

Microeconometrics

ä reading list

Jiaming Mao

This Version: Spring 2022

1 Introduction

- Imbens, G. W. and Wooldridge, J. M. (2009). Recent developments in the econometrics of program evaluation. *Journal of Economic Literature*, 47(1)
- Angrist, J. D. and Pischke, J.-S. (2010). The credibility revolution in empirical economics: How better research design is taking the con out of econometrics. *Journal of Economic Perspectives*, 24(2)
- Einav, L. and Levin, J. (2010). Empirical industrial organization: A progress report. *Journal of Economic Perspectives*, 24(2)
- Gangl, M. (2010). Causal inference in sociological research. *Annual Review of Sociology*, 36(1)
- Varian, H. R. (2014). Big data: New tricks for econometrics. *Journal of Economic Perspectives*, 28(2)
- Athey, S. and Imbens, G. W. (2017b). The state of applied econometrics: Causality and policy evaluation. *Journal of Economic Perspectives*, 31(2)
- Abadie, A. and Cattaneo, M. D. (2018). Econometric methods for program evaluation. *Annual Review of Economics*, 10(1)
- Athey, S. and Imbens, G. W. (2019). Machine learning methods that economists should know about. *Annual Review of Economics*, 11(1)
- Imbens, G. W. (2020). Potential outcome and directed acyclic graph approaches to causality: Relevance for empirical practice in economics. *Journal of Economic Literature*, 58(4)

2 Causal Graph

- Pearl, J. (1995). Causal diagrams for empirical research. *Biometrika*, 82(4)
- Pearl, J. (2009). Causal inference in statistics: An overview. *Statistics Surveys*, 3
- Spirtes, P. (2010). Introduction to causal inference. *Journal of Machine Learning Research*, 11(54)
- Elwert, F. and Winship, C. (2014). Endogenous selection bias: The problem of conditioning on a collider variable. *Annual Review of Sociology*, 40(1)
- Pearl, J. and Bareinboim, E. (2014). External validity: From do-calculus to transportability across populations. *Statistical Science*, 29(4)
- Glymour, C., Zhang, K., and Spirtes, P. (2019). Review of causal discovery methods based on graphical models. *Frontiers in Genetics*, 10

3 Randomized Experiment

Method

- Harrison, G. W. and List, J. A. (2004). Field experiments. *Journal of Economic Literature*, 42(4)
- Deaton, A. (2010). Instruments, randomization, and learning about development. *Journal of Economic Literature*, 48(2)
- Bloniarz, A., Liu, H., Zhang, C.-H., Sekhon, J. S., and Yu, B. (2016). Lasso adjustments of treatment effect estimates in randomized experiments. *Proceedings of the National Academy of Sciences*, 113(27)
- Kasy, M. (2016). Why experimenters might not always want to randomize, and what they could do instead. *Political Analysis*, 24(3)
- Wager, S., Du, W., Taylor, J., and Tibshirani, R. J. (2016). High-dimensional regression adjustments in randomized experiments. *Proceedings of the National Academy of Sciences*, 113(45)
- Athey, S. and Imbens, G. W. (2017a). The econometrics of randomized experiments. In Banerjee, A. V. and Duflo, E., editors, *Handbook of Economic Field Experiments*, volume 1 of *Handbook of Field Experiments*

- Baldassarri, D. and Abascal, M. (2017). Field experiments across the social sciences. *Annual Review of Sociology*, 43(1)
- Deaton, A. and Cartwright, N. (2018). Understanding and misunderstanding randomized controlled trials. *Social Science & Medicine*, 210
- Bouguen, A., Huang, Y., Kremer, M., and Miguel, E. (2019). Using randomized controlled trials to estimate long-run impacts in development economics. *Annual Review of Economics*, 11(1)
- Kasy, M. and Sautmann, A. (2021). Adaptive treatment assignment in experiments for policy choice. *Econometrica*, 89(1)

