

ECO 7427: Econometric Methods II

Syllabus

Lecture: Tuesdays & Thursdays, Periods 9-10 (4:05 pm - 6:00 pm), Room MAT 114.

Instructor: Prof. Hector H. Sandoval
hsandoval@ufl.edu
MAT 325
Office hours: Tuesdays, 11:45 am - 1:30 pm via Zoom

Course Description

This course is part of the Ph.D. Econometrics and Public Economics sequences. It is intended to be an applied econometrics class focusing on how to use econometrics to address causal questions and more generally on how to conduct empirical research in applied microeconomics. The focus of the course will be to link student's preparation in formal econometrics to data. The first part of the course will cover a number of topics that are useful in conducting empirical research. The second part will cover the theory and econometrics of social interactions and social networks with a particular emphasis in the topic of peer effects in education.

Assignments & Grading

Grades will be distributed as follows: assignments 60%, final project 30%, and presentation 10%. For the assignments, you are encouraged to collaborate with other students, but you should submit your own individual work. Problem sets submitted after the deadline are **not** accepted. The final project will involve writing an empirical paper and presenting it at the end of the semester. You may work in groups of two for the final project and presentation.

Letter grades will be determined as follows: [0-60) E; [60-70) D; [70-77) C; [77-80) B-; [80-85) B; [85-90) B+; [90-92) A-; [92-100] A. Note that 92.0 is A, while 91.99 is A-.

Lecture Notes & Textbooks

The main materials for this course will be available on Canvas. The following books and textbooks are extremely useful references for doing empirical work.

- Angrist, J. D., & Pischke, J. S. (2008). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton university press.
- Online resources: <https://www.mostlyharmlesseconometrics.com/>
- Angrist, J. D., & Pischke, J. S. (2014). *Mastering 'Metrics: The Path from Cause to Effect*. Princeton University Press.
- Online resources: <https://www.masteringmetrics.com/>
- Cameron, A. C., & Trivedi, P. K. (2005). *Microeconometrics: Methods and Applications*. Cambridge University Press.
- Cameron, A. C., & Trivedi, P. K. (2010). *Microeconometrics Using Stata (Revised Edition)*. Stata Press.
- Online resources: <https://www.stata-press.com/data/musr.html>

- Cattaneo, M., Idrobo, N., & Titiunik, R. (2020). *A Practical Introduction to Regression Discontinuity Designs: Foundations*. Cambridge University Press.
- Online resources: cattaneo.princeton.edu/publications
- Cunningham, S. (2021). *Causal Inference. The Mixtape*. Yale University Press.
- Online resources: <https://mixtape.scunning.com/>
- Hansen, B. (2021) *Econometrics*.
- Online resources: www.ssc.wisc.edu/~bhansen/econometrics/
- Imbens, G. W., & Rubin, D. B. (2015). *Causal Inference in Statistics, Social, and Biomedical Sciences*. Cambridge University Press.
- Jackson, M. O. (2010). *Social and Economic Networks*. Princeton University Press.
- Manski, C. F. (2009). *Identification for Prediction and Decision*. Harvard University Press.
- Murnane, R. J., & Willett, J. B. (2010). *Methods Matter: Improving Causal Inference in Educational and Social Science Research*. Oxford University Press.

The book by Hansen is an excellent graduate-level textbook in econometrics. The books by Cameron & Trivedi provide a comprehensive treatment of microeconometrics, emphasizing Stata. The book by Imbens & Rubin lays out the assumptions needed for causal inference and describes the leading analysis methods. Both Angrist & Pischke books provide intuitive and practical explanations for some of the topics. Similarly, the book by Cunningham introduces the methods necessary to arrive at answers to the questions of causation using a range of modeling techniques and coding instructions for both R and Stata. As well, the book by Murnane & Willet offers methodological insights on causal inference while examining the consequences of a wide variety of educational policies. Cattaneo *et al.* is an accessible and practical guide for the analysis and interpretation of regression discontinuity (RD) designs. The textbook by Jackson provides a comprehensive overview and synthesis of models and techniques for analyzing social and economic network. The book by Manski provides a comprehensive discussion of his work on identification. For the corresponding topic, I reference chapters from these difference sources throughout the course.

