Vanderbilt University
Department of Economics

ECON 9540, Spring 2023
Applied Microeconomic Research Designs & Methods

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Class meetings:
Tuesdays, 1:00– 3:30pm
344 Buttrick Hall

Office hours:
Mondays 1:00pm – 3:30pm, or by appointment.

To schedule a meeting, please use https://calendly.com/lesleyjturner/.

Course description: This course is designed to expose you to the core research methods used to conduct applied research (e.g., empirical labor, public, development, health, and education economics) with a focus on research design and getting causal estimates. Our department offers a fantastic econometrics sequence; this course will serve as a complement to the topics covered in these classes. The goal of this course is to help you become a critical consumer of empirical work in existing literature and teach you about techniques that can be applied to your own original research.

Course website: https://lesleyjturner.com/ECON9540S23.html

Expectations of students: Students are expected to read the assigned papers and participate in class discussions. Additionally, students are expected to attend both the Applied Economics Workshop (Tues 4:00 – 5:20pm) and VEAM work in progress seminar (Wed 12:05 – 12:55pm) regularly. The first scheduled Applied Economics Workshop will be held March 21 and the first VEAM will be held January 18.

The grade for this course will be based on:

1) Research proposal (40% of course grade). The proposal must include a clearly defined research question, motivation as to why the question is economically important, a brief review of the literature, an appropriate and state-of-the-art empirical strategy, and a description of potential data sources.

   A) Submit two or three potential questions, each with a short paragraph of motivation by **January 20**.
   B) A discussion of the relevant literature and theory (3 pages or less) is due **February 10**.
   C) A one-page summary of potential data sources is due **February 24.**
   D) A discussion of the empirical methodology should be submitted by **March 31.**
   E) The final proposal is due **April 25.**

2) Presentations of research proposal and replications (20% of course grade).

The last two class sessions (**April 11**, **April 18**) will be devoted to presentations of research proposals. Presentations should be no more than 20 minutes and include a maximum of 8 slides (including the title slide).

3) Three problem sets (10% of course grade each)

Students are encouraged to work in groups but must each submit their own solutions/write-up and code. Assignment and due dates are as follows:

Problem set 1: assigned January 17, due **January 27**.
Problem set 2: assigned February 7, due **February 24**.
Problem set 3: assigned March 28, due **April 14**.

4) Participation (10% of course grade)

Students are expected to complete the required readings (indicated by ** in the reading list) and actively participate in class activities and discussions.

Proposals, problem sets, and presentation slides should be submitted by email no later than 11:59pm CT on the due date unless approval for an extension is gained in advance of the due date.

Course Topics and Reading List

Note: Required readings (**) are listed in order in which they will be covered; other papers are listed in order of publication. Required readings may be added or subtracted but I will give you at least 2 weeks notice for any changes.

1. Regression basics (1 lecture)

A. *Rubin causal model*

** Chapters 1 & 2, Angrist, J. & J. Pischke (2008) *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press. [hereafter MHE]

** Freedman, D. (1991) "Statistical Models and Shoe Leather," *Sociological Methodology* 21: 291-313.

Holland, P. W. (1986) "Statistics and Causal Inference," *Journal of the American Statistical Association* 81: 945-960.

Imbens, G. & J. Angrist (1994) "Identification and Estimation of Local Average Treatment Effects," *Econometrica* 62(2): 467-475.

B. Regression basics

** MHE chapter 3

Cunningham, S. (2019) *Causal Inference: The Mixtape,* Chapter 2.

2. Randomized control trials (1 lecture)

** Heckman, J. J. & J. A. Smith. (1995) "Assessing the Case for Social Experiments," *Journal of Economic Perspectives* 9(2): 85-110.

** Duflo, E., R. Glennerster, & M. Kremer. (2007) "Using Randomization in Development Economics Research: A Toolkit," *Handbook of Development Economics* 4: 3895-3962.

** Muralidharan, K. & Sundararaman, V. (2015) "The Aggregate Effect of School Choice: Evidence from a Two-Stage Experiment in India," *Quarterly Journal of Economics* 130(3): 1011-1066.

Bruhn, M. & D. McKenzie (2009) "In Pursuit of Balance: Randomization in Practice in Development Field Experiments," *American Economic Journal: Applied Economics* 1(4): 200-232.

Deaton, A. S. (2009) "Instruments of Development: Randomization in the Tropics, and the Search for the Elusive Keys to Economic Development," NBER working paper 14690.

Imbens, G. (2010) "Better LATE Than Nothing: Some Comments on Deaton (2009) and Heckman and Urzua (2009)," *Journal of Economic Literature* 48: 399-423.