Application

- LaLonde, R. J. (1986). Evaluating the econometric evaluations of training programs with experimental data. *American Economic Review*, 76(4)
- Krueger, A. B. (1999). Experimental estimates of education production functions. *The Quarterly Journal of Economics*, 114(2)
- Sacerdote, B. (2001). Peer effects with random assignment: Results for dartmouth roommates. *The Quarterly Journal of Economics*, 116(2)
- Bertrand, M. and Mullainathan, S. (2004). Are emily and greg more employable than lakisha and jamal? A field experiment on labor market discrimination. *American Economic Review*, 94(4)
- Miguel, E. and Kremer, M. (2004). Worms: Identifying impacts on education and health in the presence of treatment externalities. *Econometrica*, 72(1)
- Ho, D. E. and Imai, K. (2006). Randomization inference with natural experiments. *Journal of the American Statistical Association*, 101(475)
- Kling, J. R., Liebman, J. B., and Katz, L. F. (2007). Experimental analysis of neighborhood effects. *Econometrica*, 75(1)
- Gerber, A. S., Green, D. P., and Larimer, C. W. (2008). Social pressure and voter turnout: Evidence from a large-scale field experiment. *American Political Science Review*, 102(1)
- Jensen, R. T. and Miller, N. H. (2008). Giffen behavior and subsistence consumption. *American Economic Review*, 98(4)

- Shadish, W. R., Clark, M. H., and Steiner, P. M. (2008). Can nonrandomized experiments yield accurate answers? A randomized experiment comparing random and nonrandom assignments. *Journal of the American Statistical Association*, 103(484)
- Bandiera, O., Barankay, I., and Rasul, I. (2009). Social connections and incentives in the workplace: Evidence from personnel data. *Econometrica*, 77(4)
- Dupas, P. (2011). Do teenagers respond to HIV risk information? Evidence from a field experiment in kenya. *American Economic Journal: Applied Economics*, 3(1)
- Kaboski, J. P. and Townsend, R. M. (2011). A structural evaluation of a large-scale quasi-experimental microfinance initiative. *Econometrica*, 79(5)
- Bond, R. M., Fariss, C. J., Jones, J. J., Kramer, A. D. I., Marlow, C., Settle, J. E., and Fowler, J. H. (2012). A 61-million-person experiment in social influence and political mobilization. *Nature*, 489(7415)
- Crepon, B., Duflo, E., Gurgand, M., Rathelot, R., and Zamora, P. (2013). Do labor market policies have displacement effects? Evidence from a clustered randomized experiment. *The Quarterly Journal of Economics*, 128(2)
- Banerjee, A., Duflo, E., Glennerster, R., and Kinnan, C. (2015). The miracle of microfinance? Evidence from a randomized evaluation. *American Economic Journal: Applied Economics*, 7(1)
- Caria, S., Gordon, G., Kasy, M., Quinn, S., Shami, S., and Teytelboym, A. (2020). An adaptive targeted field experiment: Job search assistance for refugees in jordan. *CESifo Working Paper No. 8535*

4 Treatment Effects under Unconfoundedness

Method

- Imbens, G. W. (2004). Nonparametric estimation of average treatment effects under exogeneity: A review. *The Review of Economics and Statistics*, 86(1)
- Chernozhukov, V., Chetverikov, D., Demirer, M., Duflo, E., Hansen, C., and Newey, W. (2017). Double/debiased/neyman machine learning of treatment effects. *American Economic Review*, 107(5)
- Liu, L., Mukherjee, R., and Robins, J. M. (2020). On nearly assumption-free tests of nominal confidence interval coverage for causal parameters estimated by machine learning. *Statistical Science*, 35(3)

- Semenova, V. and Chernozhukov, V. (2020). Debiased machine learning of conditional average treatment effects and other causal functions. *The Econometrics Journal*, 24(2)
- Farrell, M. H., Liang, T., and Misra, S. (2021). Deep neural networks for estimation and inference. *Econometrica*, 89(1)

