PPOL 7559-300: Advanced Topics in Impact Evaluation
Frank Batten School of Leadership and Public Policy
University of Virginia
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Instructor

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Summary

This course explores the practical choices that researchers face in conducting quasi-experimental impact evaluations. Students will replicate findings from prominent policy research using a range of empirical techniques, including matching; regression; propensity score weighting; instrumental variables; discontinuity designs; and panel data methods. Lectures and assignments will highlight the tradeoffs between empirical methods, techniques for assessing robustness, and strategies for effectively reporting results. The course will emphasize topics in labor economics and education policy, though students from all quantitative social science disciplines are welcome to enroll. The course assumes prior graduate-level instruction in quasi-experimental research methods.

Skill Objectives

Students in this course will develop their capacity to:

- read and critique academic, empirical economics research
- articulate the assumptions that underpin empirical strategies, both in formal mathematical notation and broadly accessible language
- implement empirical analysis with statistical software
- present empirical results in compelling visual formats

Course Texts

The required course textbook is

> Angrist, J. D. and Pischke, J.-S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press, Princeton.

You may also find it helpful to read sections of the prequel, which presents much of the same material in a slightly less technical fashion.

> Angrist, J. D. and Pischke, J.-S. (2014). *Mastering 'Metrics: The Path from Cause to Effect*. Princeton University Press, Princeton.

I will post additional readings on Collab, as the course outline details.

Software

Students are welcome to use whatever statistical software they prefer to complete assignments. Good options include Stata, R, and Python. I will post solution sets in Stata and highlight some Stata-specific skills in lecture, so I encourage students to use Stata unless they have substantial experience with other software. There are three options for accessing Stata at UVa:

1. You can purchase Stata at discounted rates through UVa's GradPlan. The least expensive one-year license is $125, and a permanent license is $198. There's no harm in ordering a temporary license for now. You can pay to upgrade to a permanent license later on if you'd like. You can also upgrade to alternate versions that support bigger data sets and faster processing speeds.
2. Students can access Stata from personal computers via the UVa Hive.
3. Stata is available in some computer labs on Grounds, including:
    - the Scholars' Lab in Alderman Library
    - the ITS computer lab in Clark Hall in the Charles L. Brown Science & Engineering Library

Note that UVA's Stata license caps the number of simultaneous users, so if you choose option 2 or 3, you may have to wait for other users to finish their sessions.

Grades

Grades will depend on three factors:

Class Participation:	10%
Problems Sets:	45%
Final Project	45%

1. Class Participation (10%)

   My expectation is that students read all required material carefully before the assigned class. Lectures will focus on the nitty gritty details of methods and results. You should read with those details in mind and come prepared to discuss them.

2. Problem Sets (45%)

   There are four problem sets. The first is an ungraded exercise that we'll use to establish good habits for programming and presenting results. The remaining three will each count for 15% of the final grade.

   For each problem set, students will replicate and extend findings from a prominent empirical study. I'll post problem set materials by the first class of each unit, and problem sets will be due on the last day of that unit. We'll use the last class in each unit to discuss the exercises in detail. Please bring your computer to class on problem set due dates.[1]

   You may consult with classmates when working on problem sets, but each student should produce and submit independent code and written responses.

3. Final Project (45%)

   For the final project, students will produce a paper deck: the graphs and tables at the end of a formal research paper. The goal is to focus on constructing a clear empirical argument through the visual presentation of results rather than the accompanying prose.[2] I've described the final project in detail on the next two pages.

A Note on Due Dates

All assignments are due in Collab by 9 am on their due dates. Since we'll be going over the problem set solutions in class, late problem sets won't be accepted. For the course project, each student is entitled to two no-questions-asked late days. You may use both late days on the same project component or divide them across two components. Late days are indivisible: an hour late is a day late. Since Collab will not accept late submissions, late assignments should be e-mailed directly to me.

[1] Outside problem set due dates, I ask that you not use electronics in class. Randomized evaluations of laptop use in university lectures indicate that laptops inhibit academic performance both for their users and nearby students, on average.

[2] Research writing is, of course, a crucial skill. You'll have many other opportunities to hone it in graduate school. Our focus here is on the empirics.

Final Project

You have two options for completing the deck project:

- pursue an original research study
- replicate and extend an existing study

If you choose to replicate, you will reproduce results from a published paper, improving the presentation as you see fit. You will then extend the results using an estimation technique not employed in the original study. I encourage doctoral students to pursue the original research option if feasible.

To help you make progress toward a finished deck, we'll have several intermediate milestones:

Data Description:	September 14 (Th)
Deck Outline:	October 17 (Th)
Draft Shells:	November 14 (Tu)
Final Deck:	December 8 (Fr)

1. The data description is a half-page memo summarizing the data that you've selected for your project. Provide a one sentence statement of your causal question, then briefly describe the identification strategy and key data elements that you'll use for your analysis. List any existing studies that have used these data in the past. The deliverables here are short by design. The goal is to commit to a question and a data set.