Allcott, H. (2015) "Site Selection Bias in Program Evaluation," *Quarterly Journal of Economics* 130(3): 1117-1165.

Abadie, A., M. Chingos, & M. West. (2017) "Endogenous Stratification in Randomized Experiments," *Review of Economics and Statistics* 100(4): 567-580.

Andrews, I. & E. Oster (2019) "A Simple Approximation for Evaluating External Validity Bias," *Economics Letters* 178: 58-62.

3. Selection on observables (1 lecture)

A. Conditional Independence Assumption

** MHE 3.3 & 3.4 (re-read).

** Altonji, J. G., T. E. Elder, & C. R. Taber (2005) "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools," *Journal of Political Economy* 113(1): 151-184.

LaLonde, R. J. (1986) "Evaluating the Econometric Evaluations of Training Programs with Experimental Data," *American Economic Review* 76(4): 604-620.

Gelbach, J. (2016) "When do Covariates Matter? And Which Ones, and How Much?" *Journal of Labor Economics* 34(2): 509-543.

Oster, E. (2019) "Unobservable Selection and Coefficient Stability: Theory and Validation," *Journal of Business Economics and Statistics* 37: 187-204.

Pei, Z., J. S. Pischke, & H. Schwandt (2019) "Poorly Measured Confounders are More, Useful on the Left Than on the Right," *Journal of Business & Economic Statistics* 37(2): 205-216.

B. Matching and propensity score reweighting

** Imbens, G. (2015) "Matching Methods in Practice: Three Examples," *Journal of Human Resources* 50(2): 373-419.

Dehejia, R. H. & S. Wahba (2002) "Propensity Score-Matching Methods for Nonexperimental Causal Studies," *Review of Economics and Statistics* 84(1): 151–161.

Smith, J. A. & P. E. Todd (2006) "Does Matching Overcome Lalonde's Critique of Nonexperimental Estimators?" *Journal of Econometrics* 125: 305-353.

Busso, M., J. DiNardo, & J. McCrary (2014) "New Evidence on the Finite Sample Properties of Propensity Score Matching and Reweighting Estimators," *Review of Economics & Statistics* 96(5): 885-897.

4. Data issues (1 lecture)

A. Weighting

** Solon, G., S. J. Haider, & J. M. Wooldridge (2015) "What Are We Weighting For?" *Journal of Human Resources* 50(2): 301–316.

MHE Ch. 3.4.1.

B. Missing data and bounding

** Lee, D. (2009) "Training, Wages, and Sample Selection: Estimating Sharp Bounds on Treatment Effects," *Review of Economics Studies* 76: 1071-1102.

Manski, C. (1989) "Anatomy of the Selection Problem," *Journal of Human Resources* 24(3): 343-360.

Hotz, V.J., C. Mullin, & S. Sanders (1997) "Bounding Causal Effects Using Data from a Contaminated Natural Experiment: Analysing the Effects of Teenage Childbearing," *Review of Economic Studies* 64(4): 575-603.

5. Difference in differences and extensions (2.5 lectures)

A. DD and fixed effects

**MHE Ch. 5

** Goodman-Bacon, A. (2021) "Difference-in-Differences with Variation in Treatment Timing," *Journal of Econometrics* 225(2): 254-277.

Jacobson, L, R. LaLonde, & D. G. Sullivan (2005) "Estimating the Returns to Community College Schooling for Displaced Workers," *Journal of Econometrics* 125(1-2): 271–304.

Gibbons, C., J. C. Suarez Serrato, & M. Urbanic (2019) "Broken or Fixed Effects," *Journal of Econometric Methods* 8(1): 20170002.

de Chaisemartin, C. & X. D'Haultfœuille (2020) "Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects," *American Economic Review* 110(9): 2964-2996.

Kahn-Lang, A. & K. Lang (2020) "The Promise and Pitfalls of Differences-in-Differences: Reflections on 16 and Pregnant and Other Applications," *Journal of Business & Economic Statistics* 38(3): 613-620.

Callaway, B., Goodman-Bacon, A., & Sant'Anna, P. H. C. (2021) "Difference-in-Differences with a Continuous Treatment," arXiv working paper.

B. Event study

** Marcus, M. & P. H. C. Sant'Anna (2021) "The Role of Parallel Trends in Event Study Settings: An Application to Environmental Economics," *Journal of the Association of Environmental and Resource Economists* 8(2): 235-275.

Deshpande, M. & Y. Li (2019) "Who is Screened Out? Application Costs and the Targeting of Disability Programs," *American Economic Journal: Economic Policy* 11(4): 213-248.