5 Heterogeneous Treatment Effects

Method

- Athey, S. and Imbens, G. (2016). Recursive partitioning for heterogeneous causal effects. *Proceedings of the National Academy of Sciences*, 113(27)
- Wager, S. and Athey, S. (2018). Estimation and inference of heterogeneous treatment effects using random forests. *Journal of the American Statistical Association*, 113(523)
- Athey, S., Tibshirani, J., and Wager, S. (2019). Generalized random forests. *The Annals of Statistics*, 47(2)
- Kunzel, S. R., Sekhon, J. S., Bickel, P. J., and Yu, B. (2019). Metalearners for estimating heterogeneous treatment effects using machine learning. *Proceedings of the National Academy of Sciences*, 116(10)
- Oprescu, M., Syrgkanis, V., and Wu, Z. S. (2019). Orthogonal random forest for causal inference. *36th International Conference on Machine Learning, ICML 2019*
- Gao, Z., Hastie, T., and Tibshirani, R. (2020). Assessment of heterogeneous treatment effect estimation accuracy via matching. *arXiv:2003.03881 [stat]*
- Knaus, M. C., Lechner, M., and Strittmatter, A. (2021). Machine learning estimation of heterogeneous causal effects: Empirical monte carlo evidence. *The Econometrics Journal*, 24(1)
- Nie, X. and Wager, S. (2021). Quasi-oracle estimation of heterogeneous treatment effects. *Biometrika*, 108(2)

6 High-dimensional Methods

Method

- Fan, J. and Li, R. (2001). Variable selection via nonconcave penalized likelihood and its oracle properties. *Journal of the American Statistical Association*, 96(456)

- Zou, H. (2006). The adaptive lasso and its oracle properties. *Journal of the American Statistical Association*, 101(476)
- Belloni, A., Chernozhukov, V., and Wang, L. (2011). Square-root lasso: pivotal recovery of sparse signals via conic programming. *Biometrika*, 98(4)
- Belloni, A., Chen, D., Chernozhukov, V., and Hansen, C. (2012). Sparse models and methods for optimal instruments with an application to eminent domain. *Econometrica*, 80(6)
- Belloni, A. and Chernozhukov, V. (2013). Least squares after model selection in high-dimensional sparse models. *Bernoulli*, 19(2)
- Zhang, C.-H. and Zhang, S. S. (2014). Confidence intervals for low dimensional parameters in high dimensional linear models. *Journal of the Royal Statistical Society. Series B (Statistical Methodology)*, 76(1)
- Belloni, A., Chernozhukov, V., and Hansen, C. (2014a). High-dimensional methods and inference on structural and treatment effects. *Journal of Economic Perspectives*, 28(2)
- Belloni, A., Chernozhukov, V., and Hansen, C. (2014b). Inference on treatment effects after selection among high-dimensional controls. *The Review of Economic Studies*, 81(2)
- Belloni, A., Chernozhukov, V., and Wang, L. (2014c). Pivotal estimation via square-root lasso in nonparametric regression. *The Annals of Statistics*, 42(2)
- Lockhart, R., Taylor, J., Tibshirani, R. J., and Tibshirani, R. (2014). A significance test for the lasso. *The Annals of Statistics*, 42(2)
- Chernozhukov, V., Hansen, C., and Spindler, M. (2015). Post-selection and post-regularization inference in linear models with many controls and instruments. *American Economic Review*, 105(5)
- Taylor, J. and Tibshirani, R. J. (2015). Statistical learning and selective inference. *Proceedings of the National Academy of Sciences*, 112(25)
- Belloni, A., Chernozhukov, V., Hansen, C., and Kozbur, D. (2016). Inference in high-dimensional panel models with an application to gun control. *Journal of Business & Economic Statistics*, 34(4)
- Hansen, B. (2016). Efficient shrinkage in parametric models. *Journal of Econometrics*, 190(1)
- Lee, J. D., Sun, D. L., Sun, Y., and Taylor, J. E. (2016). Exact post-selection inference, with application to the lasso. *The Annals of Statistics*, 44(3)

- Belloni, A., Chernozhukov, V., Fernandez-Val, I., and Hansen, C. (2017). Program evaluation and causal inference with high-dimensional data. *Econometrica*, 85(1)
- Abadie, A. and Kasy, M. (2019). Choosing among regularized estimators in empirical economics: The risk of machine learning. *The Review of Economics and Statistics*, 101(5)
- Dukes, O. and Vansteelandt, S. (2021). Inference for treatment effect parameters in potentially misspecified high-dimensional models. *Biometrika*, 108(2)

