on reserve at Rockefeller Library or on-line. You are welcome to use whatever text works best for you. You should read about the relevant topic each week.

> *Experimental and Quasi-Experimental Designs for Generalized Causal Inference* by William Shadish, Thomas Cook, and Donald Campbell (Psychologists/ General Social Scientists)
>
> *Mostly Harmless Econometrics: An Empiricist's Companion* by Joshua Angrist and Jorn-Steffen Pischke (Economists)
>
> *Causal Inference for Statistics, Social, and Biomedical Sciences* by Guido Imbens & Donald Rubin (Economist/Statistician)

Counterfactuals and Causal Inference: Methods and Principles for Social Research by Stephen Morgan and Christopher Winship (Sociologists)

Introduction to Econometrics, James Stock and Mark Watson (Economists)

Causal Inference: The Mixtape, Scott Cunningham (Economist). Available online at https://www.scunning.com/mixtape.html

The Effect: An Introduction to Research Design and Causality, Nick Huntington-Klein (Economist). Available online at https://theeffectbook.net/

Furthermore, because this course builds on your understanding of regression analysis, you likely want to have access to a book that provides an introduction to quantitative research (such as the texts that were used or recommended in your introductory course).

All other class readings will be available on the course website in Canvas or through links in the reading list below.

Statistical Software

One of the goals of the class is to improve your skills with a statistical software package. While Excel or other spreadsheet programs can do some analysis, for more sophisticated work you will need to use a program like STATA, SASS, SPSS, R, etc.

This year, we will be using STATA. You can download the software from Brown at: https://www.brown.edu/information-technology/software/catalog/stata-se-1

You might find the following book a useful resource in learning STATA. It is also on reserve:

- Alan C. Acock. (2012). *A Gentle Introduction to STATA*, Revised 3rd Edition. Stata Press.

If you would like additional information about how to manage your work in Stata, I have found the following book particularly helpful. It will also be on reserve:

- J. Scott Long. (2009). The Workflow of Data Analysis Using Stata. Stata Press.

In addition, there are many great on-line resources for learning Stata, including:

- Stata Cheat Sheets
  - http://geocenter.github.io/StataTraining/portfolio/01_resource/
- Stata Tutorial
  - http://data.princeton.edu/stata/default.html
- Official Stata Manual for "Getting Started with Stata"
  - https://www.stata.com/manuals/gsw.pdf
- E-book available through Brown library:
  - *The Stata Survival Manual* by David Pevalin and Karen Robson
- UCLA Website has excellent annotated Stata output and step-by-step guides
  - http://www.ats.ucla.edu/stat/stata/

- This Stata website has a variety of resources
    - http://www.stata.com/links/resources-for-learning-stata/
- Stata YouTube Channel: Very helpful for visual learners
    - http://www.youtube.com/user/statacorp?feature=watch

Finally, the Murnane and Willett book comes with a companion website that includes data sets and STATA code: https://stats.idre.ucla.edu/other/examples/methods-matter/

You are welcome to use a different statistical package (e.g., R, SPSS) if you prefer, but we cannot provide support.

Course Requirements and Expectations

Attendance/ Participation

The success of this class depends on the thoughtful, engaged participation of all class members. As a result, **attendance is expected at every class meeting**. Please notify me in advance if you will need to miss class.

Effective class participation is a matter of quality, not quantity. It requires that you come to class well-prepared to discuss all of the assigned readings and that you actively engage in class by posing questions and contributing to small- and large-group discussions. Asking clarifying questions and addressing points of confusion are highly encouraged.

For most every class, we will discuss an applied research article. Please come to class prepared to discuss the article in depth, and specifically to answer the set of discussion questions I will provide for each study. You will not turn these questions in, but I will sometimes "warm call" on students to share their answers to these specific questions.

You are **not** expected to be perfect; you **are** expected to try. One of the central skills I hope you learn from the class is how to talk about statistical concepts. In many ways, this is like learning a foreign language. This class will be a safe space to practice your understanding (rather than practicing for the first time in front of your boss).