2. The deck outline is a one to two-page, bullet point summary of the tables and figures you intend to produce. Your focus should be on the structure of your empirical argument. What evidence do you need to justify your identification strategy? Given a viable identification strategy, what results will shed light on your causal question? For each table and figure, provide a short (two to four sentence) description of the intended results and the role they play in your argument. Your goal should be clarity and concision. We'll meet individually during office hours the following week to discuss your outlines.

3. The draft "shells" are a set of empty tables and mock figures for your deck. The shells allow you to hone the presentation of results before you invest in the programming. The only shell that you need to have "filled in" at this stage is a table of descriptive statistics for your analysis sample. I include this step at the shell deadline to help ward off last minute challenges with data cleaning in the run-up to the final deck submission. We'll meet individually during office hours the following week to discuss your shells.

4. The final deck submission has three parts:

   - your completed tables and figures
   - a revised copy of your deck outline that briefly describes each table and figure
   - the programs that you used to produce the results

   Your final deck may include up to two empty shells if you were unable to produce some results given the time constraints. For example, if there's an important robustness check that requires data you could not obtain this semester, you can demonstrate that you would present those results without actually producing them. You should confirm with me before opting to include empty shells in your final submission. In particular, if you're replicating an existing paper, you should verify that you can produce most of the results with the available replication data. Replications that require more than two empty shells are not good candidates for this project.

Data Sources

You are welcome to work with data sources to which you already have access. I'm also happy to help you seek out new sources. As a starting point, I encourage you to visit the American Economic Association's journal listings. Many journal articles, particularly in the AEJ series, post replication data with their papers. I can also help you reach out to researchers individually to request replication data.

Final Project Assessment

I will evaluate your projects on three dimensions, each of which has equal weight in the final grade.

1. Argument:

   Does the structure of your deck tell a clear story? Did you address the primary threats to your identification strategy? Do your chosen results answer your causal question?

2. Execution:

   Did you implement the empirical methods correctly? Did you pursue appropriate robustness checks?

3. Presentation:

   Do your tables and figures clearly communicate the results? Do they highlight important features of the narrative? Do they include informative titles and notes to guide the reader in interpretation?

Honor Code

The Frank Batten School of Leadership and Public Policy embraces and upholds the University's Honor Code principles that mandate that students will not lie, cheat, or steal, nor tolerate the actions of those who do. Acting in a manner consistent with the principles of Honor benefits every member of the community while enrolled in the Batten School and in the future.

We expect every student to comply fully with all provisions of the UVA Honor System. By enrolling in this course, you agree to abide by and uphold the Honor Code System of the University of Virginia As applied to your Batten course work and requirements, and unless otherwise specified by your instructors:

- All graded assignments must be pledged.
- Students may not access any notes, study outlines, problem sets, old exams, answer keys, or collaborate with other students without explicit permission.
- When given permission to collaborate with others, students will not copy answers from another student.
- Students should always cite any resources or individuals they have consulted to complete an assignment. If in doubt, sources should be cited.
- Suspected violations will be forwarded to the Honor Committee, and, at the discretion of the instructor, students may receive "no credit" the assignment in question, independent of the actions taken by the Honor Committee.
- Any questions about what is or is not permitted on an assignment, should be clarified by students with their instructors prior to the completion of their work.

If you believe you may have committed an Honor Offense, you may wish to file a Conscientious Retraction ("CR") by calling the Honor Offices at (434) 924-7602. According to Honor guidelines, for your retraction to be considered valid, it must, among other things, be filed with the Honor Committee before you are aware that the act in question has come under suspicion by anyone. More information can be found at www.virginia.edu/honor. If you have questions regarding the course honor policy, please contact your honor representatives.

Student Well-Being

If you are feeling overwhelmed, stressed, or isolated, there are many individuals here who are ready and wanting to help. Both Amanda Crombie, Director of Academic Programs and Jill Rockwell, Assistant Dean for Student Services are available to help all Batten Students. They are readily accessible during walk in hours or by setting up an appointment.

Alternatively, there are also other University of Virginia resources available. The Student Health Center offers Counseling and Psychological Services (CAPS) for its students. Call 434-243-5150

(or 434-972-7004 for after hours and weekend crisis assistance) to get started and schedule an appointment. If you prefer to speak anonymously and confidentially over the phone, call Madison House's HELP Line at any hour of any day: 434-295-8255.

If you or someone you know is struggling with gender, sexual, or domestic violence, there are many community and University of Virginia resources available. The Office of the Dean of Students, Sexual Assault Resource Agency (SARA), Shelter for Help in Emergency (SHE), and UVA Women's Center are ready and eager to help.