7 Matching

Method

- Abadie, A. and Imbens, G. W. (2006). Large sample properties of matching estimators for average treatment effects. *Econometrica*, 74(1)
- Ho, D. E., Imai, K., King, G., and Stuart, E. A. (2007). Matching as nonparametric pre-processing for reducing model dependence in parametric causal inference. *Political Analysis*, 15(3)
- Sekhon, J. S. (2009). Opiates for the matches: Matching methods for causal inference. *Annual Review of Political Science*, 12(1)
- Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical sciences*, 25(1)
- Abadie, A. and Imbens, G. W. (2011). Bias-corrected matching estimators for average treatment effects. *Journal of Business & Economic Statistics*, 29(1)
- Diamond, A. and Sekhon, J. S. (2013). Genetic matching for estimating causal effects: A general multivariate matching method for achieving balance in observational studies. *The Review of Economics and Statistics*, 95(3)
- Imbens, G. W. (2015). Matching methods in practice: Three examples. *The Journal of Human Resources*, 50(2)
- Otsu, T. and Rai, Y. (2017). Bootstrap inference of matching estimators for average treatment effects. *Journal of the American Statistical Association*, 112(520)
- Athey, S., Imbens, G. W., and Wager, S. (2018). Approximate residual balancing: debiased inference of average treatment effects in high dimensions. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 80(4)

- Abadie, A. and Spiess, J. (2020). Robust post-matching inference. *Journal of the American Statistical Association*, 1(13)
- Ozery-Flato, M., Thodoroff, P., Ninio, M., Rosen-Zvi, M., and El-Hay, T. (2020). Adversarial balancing for causal inference. *arXiv:1810.07406 [cs, stat]*
- Rosenbaum, P. R. (2020). Modern algorithms for matching in observational studies. *Annual Review of Statistics and Its Application*, 7(1)

Application

- 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. *The Quarterly Journal of Economics*, 117(4)
- Harding, D. J. (2003). Counterfactual models of neighborhood effects: The effect of neighborhood poverty on dropping out and teenage pregnancy. *American Journal of Sociology*, 109(3)
- Jalan, J. and Ravallion, M. (2003). Does piped water reduce diarrhea for children in rural india? *Journal of Econometrics*, 112(1)
- Black, D. and Smith, J. (2004). How robust is the evidence on the effects of college quality? Evidence from matching. *Journal of Econometrics*, 121(1)
- Arceneaux, K., Gerber, A. S., and Green, D. P. (2006). Comparing experimental and matching methods using a large-scale voter mobilization experiment. *Political Analysis*, 14(1)
- Colak, G. and Whited, T. (2007). Spin-offs, divestitures, and conglomerate investment. *Review of Financial Studies*, 20(3)

8 Propensity Score Methods

Method

- Rosenbaum, P. R. and Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1)
- Hahn, J. (1998). On the role of the propensity score in efficient semiparametric estimation of average treatment effects. *Econometrica*, 66(2)
- Hirano, K. and Imbens, G. W. (2001). Estimation of causal effects using propensity score weighting: An application to data on right heart catheterization. *Health Services and Outcomes Research Methodology*, 2(3)

- Ichimura, H. and Taber, C. (2001). Propensity-score matching with instrumental variables. *American Economic Review*, 91(2)
- Dehejia, R. H. and Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *The Review of Economics and Statistics*, 84(1)
- Hirano, K., Imbens, G. W., and Ridder, G. (2003). Efficient estimation of average treatment effects using the estimated propensity score. *Econometrica*, 71(4)
- Bang, H. and Robins, J. M. (2005). Doubly robust estimation in missing data and causal inference models. *Biometrics*, 61(4)
- Kang, J. D. Y. and Schafer, J. L. (2007). Demystifying double robustness: A comparison of alternative strategies for estimating a population mean from incomplete data. *Statistical Science*, 22(4)
- Tan, Z. (2007). Comment: Understanding or, PS and DR. *Statistical Science*, 22(4)
- Imai, K. and Ratkovic, M. (2014). Covariate balancing propensity score. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 76(1)
- Abadie, A. and Imbens, G. W. (2016). Matching on the estimated propensity score. *Econometrica*, 84(2)
- Benkeser, D., Carone, M., Laan, M. J. V. D., and Gilbert, P. B. (2017). Doubly robust nonparametric inference on the average treatment effect. *Biometrika*, 104(4)
- Fong, C., Hazlett, C., and Imai, K. (2018). Covariate balancing propensity score for a continuous treatment: Application to the efficacy of political advertisements. *The Annals of Applied Statistics*, 12(1)
- King, G. and Nielsen, R. (2019). Why propensity scores should not be used for matching. *Political Analysis*, 27(4)
- Ning, Y., Sida, P., and Imai, K. (2020). Robust estimation of causal effects via a high-dimensional covariate balancing propensity score. *Biometrika*, 107(3)