Computers

While you are welcome to use laptops in class for taking notes, I strongly suggest you keep your computer closed during lecture and focus on engaging with the material. Much of the content covered in class will be illustrated through figures and graphs. I find it easier to take notes on these images using paper and pencil. If you are considering using a laptop please read this first: For better learning in college lectures, lay down the laptop and pick up a pen

If you do choose to use a laptop, please refrain from any other uses (e.g. checking email, web surfing, etc.) – these activities are distracting to me and (more importantly) to others trying to pay attention. Respect your classmates.

Problem Sets

There will be 3 problem sets over the course of the semester. These assignments are designed to help you solidify your understanding of the key content and to give you practice in applying the approaches we have discussed. Each problem set will guide you through a real analysis of a dataset. You will need to conduct the required analyses in STATA, interpret your findings, and write up your results. **You may choose to complete this work on your own or with a partner.** Each team should turn in one assignment. **You may only discuss your work with your partner**.

Memos

You will also be required to write 2 brief memos. These assignments are designed to allow you to think synthetically across your learning in the course and to give you more practice in communicating your ideas to an audience of policymakers/practitioners who are not trained in data analysis. **You will complete these memos independently and may not discuss the content with any of your classmates**.

Final Paper

The final paper is more open-ended. There are three main options, each designed to allow you to complete an analysis that interests you. You may choose an option that can help further your own goals, and you may find it useful to tie in this paper to your internship.

- Option 1: Replication Study: Take an existing quantitative study of an education policy issue and replicate the analysis. You may use a paper that we have read in the course or another paper of interest published in a peer-reviewed journal. Replicating an existing paper will help you to gain familiarity with a dataset and to hone your data-analytic skills.

- Option 2: Original study: Conduct a small-scale evaluation of an existing program or policy. Here, you could leverage your connections with your internship to identify a program of interest and find appropriate data for an evaluation. Your analysis should be framed causally, although you need not use one of the techniques we discussed in the class. NOTE: Conducting a high-quality evaluation in a single semester (while learning the methods) will be challenging. In particular, identifying and negotiating access to the appropriate data may be difficult. If you are interested in pursuing this option, I recommend that you start this process early.

- Option 3: Evaluation design proposal: Write a proposal for a *feasible* evaluation of a program or policy of interest. Again, you could leverage your connections with your internship. Your paper will describe the design of an evaluation that would answer a causal question of interest about the program. Please note: the proposal should be rooted in reality (i.e., only propose a study that could be carried out reasonably).

The final paper should be approximately 15 pages in length (double-spaced, excluding any tables and figures). **You may work in pairs on this assignment if you prefer.** More details on this assignment will be distributed in a few weeks. Regardless of which option you choose, you should follow the timeline below:

- *Friday, November 5*: Submit a one-paragraph description of your paper topic.

- *Thursday, December 2*: Present your research-in-progress to the class.

- *Monday, December 20*: Final papers due by 11:59 pm.

Course Grades

Course grades will be based on written assignments and class participation, using the following approximate percentages:

Attendance, class participation, and preparedness:	20%
Problem sets:	30%
Memos:	20% (8% 1st memo; 12% 2nd memo)
Final paper:	30%

Important Policies

- In order to be equitable to all students, I do not provide make-up assignments or extra credit.
- If you need an extension, don't hesitate to ask for it. They key is planning in advance and good communication. You must submit a request for extensions due to extenuating circumstances (very broadly defined) at least 24 hours before the assignment is due. Assignments turned in late without prior approval will lose one letter grade each day the assignment is late.

Course Time Allotment

The total of in-class hours and out-of-class work for all full-credit courses at Brown is approximately 180 hours over the semester. In this course, students can expect to spend 2.5 hours in class each week (25 hours total). Required reading and preparation for the class meetings is expected to take up approximately 6 hours per session (72 hours). In addition, students will complete three problem sets and two memos, each of which should take approximately 11 hours (55 hours) and a final paper (approximately 30 hours). Actual times will vary for each student; final grades are not determined by the amount of time a student spends on the course

Academic Code

All students should read, understand and abide by the Academic Conduct Code at Brown. In particular, please pay close attention to the section on "use of sources" (p. 6) to be sure to appropriately credit outsides sources and avoid any potential issue of plagiarism. Note in particular that "A student's name on any exercise (e.g., a theme, report, notebook, performance, computer program, course paper, quiz, or examination) is regarded as assurance that the exercise is the result of the student's own thoughts and study, stated in his or her own words, and produced without assistance, except as quotation marks, references, and footnotes acknowledge the use of printed sources or other outside help" (Academic Code, p. 5).