Course Outline

Date	Topic	Required Reading	Due Dates
Aug. 22 (Tu)	Ideal Experiments	—	—
Aug. 24 (Th)	Real Experiments	MHE 1-2	—
Aug. 29 (Tu)		Chetty et al. (2011)	—
Aug. 31 (Th)		Krueger (1999)	PS1
Sept. 5 (Tu)	Selection on Observables: Matching, Regression, and Reweighting	MHE 3.3.1; Dale and Krueger (2002)	—
Sept. 7 (Th)		MHE 3.1-3.2	—
Sept. 12 (Tu)		MHE 3.4.1-3.4.2	—
Sept. 14 (Th)		MHE 3.3.2-3.3.3;	data description
Sept. 19 (Tu)		—	
Sept. 21 (Th)		Dehejia and Wahba (1999)	PS2
Sept. 26 (Tu)	Instruments	MHE 4.1, AbdulkadiroÇ§lu et al. (2011)	—
Sept. 28 (Th)		MHE 4.4	—
Oct. 3 (Tu)	No Class: Reading Day		
Oct. 5 (Th)	Instruments	Angrist et al. (2013)	—
Oct. 10 (Tu)		MHE 4.5-4.6	—
Oct. 12 (Th)		Angrist and Evans (1998)	PS3
Oct. 17 (Tu)	Discontinuities and Distributional FX	Lee and Lemieux (2010)	deck outline
Oct. 19 (Th)		Goodman et al. (2017)	—
Oct. 24 (Tu)		Angrist and Rokkanen (2015)	—
Oct. 26 (Th)		MHE 7	—
Oct. 31 (Tu)		Abadie et al. (2014)	—
Nov. 2 (Th)	No Class: APPAM Conference		
Nov. 7 (Tu)	Discontinuities	—	PS4 (and vote!)
Nov. 9 (Th)	Panel Data	MHE 5.1-5.3, Hoynes and Patel (2015)	—
Nov. 14 (Tu)		Jayachandran and Lleras-Muney (2009)	draft shells
Nov. 16 (Th)		Bertrand et al. (2004)	—
Nov. 21 (Tu)		—	—
Nov. 23 (Th)	No Class: Thanksgiving		
Nov. 28 (Tu)	Hybrids	Walters (2015)	—
Nov. 30 (Th)			—
Dec. 5 (Tu)	Recap	—	—

References

Abadie, A., Chingos, M. M., and West, M. R. (2014). Endogenous Stratification in Randomized Experiments.

AbdulkadiroÇ§lu, A., Angrist, J. D., Dynarski, S. M., Kane, T. J., and Pathak, P. A. (2011). Accountability and Flexibility in Public Schools: Evidence from Boston's Charters and Pilots. *Quarterly Journal of Economics*, 126(2):699–748.

Angrist, J. D. and Evans, W. N. (1998). Children and Their Parents' Labor Supply: Evidence from Exogenous Variation in Family Size. *American Economic Review*, 88(3):450–477.

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Angrist, J. D. and Rokkanen, M. (2015). Wanna Get Away? Regression Discontinuity Estimation of Exam School Effects Away from the Cutoff. *Journal of the American Statistical Association*.

Bertrand, M., Duflo, E., and Mullainathan, S. (2004). How Much Should We Trust Differences-in-Differences Estimates? *Quarterly Journal of Economics*, 119(1):249–275.

Chetty, R., Friedman, J. N., Hilger, N., Saez, E., Schanzenbach, D. W., and Yagan, D. (2011). How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR. *Quarterly Journal of Economics*, 126(4):1593–1660.

Dale, S. B. and Krueger, A. B. (2002). Estimating the Payoff to Attending a More Selective College: an Application of Selection on Observables and Unobservables. *Quarterly Journal of Economics*, 117(4):1491–1527.

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Goodman, J. S., Hurwitz, M., and Smith, J. (2017). Access to Four-Year Public Colleges and Degree Completion. *Journal of Labor Economics*.

Hoynes, H. W. and Patel, A. J. (2015). Effective Policy for Reducing Inequality? The Earned Income Tax Credit and the Distribution of Income.

Jayachandran, S. and Lleras-Muney, A. (2009). Life Expectancy and Human Capital Investments: Evidence from Maternal Mortality Declines. *Quarterly Journal of Economics*, 124(1):349–397.

Krueger, A. B. (1999). Experimental Estimates of Education Production Functions. *The Quarterly Journal of Economics*, 114(2):497–532.

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Walters, C. R. (2015). Inputs in the Production of Early Childhood Human Capital: Evidence from Head Start. *American Economic Journal: Applied Economics*, 7(4):76–102.