Application

- Dehejia, R. H. and Wahba, S. (1999). Causal effects in nonexperimental studies: Reevaluating the evaluation of training programs. *Journal of the American Statistical Association*, 94(448)
- Smith, J. A. and Todd, P. E. (2001). Reconciling conflicting evidence on the performance of propensity-score matching methods. *American Economic Review*, 91(2)

- Smith, J. A. and Todd, P. E. (2005). Does matching overcome LaLonde’s critique of nonexperimental estimators? *Journal of Econometrics*, 125(1)
- Chan, D., Ge, R., Gershony, O., Hesterberg, T., and Lambert, D. (2010). Evaluating online ad campaigns in a pipeline: Causal models at scale. In *Proceedings of ACM SIGKDD 2010*

9 Ensemble Methods

Method

- Hjort, N. L. and Claeskens, G. (2003). Frequentist model average estimators. *Journal of the American Statistical Association*, 98(464)
- Hansen, B. E. (2007). Least squares model averaging. *Econometrica*, 75(4)
- Hansen, B. E. and Racine, J. S. (2012). Jackknife model averaging. *Journal of Econometrics*, 167(1)
- Koop, G., Leon-Gonzalez, R., and Strachan, R. (2012). Bayesian model averaging in the instrumental variable regression model. *Journal of Econometrics*, 171(2)
- Ando, T. and Li, K.-C. (2014). A model-averaging approach for high-dimensional regression. *Journal of the American Statistical Association*, 109(505)
- Moral-Benito, E. (2015). Model averaging in economics: An overview. *Journal of Economic Surveys*, 29(1)
- Kitagawa, T. and Muris, C. (2016). Model averaging in semiparametric estimation of treatment effects. *Journal of Econometrics*, 193(1)
- Ando, T. and Li, K.-C. (2017). A weight-relaxed model averaging approach for high-dimensional generalized linear models. *The Annals of Statistics*, 45(6)
- Steel, M. F. J. (2020). Model averaging and its use in economics. *Journal of Economic Literature*, 58(3)

10 Instrumental Variables

Method

- Bound, J., Jaeger, D. A., and 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)

- Angrist, J. D., Imbens, G. W., and Rubin, D. B. (1996). Identification of causal effects using instrumental variables. *Journal of the American statistical Association*, 91(434)
- Angrist, J. D., Graddy, K., and Imbens, G. W. (2000). The interpretation of instrumental variables estimators in simultaneous equations models with an application to the demand for fish. *The Review of Economic Studies*, 67(3)
- Angrist, J. D. and Krueger, A. B. (2001). Instrumental variables and the search for identification: From supply and demand to natural experiments. *Journal of Economic Perspectives*, 15(4)
- Abadie, A. (2003). Semiparametric instrumental variable estimation of treatment response models. *Journal of Econometrics*, 113(2)
- Kleibergen, F. and Zivot, E. (2003). Bayesian and classical approaches to instrumental variable regression. *Journal of Econometrics*, 114(1)
- Newey, W. K. and Powell, J. L. (2003). Instrumental variable estimation of nonparametric models. *Econometrica*, 71(5)
- Hall, P. and Horowitz, J. L. (2005). Nonparametric methods for inference in the presence of instrumental variables. *Annals of Statistics*, 33(6)
- Murray, M. P. (2006). Avoiding invalid instruments and coping with weak instruments. *Journal of Economic Perspectives*, 20(4)
- Chernozhukov, V., Imbens, G. W., and Newey, W. K. (2007). Instrumental variable estimation of nonseparable models. *Journal of Econometrics*, 139(1)
- Frolich, M. (2007). Nonparametric IV estimation of local average treatment effects with covariates. *Journal of Econometrics*, 139(1)
- Horowitz, J. L. and Lee, S. (2007). Nonparametric instrumental variables estimation of a quantile regression model. *Econometrica*, 75(4)
- Conley, T. G., Hansen, C. B., McCulloch, R. E., and Rossi, P. E. (2008). A semi-parametric bayesian approach to the instrumental variable problem. *Journal of Econometrics*, 144(1)
- Kuersteiner, G. and Okui, R. (2010). Constructing optimal instruments by first-stage prediction averaging. *Econometrica*, 78(2)
- Darolles, S., Fan, Y., Florens, J.-P., and Renault, E. (2011). Nonparametric instrumental regression. *Econometrica*, 79(5)