Additional Support

I am committed to providing you with the resources necessary to meet your objectives in this class. I will hold regular office hours and am available to meet outside of those times as well. **One note in this regard – it is incumbent upon you to let me know if you have areas of confusion.** Ideally, you will raise these in class. But, you can also let me know if you are struggling with concepts or have questions outside of class. Letting me know that you have a question or area of confusion will NOT affect your grade!

Instructional Support

Drew Milligan will serve as an instructional resource for students in the class. Drew is a graduate of the UEP program who currently works at the Rhode Island Department of Education. Drew will hold regular office hours and will be available to review concepts as needed.

Study Groups

I strongly encourage you to form study groups. Collaborative learning is an important component of this class, and you will get more out of the class if you engage with your peers outside of class time. You will also find that you come to class better prepared to share ideas and engage in discussion. **However, you should not discuss your work on the problem sets other than as described above.** Study groups are not required, but should you form one, I suggest that you include members with experiences, abilities, and career plans different from your own. Effective study groups typically have between three and five members.

Accessibility and Accommodations

Brown University is committed to full inclusion of all students. Please inform me early in the term if you have a disability or other conditions that might require accommodations or modification of any of these course procedures. You may speak with me after class or during office hours. For more information, please contact Student Accessibility Services at 401-863-9588 or SAS@brown.edu. Students in need of short-term academic advice or support can contact one of the deans in the Graduate School.

Brown welcomes students from around the country and the world, and their unique perspectives enrich our learning community. To support students whose primary language is not English, an array of English support services are available on campus including language and culture workshops and individual appointments. For more information, contact english-support@brown.edu or (401) 863-5672.

Detailed Course Outline

Week 1 (Sept 9): Introduction: Why Study Program Evaluation

A. Discussion reading
- Zuberi, T., & Bonilla-Silva, E. (2008). *White Logic, White Methods.* Chapter 1. Toward a Definition of White Logic and White Methods.
- Strunk, K.K., & Hoover, P.D. (2019). *Research Methods for Social Justice and Equity in Education*. Chapter 16: Quantitative Methods for Social Justice and Equity: Theoretical and Practical Considerations.

B. New Content Reading [OLS Review and Value-Added]
- Murnane and Willett, Ch. 1-3
- Review notes on regression from last semester

Week 2 (Sept 16): OLS Review/Value-Added

A. Discussion reading
- Papay et. al (2012) Does an Urban Teacher Residency Increase Student Achievement? Early Evidence from Boston. *Education Evaluation and Policy Analysis, 34(4), 413-434.*

B. New Content Reading [Randomized Experiments]
- Murnane and Willett, Ch. 4 and 5
- [RECOMMENDED] Mosteller, F. (1995). The Tennessee study of class size in the early grades. *The Future of Children, 5*(2). pp. 113-127.

Week 3 (Sept 23): Randomized Experiments

A. Discussion reading
- Bettinger, E. P., Long, B. T., Oreopoulos, P., & Sanbonmatsu, L. (2012). The role of application assistance and information in college decisions: Results from the H&R Block FAFSA experiment. *The Quarterly Journal of Economics*, *127*(3), 1205-1242.

B. New Content Reading [Instrumental Variables- Extensions to RCTs]
- Murnane & Willett, Ch. 11 pp. 265- 280
- [RECOMMENDED] Angrist, J. & Pischke, J. (2009). *Mostly Harmless Econometrics*. Princeton, NJ: Princeton University Press. pp.113-121.