Abraham, S. & L. Sun (2021) "Estimating Dynamic Treatment Effects in Event Studies with Heterogeneous Treatment Effects," *Journal of Econometrics* 225(2): 254-277.

Calloway, B. & P.H.C. Sant'Anna (2021) "Difference-in-Differences with Multiple Time Periods," *Journal of Econometrics* 225(2): 254-277.

Rambachan, A. & Roth, J. (2022) "A More Credible Approach to Parallel Trends," working paper.

C. Bartik/shift-share instruments

** Card, D. (2009) "Immigration and Inequality," *American Economic Review* 99(2): 1-21.

** Goldsmith-Pinkham, P., I. Sorkin, & H. Swift (2020) "Bartik Instruments: What, When, Why, and How," *American Economic Review* 110(8): 2586-2624. See also: https://blogs.worldbank.org/impactevaluations/rethinking-identification-under-bartik-shift-share-instrument.

Borusyak, K., P. Hull, & X. Jaravel (2022) "Quasi-Experimental Shift-Share Research Designs," *Review of Economic Studies* 89(1): 181-213.

D. Synthetic control

** Abadie, A., A. Diamond, & J. Hainmueller (2010) "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program," *Journal of the American Statistical Association* 105(490): 493-505.

Abadie, A. (2021) "Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects," *Journal of Economic Literature* 59(2): 391-425. See also NBER SI 2021 Methods Lecture, available at: https://youtu.be/T2p9Wg650bY.

Powell, D. (2022) "Synthetic Control Estimation Beyond Comparative Case Studies: Does the Minimum Wage Reduce Employment?" *Journal of Business and Economic Statistics* 40(3): 1302-1314.

Ben-Michael, E., Feller, A., & Rothstein, J. (2022) "Synthetic controls with staggered adoption," *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* 84(2): 351-381.

6. Instrumental variables (2 lectures)

A. Basics

** MHE Ch. 4

** Angrist, J. and V. Lavy (1999) "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement," *Quarterly Journal of Economics* 114(2): 533-575.

Imbens, G. W., and J. D. Angrist (1994) "Identification and Estimation of Local Average Treatment Effects," *Econometrica* 62(2): 467–75

Evans, W. N. & R. M. Schwab (1995) "Finishing High School and Starting College: Do Catholic Schools Make a Difference?" *Quarterly Journal of Economics* 110(4): 941–974.

Black, D., J. Joonwhi, R. LaLonde, J. Smith, & E. Taylor (2015) "Simple Tests for Selection Bias: Learning more from IV," IZA discussion paper 9346.

Kline, P. & C. R. Walters (2016) "Evaluating Public Programs with Close Substitutes: The Case of Head Start," *Quarterly Journal of Economics* 131(4): 1795-1848.

B. LATE and MTE

** Cameron, S. V. & Taber, C. (2004) "Estimation of Educational Borrowing Constraints and the Returns to Schooling," *Journal of Political Economy* 112(1): 132-182.

Angrist, J., & G. Imbens (1995) "Two Stage Least Squares Estimation of Average Causal Effects in Models with Variable Treatment Intensity," *Journal of the American Statistical Association* 90(430): 431-442.

Abadie, A. (2003) "Semiparametric Instrumental Variable Estimation of Treatment Response Models," *Journal of Econometrics* 113: 231-263.

Heckman, J., S. Urzua, & E. Vytlacil (2006) "Understanding Instrumental Variables in Models with Essential Heterogeneity," *Review of Economics and Statistics* 88(3): 389-432.

Oreopoulos, P. (2006) "Estimating Average and Local Average Treatment Effects of Education When Compulsory Schooling Laws Really Matter," *American Economic Review* 96(1): 152-175.

Cornelissen, T., C. Dustmann, A. Raute, & U. Schonberg (2016) "From LATE to MTE: Alternative Methods for the Evaluation of Policy Interventions," *Labour Economics* 41: 47-60.

Mogstad, M., A. Torgovitsky, & C. R. Walters (2021) "The Causal Interpretation of Two-Stage Least Squares with Multiple Instrumental Variables," *American Economic Review* 111(11): 3663-3698.

C. Administrative screeners

** Maestas, N., Mullen, K. J. & Strand, A. (2013) "Does Disability Insurance Receipt Discourage Work? Using Examiner Assignment to Estimate Causal Effects of SSDI Receipt," *American Economic Review* 103(5): 1797-1829.