- Horowitz, J. L. (2011). Applied nonparametric instrumental variables estimation. *Econometrica*, 79(2)
- Bollen, K. A. (2012). Instrumental variables in sociology and the social sciences. *Annual Review of Sociology*, 38(1)
- Florens, J.-P. and Simoni, A. (2012). Nonparametric estimation of an instrumental regression: A quasi-bayesian approach based on regularized posterior. *Journal of Econometrics*, 170(2)
- Gagliardini, P. and Scaillet, O. (2012a). Nonparametric instrumental variable estimation of structural quantile effects. *Econometrica*, 80(4)
- Gagliardini, P. and Scaillet, O. (2012b). Tikhonov regularization for nonparametric instrumental variable estimators. *Journal of Econometrics*, 167(1)
- Okui, R., Small, D. S., Tan, Z., and Robins, J. M. (2012). Doubly robust instrumental variable regression. *Statistica Sinica*, 22(1)
- Chesher, A. and Rosen, A. M. (2013). What do instrumental variable models deliver with discrete dependent variables? *American Economic Review*, 103(3)
- Newey, W. K. (2013). Nonparametric instrumental variables estimation. *American Economic Review*, 103(3)
- Imbens, G. W. (2014). Instrumental variables: An econometrician's perspective. *Statistical Science*, 29(3)
- Kasy, M. (2014). Instrumental variables with unrestricted heterogeneity and continuous treatment. *The Review of Economic Studies*, 81(4)
- Kitagawa, T. (2015). A test for instrument validity. *Econometrica*, 83(5)
- DiTraglia, F. J. (2016). Using invalid instruments on purpose: Focused moment selection and averaging for GMM. *Journal of Econometrics*, 195(2)
- Chetverikov, D. and Wilhelm, D. (2017). Nonparametric instrumental variable estimation under monotonicity. *Econometrica*, 85(4)
- Mogstad, M. and Torgovitsky, A. (2018). Identification and extrapolation of causal effects with instrumental variables. *Annual Review of Economics*, 10(1)
- Andrews, I., Stock, J. H., and Sun, L. (2019). Weak instruments in instrumental variables regression: Theory and practice. *Annual Review of Economics*, 11(1)

- Breunig, C., Mammen, E., and Simoni, A. (2020). Ill-posed estimation in high-dimensional models with instrumental variables. *Journal of Econometrics*, 219(1)
- Gold, D., Lederer, J., and Tao, J. (2020). Inference for high-dimensional instrumental variables regression. *Journal of Econometrics*, 217(1)
- Goldsmith-Pinkham, P., Sorkin, I., and Swift, H. (2020). Bartik instruments: What, when, why, and how. *American Economic Review*, 110(8)
- Chen, X., Christensen, T., and Kankanala, S. (2021). Adaptive estimation and uniform confidence bands for nonparametric IV. *arXiv:2107.11869 [econ, stat]*

Application

- Angrist, J. D. (1990). Lifetime earnings and the vietnam era draft lottery: Evidence from social security administrative records. *American Economic Review*, 80(3)
- Angrist, J. D. and Krueger, A. B. (1991). Does compulsory school attendance affect schooling and earnings? *The Quarterly Journal of Economics*, 106(4)
- Levitt, S. (1997). Using electoral cycles in police hiring to estimate the effect of police on crime. *American Economic Review*, 87(3)
- 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)
- Acemoglu, D., Johnson, S., and Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, 91(5)
- Card, D. (2001). Estimating the return to schooling: Progress on some persistent econometric problems. *Econometrica*, 69(5)
- Kling, J. R. (2001). Interpreting instrumental variables estimates of the returns to schooling. *Journal of Business & Economic Statistics*, 19(3)
- Abadie, A., Angrist, J., and Imbens, G. (2002). Instrumental variables estimates of the effect of subsidized training on the quantiles of trainee earnings. *Econometrica*, 70(1)
- Edin, P.-A., Fredriksson, P., and Aslund, O. (2003). Ethnic enclaves and the economic success of immigrants - evidence from a natural experiment. *The Quarterly Journal of Economics*, 118(1)
- Black, S. E., Devereux, P. J., and Salvanes, K. G. (2005). The more the merrier? The effect of family size and birth order on children's education. *The Quarterly Journal of Economics*, 120(2)