Week 4 (Sept 30): Instrumental Variables- Extensions to RCTs

A. Discussion reading
- Angrist, J.D., et al. (2010). Inputs and impacts in charter schools: KIPP Lynn. *American Economic Review: Papers and Proceedings, 100*(May): 1-5.

B. New Content Reading [Quasi- Experimental Designs - Panel Data and Fixed Effects]
- Barrow, L. & Rouse, C. (2005). Causality, Causality, Causality: The View of Education Inputs and Outputs from Economics. Paper prepared for the Federal Reserve Bank of Chicago.
- Stock and Watson Ch. 10
- [RECOMMENDED] Mostly Harmless Econometrics pp. 221- 226

Week 5 (Oct 7): Quasi- Experimental Designs - Panel Data and Fixed Effects

Problem Set 1 Due

A. Discussion reading
- Taylor, E.S., & Tyler, J.H. (2012). The effect of evaluation on teacher performance. *American Economic Review.*

B. New Content Reading [Difference-in-Differences]
- Murnane & Willett, Ch. 8

Week 6 (Oct 14): Difference-in-Differences

A. Discussion reading
- Dynarski, S. (2003). Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion. *American Economic Review, 93*(1), 279-288.

B. New Content Reading [Interrupted Time Series]
- Shadish, W.R., Cook, T.D., & Campbell, D.T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin Company, pp. 171-188
- Bloom, H. S. 2003. "Using 'Short' Interrupted Time-Series Analysis to Measure the Impacts of Whole-School Reforms: With Applications to a Study of Accelerated Schools." Evaluation Review 27 (3): 3-49.

Week 7 (Oct 21): Interrupted Time Series

Problem Set 2 Due

A. Discussion reading
- Thomas S. Dee & Brian Jacob, 2011. "The Impact of No Child Left Behind on Student Achievement," Journal of Policy Analysis and Management, John Wiley & Sons, Ltd., vol. 30(3), pages 418-446, Summer.

B. New Content Reading [Regression-Discontinuity Designs]
- Murnane & Willett, Ch. 9
- [RECOMMENDED] Shadish, W.R., Cook, T.D., & Campbell, D.T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin Company, pp. 207- 237

Week 8 (Oct 28): Regression-Discontinuity Designs

A. Discussion reading
- Dee, T.S., & Penner, E. (2015). The Causal Effects of Cultural Relevance: Evidence from an Ethnic Studies Curriculum. *National Bureau of Economic Research* Working Paper # 21865.

B. New Content Reading [Instrumental Variables Estimation]
- Murnane & Willett, Ch. 10

Week 9 (Nov 4): Instrumental Variables Estimation

Problem Set 3 Due

A. Discussion reading
- Jackson, C.K., Johnson, R.C. & Persico, C. (2016). The Effects of School Spending on Educational and Economic Outcomes: Evidence from School Finance Reforms. *The Quarterly Journal of Economics*, vol 131(1), pages 157-218.

B. New Content Reading [Matching Estimators]
- Murnane & Willett, Ch. 12
- Shadish, W.R., Cook, T.D., & Campell, D.T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. pp. 118-122.

FINAL PAPER TOPIC DUE – Friday, 11/5

Week 10 (Nov 11): Matching Estimators

A. Discussion reading
- Center for Research on Education Outcomes (CREDO) (2017). *Charter Management Organizations*. Palo Alto: CREDO, Stanford University.

B. New Content Reading [Statistical Power/Sample Size]
- Murnane & Willett, Ch. 6
- [RECOMMENDED] Orr, L. (1999). *Social experiments: Evaluating public programs with experimental methods.* Thousand Oaks, CA: Sage. Chapter 4, pp. 103-120.

Week 11 (Nov 18): Other Topics: Data Visualization; Review

Memo 1 Due

- [Revisit] Barrow, L. & Rouse, C. (2005). Causality, Causality, Causality: The View of Education Inputs and Outputs from Economics. Paper prepared for the Federal Reserve Bank of Chicago.

Week 12 (Dec 2) – Student Presentations

MEMO 2 DUE

FINAL PAPER DUE - MONDAY, DECEMBER 20, 11:59 PM