** Mueller-Smith, M. (2015) "The Criminal and Labor Market Impacts of Incarceration," working paper.

Dobbie, W., J. Goldin, & C. Yang (2017) "The Effects of Pre-Trial Detention on Conviction, Future Crime, and Employment: Evidence from Randomly Assigned Judges," *American Economics Review* 108(2): 201-240.

7. Regression discontinuity design (2.5 lectures)

A. Introduction and basics

** Lee, D. (2008) "Randomized Experiments from Non-Random Selection in the U.S. House Elections," *Journal of Econometrics* 142(2): 675-697.

** Lee, D. & Lemieux, T. (2010) "Regression Discontinuity Designs in Economics," *Journal of Economic Literature* 48(2): 281-355.

MHE chapter 6

Hahn, J., P. Todd, & W. Van Der Klaauw (2001) "Identification and Estimation of Treatment Effects with a Regression-Discontinuity Design," *Econometrica* 69(1): 201–209.

Almond, D. & J. J. Doyle (2008) "After Midnight: A Regression Discontinuity Design in Length of Postpartum Hospital Stays," NBER working paper 13877.

McCrary, J. (2008) "Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test," *Journal of Econometrics* 142(2): 698-714.

Urquiola, M. & E. Verhoogen (2009) "Class-size Caps, Sorting, and the Regression-Discontinuity Design," *American Economic Review* 99(1): 179-215.

Imbens, G., & Kalyanaraman, K. (2011) "Optimal Bandwidth Choice for the Regression Discontinuity Estimator," *Review of Economic Studies* 79(3): 933-959.

Schmieder, J. F., T. von Wachter, & S. Bender (2012) "The Effects of Extended Unemployment Insurance over the Business Cycle: Evidence from Regression Discontinuity Estimates Over Twenty Years," *Quarterly Journal of Economics* 127(2): 701-752.

Barreca, A. I., J. M. Lindo, & G. R. Waddell (2016) "Heaping-Induced Bias in Regression-Discontinuity Designs," *Economic Inquiry* 54(1): 268-293.

Bertanha, M. & G. W. Imbens. (2020) "External Validity in Fuzzy Regression Discontinuity Designs," *Journal of Business & Economic Statistics* 38(3): 593-612.

Cattaneo, M. D. & R. Titiunik (2021) NBER SI Methods Lecture. See also https://rdpackages.github.io/.

B. *Extensions (RD in space, RD in time, dynamic, multiple cut-offs, unknown threshold, etc.)*

** Cellini, S. R., F. Ferreira, & J. Rothstein (2010) "The Value of School Facility Investments: Evidence from a Dynamic Regression Discontinuity Design," *Quarterly Journal of Economics* 125(1): 215-261.

Card, D., A. Mas, & J. Rothstein (2008) "Tipping and the Dynamics of Segregation," *Quarterly Journal of Economics* 123(1): 177-218.

Angrist, J. D. & Rokkanen, M. (2015) "Wanna Get Away? Regression Discontinuity Estimation of Exam School Effects Away from the Cutoff," *Journal of the American Statistical Association* 110(512): 1331-1344.

Keele, L. J. & R. Titiunik (2015) "Geographic Boundaries as Regression Discontinuities," *Political Analysis* 23(1): 127–155.

Cattaneo, M., L. Keele, G. Vazquez-Bare, & R. Titiunik (2016) "Interpreting Regression Discontinuity Designs with Multiple Cutoffs," *Journal of Politics* 78(4): 1229-1248.

Hausman, C. & D. S. Rapson (2018) "Regression Discontinuity in Time: Considerations for Empirical Applications," *Annual Review of Resource Economics* 10: 533-552.

Bertanha, M. (2020) "Regression Discontinuity Design with Many Thresholds," *Journal of Econometrics* 218(1): 216-241.

C. *Regression Kink*

** Card, D., Lee, D. S., Pei, Z., and Weber A. (2015) "Inference on Causal Effects in a Generalized Regression Kink Design," *Econometrica* 83(6): 2453-2483.

** Turner, L.J. (2017) "The Economic Incidence of Federal Student Grant Aid," working paper.

Nielsen, H. S., Sørensen, T., & Taber, C. (2010) "Estimating the Effect of Student Aid on College Enrollment: Evidence from a Government Grant Policy Reform," *American Economic Journal: Economic Policy* 2(2): 185-215.

8. Bunching estimation (1 lecture)

** Kleven, H. J. (2016) "Bunching," *Annual Review of Economics* 8: 435-464.

** Persson, P. (2020) "Social Insurance and the Marriage Market." *Journal of Political Economy* 128(1): 252-300.

Saez, E. (2010) "Do Taxpayers Bunch at Kink Points?" *American Economic Journal: Economic Policy* 2(3): 180-212.