Course Outline & Schedule (subject to change)

| TUESDAY | THURSDAY |
|--|--|
| Jan 4th | 6th Lecture 1: Introduction - Recap |
| 11th | 13th |
| 18th Lecture 2: Identification | 20th |
| 25th Lecture 3: Causality & RCT | 27th |
| Feb 1st | 3rd <i>Assignment #1 due</i> |
| 8th Lecture 4: Matching | 10th |
| 15th Lecture 5: Topics in IV | 17th |
| 22nd | 24th Lecture 6: Panel Data <i>Assignment #2 due</i> |
| Mar 1st Lecture 7: Regression Discontinuity | 3rd <i>Assignment #3 due</i> |
| 8th Spring Break - NO CLASS | 10th Spring Break - NO CLASS |
| 15th Lecture 8: Topics in Diff-in-Diff | 17th |
| 22nd Lecture 9: Synthetic Control | 24th |
| 29th Lecture 10: Microeconomic Policy Evaluation | 31st Lecture 11: Social Interactions <i>Assignment #4 due</i> |
| Apr 5th | 7th |
| 12th Lecture 12: Social Networks | 14th |
| 19th <i>Student presentation</i> | 21st No CLASS <i>Assignment #5 due</i> |
| 26th NO CLASS | 28th <i>Final project due</i> |

Policies

Make-Up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>.

Students Requiring Accommodations

Students with disabilities requesting accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Digital Millennium Copyright Act (DMCA) Notice

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Recording Policy

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Detailed Reading List (Required readings: † = Methodology; ‡=Empirical paper)**[01/06] Lecture 1: Introduction - Recap** «3 lectures»

- ▷ Estimand, estimator, and estimate
- ▷ Conditional expectation function and least squares
- ▷ Inference

Readings:

Angrist, J. D., & Pischke, J. S. (2008) Chapter 8.

† Cunningham S. (2021) §2.

† Hansen B. (2021) Chapters 1 - 4.

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

Abadie, A., Athey, S., Imbens, G. W., & Wooldridge, J. (2017). When should you adjust standard errors for clustering? (No. w24003). National Bureau of Economic Research.

Duflo, E., Dupas, P., & Kremer, M. (2011). Peer Effects, Teacher Incentives, and the Impact of Tracking: Evidence from a Randomized Evaluation in Kenya. *The American Economic Review*, 101(5), 1739-1774.

[01/18] Lecture 2: Identification «2 lectures»

- ▷ Prediction with incomplete data
- ▷ Response-based sampling & Analysis of treatment response

Readings:

† Manski (2009) Chapters 1 - 3, 6 - 7.

Manski, C. F., & Nagin, D. S. (1998). Bounding disagreements about treatment effects: A case study of sentencing and recidivism. *Sociological Methodology*, 28(1), 99-137.

Manski, C. F. (2016). Credible interval estimates for official statistics with survey nonresponse. *Journal of Econometrics*, 191(2), 293-301.

[01/25] Lecture 3: Causality & RCT «4 lectures»

- ▷ Potential outcomes, treatment effects & RCT
- ▷ Randomized experiments
- ▷ Experimental approach to development economics
- ▷ Conditional cash transfer program: Progresa/Oportunidades

Readings:

Angrist, J. D., & Pischke, J. S. (2014) Chapter 1.

