Policy Analysis and Program Evaluation for Education
EDUC 2360, Fall 2019

Logistics

Lectures: MWF, 2:00 to 2:50 pm
Friedman Hall 201

Instructor: John Papay
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Website: https://canvas.brown.edu/courses/1079225
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 a range of 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. On Mondays, I will introduce a topic or method. On Wednesdays, we will critically examine a research article and discuss the specific method or approach the article uses. On Fridays, we will discuss a practice problem set and answer any remaining questions about the approach.

Thus, class readings fall into two categories. First, for Mondays, 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. Most of these readings will come from the book *Methods Matter* by Richard Murnane and John Willett.

Second, on Wednesdays, 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.**

For Fridays, I will post a practice problem set. Students should (either on their own or with their study group) work through this problem set **carefully** before class.

Required Texts/Course Materials

This course will draw heavily on *Methods Matter* by Richard Murnane and John Willett. It is the only required text for the course. The book is available on-line or at the Brown University Bookstore. We will start using the book at the beginning of the semester.

> Murnane, R.J. & Willett, J.B. (2011). *Methods Matter: Improving Causal Inference in Educational and Social Science Research.* New York: Oxford University Press. $73.00 New from the Brown Bookstore.

Because this course builds on your understanding of regression analysis, you may 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). In addition, some students might find it useful to supplement their reading in *Methods Matter* with other texts. Many authors from a variety of disciplines have written books on program evaluation. 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.

> *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)

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 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.

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

To engage in in-class exercises, you will need to bring a laptop to class. If you do not have a laptop computer, that is not a problem. Please let me know and I will coordinate access to one for the class.

However, 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 four 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: Critical Policy Analysis: Write a critical summary of the research literature on a policy or program of interest. Your paper should review the available evaluations of this program or policy, describe the evaluation approaches used, and assess the strengths and weaknesses of these studies. You should explain what the weight of the research evidence is for policymakers, including a discussion of what implications are and are not warranted. You should conclude with a discussion of how the limitations of these studies could be addressed in future research to help inform policymakers.

- Option 3: 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 4: 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 8*: Submit a one-paragraph description of your paper topic.

- *Monday/Wednesday, December 2 & 4*: Present your research-in-progress to the class.

- *Wednesday, December 18*: 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 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 50 minutes in class for 36 sessions (30 hours total). Required reading and preparation for the class meetings is expected to take up approximately 2 hours per session (72 hours). In addition, students will complete three problem sets and two memos, each of which should take approximately 10 hours (50 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

In addition, Kate Donohue will serve as an instructional resource for students in the class. Kate is a graduate of the UEP program who currently works as a researcher in the Education Department. Kate 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 and Employee Accessibility Services at 401-863-9588 or SEAS@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: Introductions

(1) Sept 4 – Course Introduction

(2) Sept 6 – Introduction: From the age of regression to causal inference

- Murnane and Willett, Ch. 1-3
- Review notes on regression from last semester

Week 2: OLS Review/Value-Added

(3) Sept 9 – Presentation

(4) Sept 11 – Discussion

- 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.*

(5) Sept 13 – Practice

Week 3: Randomized Experiments

(6) Sept 16 – Presentation

- 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.

(7) Sept 18 – Discussion

- York, B.N., Loeb, S., & Doss, C. One Step at a Time: The Effects of an Early Literacy Text Messaging Program for Parents of Preschoolers. CEPA Working Paper. https://cepa.stanford.edu/sites/default/files/One%20Step%20CEPA%20Working%20Paper%206%201%2017.pdf

(8) Sept 20 – Practice

Week 4: Instrumental Variables- Extensions to RCTs

(9) Sept 23 – Presentation

- Murnane & Willett, Ch. 11 pp. 265- 280
- [RECOMMENDED] Angrist, J. & Pischke, J. (2009). *Mostly Harmless Econometrics*. Princeton, NJ: Princeton University Press. pp.113-121.

(10) Sept 25 - Discussion

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

(11) Sept 27 - Practice

Week 5: Quasi- Experimental Designs - Panel Data and Fixed Effects

(12) Sept 30 – Presentation

- 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

(13) Oct 2 – Discussion

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

(14) Oct 4 – Practice

- ***PROBLEM SET 1 DUE***

Week 6: Difference-in-Differences

(15) Oct 7 - Presentation

- Murnane & Willett, Ch. 8

(16) Oct 9 – Discussion

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

(17) Oct 11 – Practice

Week 7: Interrupted Time Series

Oct 14 – NO CLASS

(18) Oct 16 - Presentation

- 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.

(19) Oct 18 – Discussion

- ***PROBLEM SET 2 DUE***
- 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.

Week 8: Regression-Discontinuity Designs

(20) Oct 21 - Presentation

- 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

(21) Oct 23 – Discussion

- 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.

(22) Oct 25 – Practice

Week 9: Instrumental Variables Estimation

(23) Oct 28 - Presentation

- Murnane & Willett, Ch. 10

(24) Oct 30 – Discussion

- 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.

(25) Nov 1 – Practice

- ***PROBLEM SET 2 DUE***

Week 10: Matching Estimators

(26) Nov 4 - Presentation

- 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.

(27) Nov 6 – Discussion

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

(28) Nov 8 - Practice

"Week" 11: Other Topics

Nov 11 – NO CLASS: Final Project Workday

- ***MEMO 1 DUE***

(29) Nov 13 – Review of Approaches for Causal Inference

- [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.

(30) Nov 15 - Statistical Power and Sample Size – Presentation

- 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.

(31) Nov 18 – Statistical Power and Sample Size – Discussion

- SRI International. Validating the SunBay Middle School Digital Mathematics Program: An Innovative Approach to Increasing Student Achievement Using Technology. Investing in Innovation Fund (i3) grant application. http://www2.ed.gov/programs/innovation/2013/sri.pdf

(32) Nov 20 – Data Visualization

(33) Nov 22 – Data Visualization

Week 12 – Wrap Up

Nov 25 – NO CLASS (Final Project Workday)

- ***MEMO 2 DUE***

Nov 27 & 29 – NO CLASS (Thanksgiving Recess)

(34) Dec 2 – Student Presentations

(35) Dec 4 – Student Presentations

(36) Dec 6 – Wrap Up

FINAL PAPER DUE- WEDNESDAY, DECEMBER 18, 11:59 PM