Chetty, R., J. Friedman, T. Olsen & L. Pistaferri (2011) "Adjustment Costs, Firm Responses, and Micro vs. Macro Labor Supply Elasticities: Evidence from Danish Tax Records," *Quarterly Journal of Economics* 126(2): 749-804.

Manoli, D. S. & A. Weber (2011) "Nonparametric Evidence on the Effects of Financial Incentives on Retirement Decisions," NBER Working Paper 17320.

Kleven, H. & M. Waseem (2013) "Using Notches to Uncover Optimization Frictions and Structural Elasticities: Theory and Evidence from Pakistan," *Quarterly Journal of Economics* 128: 669-723.

Cengiz, D., A. Dube, A. Lindner, & B. Zipperer (2019) "The Effect of Minimum Wages on Low-Wage jobs: Evidence from the United States Using a Bunching Estimator," *Quarterly Journal of Economics* 134(3): 1405-1454.

9. Inference and standard errors [if time]

A. Basics

** MHE Ch. 8

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

Cameron, C. & D. L. Miller (2015) "A Practitioner's Guide to Cluster-Robust Inference," *Journal of Human Resources* 50(2): 317-372.

B. Advanced (wild cluster bootstrap, randomization inference, multiple hypothesis testing, etc.)

** Anderson, M. L. (2008) "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Re-evaluation of the Abecedarian, Perry Preschool, and Early Training Projects," *Journal of the American Statistical Association* 103(84): 1481–1495.

Kling, J., J. Liebman, & L. Katz (2007) "Experimental Analysis of Neighborhood Effects," *Econometrica* 75: 83-119. See the 2005 NBER working paper version for more extensive discussion of multiple hypothesis testing.

Cameron, A. C., J. B. Gelbach, & D. M. Miller (2008) "Bootstrap-Based Improvements for Inference with Clustered Errors," *Review of Economics and Statistics* 90(3): 414-427.

Ganong, P. & S. Jaeger (2018) "A Permutation Test for the Regression Kink Design," *Journal of the American Statistical Association* 113(522): 494-504.

List, J. A., A. M. Shaikh, & Y. Xu. (2019) "Multiple Hypothesis Testing in Experimental Economics," *Experimental Economics* 22: 773-793.

Young, A. (2019) "Channeling Fisher: Randomization Tests and the Statistical Insignificance of Seemingly Significant Experimental Results," *Quarterly Journal of Economics* 134(2): 557-598.

Abadie, A., S. Athey, G. Imbens, & J. Wooldridge (2020) "Sampling-based vs. Design-based Uncertainty in Regression Analysis," *Econometrica* 88(1): 265-296.

de Chaisemartin, C., & Ramirez-Cuellar, J. (2020) "At what level should one cluster standard errors in paired experiments, and in stratified experiments with small strata?" NBER working paper 27609.

General References

Methods

Cunningham, Scott (2019). *Causal Inference: The Mixtape.*

Cameron, C. and P. Trivedi (2005) *Microeconometrics: Methods and Applications.* Cambridge University Press.

Imbens, G. W. and D. B. Rubin. (2015) *Causal Inference for Statistics, Social, and Biomedical Sciences.* Cambridge University Press.

Imbens, G. and Wooldridge, J. (2007) What's New in Econometrics: NBER Summer Institute Mini-Course. Available at: http://www.nber.org/minicourse3.html

Wooldridge, J. M. (2010) *Econometric Analysis of Cross Section and Panel Data*, MIT Press.

Complete Index of NBER Summer Institute Methods Lectures, available at: https://www.nber.org/SI_econometrics_lectures.html.

Blundell, R. & M. Costas Dias (2009) "Alternative Approaches to Evaluation in Empirical Microeconomics," *Journal of Human Resources* 44(3): 565 – 640.

Useful for writing literature reviews

Annual Review of Economics, https://www.annualreviews.org/journal/economics.

Journal of Economic Literature, https://www.aeaweb.org/journals/jel.

Journal of Economic Perspectives, https://www.aeaweb.org/journals/jep.

AEA Papers & Proceedings (short write-ups of a selection of papers presented at the annual AEA/ASSA meetings), https://www.aeaweb.org/journals/pandp.

Handbook chapters.

Misc.

Gentzkow, M. & J. M. Shapiro. (2014). "Code and Data for the Social Sciences: A Practitioner's Guide."

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NBER working paper series. Create an account at https://www.nber.org/login/ to sign up for weekly notification emails (Monday).

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