- † Cunningham S. (2021) §4.
- † Imbens, G. W., & Rubin, D. B. (2015) Chapters 1 - 3, 7.
Murnane & Willet (2010) Chapters 4 - 5.
- ‡ Angelucci, M., & De Giorgi, G. (2009). Indirect Effects of an Aid Program: How Do Cash Transfers Affect Ineligibles' Consumption?. *The American Economic Review*, 99(1), 486-508.
Aron-Dine, A., Einav, L., & Finkelstein, A. (2013). The RAND health insurance experiment, three decades later. *Journal of Economic Perspectives*, 27(1), 197-222.
Athey, S., & Imbens, G. W. (2017). The Econometrics of Randomized Experiments. In *Handbook of Economic Field Experiments* (Vol. 1, pp. 73-140). North-Holland.
- † Banerjee, A. V., & Duflo, E. (2009). The Experimental Approach to Development Economics. *Annual Review of Economics*, 1(1), 151-178
- ‡ Chetty, R., Hendren, N., & Katz, L. F. (2016). The effects of exposure to better neighborhoods on children: New evidence from the Moving to Opportunity experiment. *The American Economic Review*, 106(4), 855-902.
- † Deaton, A., & Cartwright, N. (2018). Understanding and Misunderstanding Randomized Controlled Trials. *Social Science & Medicine*, 210, 2-21.
- † Cox, D. R. (1992). Causality: Some Statistical Aspects. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 291-301.
- † Heckman, J. J. (1991). Randomization and Social Policy Evaluation. *National Bureau of Economic Research*, Technical Working Paper No. 107.
Heckman, J. J., & Smith, J. A. (1995). Assessing the Case for Social Experiments. *Journal of Economic Perspectives*, 9(2), 85-110.
- † Holland, P. (1986). Statistics and Causal Inference. *Journal of the American Statistical Association*, 81(396), 945-960.
Hudgens, M. G., & Halloran, M. E. (2008). Toward Causal Inference with Interference. *Journal of the American Statistical Association*, 103(482), 832-842.
- ‡ Kling, J. R., Ludwig, J., & Katz, L. F. (2005). Neighborhood Effects on Crime for Female and Male Youth: Evidence from a Randomized Housing Voucher Experiment. *The Quarterly Journal of Economics*, 120(1), 87-130.
Manski, C. F. (2013). Identification of Treatment Response with Social Interactions. *The Econometrics Journal*, 16(1), S1-S23.
- ‡ Miguel, E., & Kremer, M. (2004). Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities. *Econometrica*, 72(1), 159-217.
- ‡ Parker, S. W., & Todd, P. E. (2017). Conditional Cash Transfers: The Case of Progresa/ Oportunidades. *Journal of Economic Literature*, 55(3), 866-915.
Ravallion, M. (2018). Should the Randomistas (Continue to) Rule?. *Center for Global Development Working Paper*, 492.
- † Rubin, D. B. (1974). Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies. *Journal of Educational Psychology*, 66(5), 688.

Sobel, M. E. (2006). What Do Randomized Studies of Housing Mobility Demonstrate? Causal Inference in the Face of Interference. *Journal of the American Statistical Association*, 101(476), 1398-1407.

Słoczyński, T. (2020). Interpreting ols estimands when treatment effects are heterogeneous: Smaller groups get larger weights. *The Review of Economics and Statistics*, 1-27.

[02/08] **Lecture 4: Matching** «2 lectures»

- ▷ Matching, Exact and Approximate Matching
- ▷ Ex-ante Program Evaluation

Readings:

† Imbens, G. W., & Rubin, D. B. (2015) Chapters 12 - 13.

† Cunningham S. (2021) §5.

Murnane & Willet (2010) Chapter 12.

† Caliendo, M., & Kopeinig, S. (2008). Some Practical Guidance for the Implementation of Propensity Score Matching. *Journal of Economic Surveys*, 22(1), 31-72.

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

Heckman, J. J., Ichimura, H., & Todd, P. (1998). Matching as an Econometric Evaluation Estimator. *The Review of Economic Studies*, 65(2), 261-294.

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

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

† Lechner, M. (2002). Program Heterogeneity and Propensity Score Matching: An application to the Evaluation of Active Labor Market Policies. *The Review of Economics and Statistics*, 84(2), 205-220.

† Rosenbaum, P. R., & Rubin, D. B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, 70(1), 41-55

† Smith, J. A., & Todd, P. E. (2005). Does Matching Overcome LaLonde's critique of Nonexperimental Estimators? *Journal of Econometrics*, 125(1), 305-353.

Black, D. A., & Smith, J. A. (2004). How Robust is the Evidence on the Effects of College Quality? Evidence From Matching. *Journal of Econometrics*, 121(1), 99-124.

Jalan, J., & Ravallion, M. (2003). Does Piped Water Reduce Diarrhea for Children in Rural India?. *Journal of Econometrics*, 112(1), 153-173

† Todd, P. E., & Wolpin, K. I. (2008). Ex-ante Evaluation of Social Programs. *Annales d'Economie et de Statistique*, 263-291.

Mueser, P. R., Troske, K. R., & Gorislavsky, A. (2007). Using State Administrative Data to Measure Program Performance. *The Review of Economics and Statistics*, 89(4), 761-783.

[02/15] **Lecture 5: Topics in Instrumental Variables** «3 lectures»

- ▷ Instrumental variables
- ▷ Local Average Treatment Effects (LATE)
- ▷ IV in Randomized Trials

Readings:

Angrist, J. D., & Pischke, J. S. (2014) Chapter 3.

† Cunningham S. (2021) §7.

† Hansen (2021) Chapter 12.

Murnane & Willet (2010) Chapter 10.

Andrews, I., Stock, J. H., & Sun, L. (2019). Weak instruments in instrumental variables regression: Theory and practice. *Annual Review of Economics*, 11, 727-753.

Angrist, J. D. (1990). Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records. *The American Economic Review*, 313-336.

Angrist, J., Bettinger, E., Bloom, E., King, E., & Kremer, M. (2002). Vouchers for private schooling in Colombia: Evidence from a randomized natural experiment. *The American Economic Review*, 92(5), 1535-1558.

Angrist, J. D., Imbens, G. W., & Rubin, D. B. (1996). Identification of Causal Effects Using Instrumental Variables. *Journal of the American statistical Association*, 91(434), 444-455.

‡ Angrist, J. D., & Keueger, A. B. (1991). Does Compulsory School Attendance Affect Schooling and Earnings?. *The Quarterly Journal of Economics*, 106(4), 979-1014.

Bloom, H. S. (1984). Accounting for No-shows in Experimental Evaluation Designs. *Evaluation Review*, 8(2), 225-246.

Bloom, H. S., Orr, L. L., Bell, S. H., Cave, G., Doolittle, F., Lin, W., & Bos, J. M. (1997). The Benefits and Costs of JTPA Title II-A programs: Key Findings from the National Job Training Partnership Act study. *Journal of Human Resources*, 32(3).

‡ Bound, J., Jaeger, D. A., & Baker, R. M. (1995). Problems with Instrumental Variables Estimation When the Correlation Between the Instruments and the Endogenous Explanatory Variable is Weak. *Journal of the American Statistical Association*, 90(430), 443-450.

Dee, T. S. (2004). Are there civic returns to education?. *Journal of Public Economics*, 88(9-10), 1697-1720.

‡ Dynarski, S., Libassi, C. J., Michelmore, K., & Owen, S. (2018). Closing the Gap: The effect of a Targeted, Tuition-free Promise on College Choices of High-achieving, Low-income Students. *National Bureau of Economic Research*, Working Paper No. 25349.

‡ Fowlie, M., Greenstone, M., & Wolfram, C. (2018). Do Energy Efficiency Investments Deliver? Evidence from the Weatherization Assistance Program. *The Quarterly Journal of Economics*, 133(3), 1597-1644.

† Gandhi, R., Knittel, C. R., Pedro, P., & Wolfram, C. (2016). Running Randomized Field Experiments for Energy Efficiency Programs: A Practitioner's Guide. *Economics of Energy & Environmental Policy*, 5(2), 7-26.

Hahn, J., & Hausman, J. (2003). Weak Instruments: Diagnosis and Cures in Empirical Econometrics. *The American Economic Review*, 93(2), 118-125.

‡ Heckman, J. J. (1996). Randomization as an Instrumental Variable. *The Review of Economics and Statistics*, 336-341.

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

Mogstad, M., Torgovitsky, A., & Walters, C. R. (2021). The causal interpretation of two-stage least squares with multiple instrumental variables. *The American Economic Review*, 111(11), 3663-98.

Murray, M. P. (2006). Avoiding Invalid Instruments and Coping with Weak Instruments. *The Journal of Economic Perspectives*, 20(4), 111-132.

Staiger, D., & Stock, J. H. (1997). Instrumental Variables Regression with Weak Instruments. *Econometrica*, 65(3), 557-586.

‡ Stock, J. H., Wright, J. H., & Yogo, M. (2002). A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments. *Journal of Business & Economic Statistics*, 20(4), 518-529.

[02/24] **Lecture 6: Panel Data** «1 lecture»

▷ Random Effects, Fixed Effects, and First Difference

Readings:

† Cunningham S. (2021) §8.

† Hansen (2021) Chapter 17.

‡ Almond, D., Chay, K. Y., & Lee, D. S. (2005). The Costs of Low Birth Weight. *The Quarterly Journal of Economics*, 120(3), 1031-1083.

‡ Bleakley, H. (2010). Malaria Eradication in the Americas: A Retrospective Analysis of Childhood Exposure. *American Economic Journal: Applied Economics*, 2(2), 1-45.

Bond, S. R. (2002). Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice. *Portuguese Economic Journal*, 1(2), 141-162.

[03/01] **Lecture 7: Regression Discontinuity** «2 lectures»

▷ Sharp & Fuzzy Regression Discontinuity

Readings:

Angrist, J. D., & Pischke, J. S. (2014) Chapter 4.

† Cattaneo, M., Idrobo, N., & Titiunik, R. (2020)

† Cunningham S. (2021) §6.

Murnane & Willet (2010) Chapter 9.

- ‡ Anderson, M., Dobkin, C., & Gross, T. (2012). The Effect of Health Insurance Coverage on the Use of Medical Services. *American Economic Journal: Economic Policy*, 4(1), 1-27.
- ‡ Angrist, J. D., & Lavy, V. (1999). Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement. *The Quarterly Journal of Economics*, 114(2), 533-575.
- Card, D., Dobkin, C., & Maestas, N. (2008). The Impact of Nearly Universal Insurance Coverage on Health Care Utilization: Evidence from Medicare. *The American Economic Review*, 98(5), 2242-58.
- ‡ Carpenter, C., & Dobkin, C. (2009). The Effect of Alcohol Consumption on Mortality: Regression Discontinuity Evidence from the Minimum Drinking Age. *American Economic Journal: Applied Economics*, 1(1), 164-182
- Carpenter, C., & Dobkin, C. (2011). The Minimum Legal Drinking Age and Public Health. *Journal of Economic Perspectives*, 25(2), 133-156.
- Hahn, J., Todd, P., & Van der Klaauw, W. (2001). Identification and Estimation of Treatment Effects with a Regression Discontinuity Design. *Econometrica*, 69(1), 201-209.
- Imbens, G. W., & Lemieux, T. (2008). Regression Discontinuity Designs: A Guide to Practice. *Journal of Econometrics*, 142(2), 615-635.
- ‡ Jacob, B. A., & Lefgren, L. (2004). Remedial education and student achievement: A regression-discontinuity analysis. *The Review of Economics and Statistics*, 86(1), 226-244.
- ‡ Jepsen, C., Mueser, P., & Troske, K. (2016). Labor Market Returns to the GED using Regression Discontinuity Analysis. *Journal of Political Economy*, 124(3), 621-649.
- Jepsen, C., Mueser, P., & Troske, K. (2017). Second Chance for High School Dropouts? A Regression Discontinuity Analysis of Postsecondary Educational Returns to the GED. *Journal of Labor Economics*, 35(S1), S273-S304.
- Lee, D. S. (2008). Randomized Experiments from Non-random Selection in US House Elections. *Journal of Econometrics*, 142(2), 675-697.
- Lee, D. S., & Lemieux, T. (2010). Regression Discontinuity Designs in Economics. *Journal of Economic Literature*, 48(2), 281-355.

[03/15] **Lecture 8: Difference-in-Differences** «2 lectures»

- ▷ Sharp & Fuzzy Difference-in-Differences (DiD), and Changes-in-Changes (CiC)
- ▷ Two-way Fixed Effects

Readings:

Angrist, J. D., & Pischke, J. S. (2014) Chapter 5.

- † Cunningham S. (2021) §9.
- † Hansen (2019) Chapter 18.

- ‡ Adda, J., & Cornaglia, F. (2010). The Effect of Bans and Taxes on Passive Smoking. *American Economic Journal: Applied Economics*, 2(1), 1-32
- † Athey, S., & Imbens, G. W. (2006). Identification and Inference in Nonlinear Difference-in-Differences Models. *Econometrica*, 74(2), 431-497.

- † Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How Much Should We Trust Differences-in-Differences Estimates?. *The Quarterly Journal of Economics*, 119(1), 249-275.
- † Callaway, B., & Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2), 200-230.
- Conley, T. G., & Taber, C. R. (2011). Inference with “Difference in Differences” with a Small Number of Policy Changes. *The Review of Economics and Statistics*, 93(1), 113-125.
- † de Chaisemartin, C., & D’Haultfœuille, X. (2017). Fuzzy Differences-in-Differences. *The Review of Economic and Studies*, 85(2), 999-1028.
- De Chaisemartin, C., & d’Haultfœuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *The American Economic Review*, 110(9), 2964-96.
- ‡ Duflo, E. (2001). Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment. *The American Economic Review*, 91(4), 795-813.
- † Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*
- Jaeger, D. A., Joyce, T. J., & Kaestner, R. (2020). A cautionary tale of evaluating identifying assumptions: did reality TV really cause a decline in teenage childbearing?. *Journal of Business & Economic Statistics*, 38(2), 317-326.
- Kahn-Lang, A., & Lang, K. (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.
- Lechner, M. (2011). The Estimation of Causal Effects by Difference-in-Difference Methods. *Foundations and Trends in Econometrics*, 4(3), 165-224.
- Lee, M. J., & Kang, C. (2006). Identification for Difference in Differences with Cross-Section and Panel Data. *Economics Letters*, 92(2), 270-276
- ‡ Kottelenberg, M. J., & Lehrer, S. F. (2017). Targeted or universal coverage? Assessing heterogeneity in the effects of universal child care. *Journal of Labor Economics*, 35(3), 609-653.
- ‡ Muralidharan, K., & Prakash, N. (2017). Cycling to School: Increasing Secondary School Enrollment for Girls in India. *American Economic Journal: Applied Economics*, 9(3), 321-50.
- Wooldridge, J. (2021). Two-way fixed effects, the two-way Mundlak regression, and difference-in-differences estimators. Available at SSRN 3906345.

[03/22] **Lecture 9: Synthetic Control** «2 lectures»

- ▷ Synthetic Control Group
- ▷ Application: Wage Impacts

Readings:

- † Cunningham S. (2021) §9.
- † Abadie, A. (2021). Using synthetic controls: Feasibility, data requirements, and methodological aspects. *Journal of Economic Literature*, 59(2), 391-425.
- Abadie, A., & Gardeazabal, J. (2003). The Economic Costs of Conflict: A Case Study of the Basque Country. *The American Economic Review*, 93(1), 113-132.

- † Abadie, A., Diamond, A., & Hainmueller, J. (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., Diamond, A., & Hainmueller, J. (2015). Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, 59(2), 495-510.
- Anastasopoulos, L. J., Borjas, G. J., Cook, G. G., & Lachanski, M. (2021). Job Vacancies and Immigration: Evidence from the Mariel Supply Shock. *Journal of Human Capital*, 15(1), 1-33.
- Arkhangelsky, D., Athey, S., Hirshberg, D. A., Imbens, G. W., & Wager, S. (2021). Synthetic Difference-in-Differences. *The American Economic Review*, 111(12), 4088-4118.
- Bohn, S., Lofstrom, M., & Raphael, S. (2014). Did the 2007 Legal Arizona Workers Act reduce the state's unauthorized immigrant population?. *The Review of Economics and Statistics*, 96(2), 258-269.
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[03/29] **Lecture 10: Microeconomic Policy Evaluation** «1 lecture»

- ▷ Review of Methods: Experiments, Natural Experiments, Discontinuity, Matching, IV, & Control Function

Readings:

- † Abadie, A., & Cattaneo, M. D. (2018). Econometric Methods for Program Evaluation. *Annual Review of Economics*, 10, 465-503.
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[03/31] **Lecture 11: Social Interactions** «3 lectures»

- ▷ Social Interactions: Econometrics
- ▷ Social Interactions: Further Applications

Readings:

- † Akerlof, G. A. (1997). Social Distance and Social Decisions. *Econometrica*, 1005-1027.

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- † Bramoullé, Y., Djebbari, H., & Fortin, B. (2009). Identification of Peer Effects through Social Networks. *Journal of Econometrics*, 150(1), 41-55.
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- Guryan, J., Kroft, K., & Notowidigdo, M. J. (2009). Peer Effects in the Workplace: Evidence from Random Groupings in Professional Golf Tournaments. *American Economic Journal: Applied Economics*, 1(4), 34-68.
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- † Manski, C. F. (1993). Identification of Endogenous Social Effects: The Reflection Problem. *The Review of Economic Studies*, 60(3), 531-542.
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[04/12] **Lecture 12: Social Networks** «2 lectures»

- ▷ Introduction to Social Networks

Readings:

- † Jackson, M. O. (2010) Chapters 1 - 2.
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