- Bennis, M., Nielsen, K. M., Perez-Gonzalez, F., and Wolfenzon, D. (2007). Inside the family firm: The role of families in succession decisions and performance. *The Quarterly Journal of Economics*, 122(2)
- Angrist, J. D., Chen, S. H., and Song, J. (2011). Long-term consequences of vietnam-era conscription: New estimates using social security data. *American Economic Review*, 101(3)
- Nunn, N. and Qian, N. (2011). The potato's contribution to population and urbanization: Evidence from a historical experiment. *The Quarterly Journal of Economics*, 126(2)
- Nunn, N. and Wantchekon, L. (2011). The slave trade and the origins of mistrust in africa. *American Economic Review*, 101(7)
- Autor, D. H., Dorn, D., and Hanson, G. H. (2013). The china syndrome: Local labor market effects of import competition in the united states. *American Economic Review*, 103(6)
- Angrist, J. D., Cohodes, S. R., Dynarski, S. M., Pathak, P. A., and Walters, C. R. (2016). Stand and deliver: Effects of boston's charter high schools on college preparation, entry, and choice. *Journal of Labor Economics*, 34(2)
- Bai, Y. and Jia, R. (2016). Elite recruitment and political stability: The impact of the abolition of china's civil service exam. *Econometrica*, 84(2)
- Shue, K. and Townsend, R. R. (2017). How do quasi-random option grants affect CEO risk-taking? *The Journal of Finance*, 72(6)
- Acemoglu, D. and Restrepo, P. (2020). Robots and jobs: Evidence from US labor markets. *Journal of Political Economy*, 128(6)
- Manacorda, M. and Tesei, A. (2020). Liberation technology: Mobile phones and political mobilization in africa. *Econometrica*, 88(2)

11 Difference-in-Differences

Method

- Bertrand, M., Duflo, E., and Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics*, 119(1)
- Abadie, A. (2005). Semiparametric difference-in-differences estimators. *The Review of Economic Studies*, 72(1)

- Athey, S. and Imbens, G. W. (2006). Identification and inference in nonlinear difference-in-differences models. *Econometrica*, 74(2)
- Lechner, M. (2011). The estimation of causal effects by difference-in-difference methods. *Foundations and Trends in Econometrics*, 4(3)
- de Chaisemartin, C. and D'Haultfoeuille, X. (2018). Fuzzy differences-in-differences. *The Review of Economic Studies*, 85(2)
- Sant'Anna, P. H. C. and Zhao, J. (2020). Doubly robust difference-in-differences estimators. *Journal of Econometrics*, 219(1)
- Arkhangelsky, D., Athey, S., Hirshberg, D. A., Imbens, G. W., and Wager, S. (2021). Synthetic difference-in-differences. *American Economic Review*, 111(12)
- Callaway, B. and Sant'Anna, P. H. C. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2)
- de Chaisemartin, C. and D'Haultfoeuille, X. (2021). Difference-in-differences estimators of intertemporal treatment effects. *arXiv:2007.04267 [econ]*
- D'Haultfoeuille, X., Hoderlein, S., and Sasaki, Y. (2021). Nonparametric difference-in-differences in repeated cross-sections with continuous treatments. *arXiv:2104.14458 [econ]*
- Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2)
- Imai, K. and Kim, I. S. (2021). On the use of two-way fixed effects regression models for causal inference with panel data. *Political Analysis*, 29(3)
- Athey, S. and Imbens, G. W. (2022). Design-based analysis in difference-in-differences settings with staggered adoption. *Journal of Econometrics*, 226(1)
- de Chaisemartin, C. and D'Haultfoeuille, X. (2022). Two-way fixed effects and differences-in-differences with heterogeneous treatment effects: A survey. *arXiv:2112.04565 [econ]*
- Roth, J. (2022). Pre-test with caution: Event-study estimates after testing for parallel trends. *American Economic Review: Insights*, forthcoming
- Roth, J., Sant'Anna, P. H. C., Bilinski, A., and Poe, J. (2022). What's trending in difference-in-differences? A synthesis of the recent econometrics literature. *arXiv:2201.01194 [econ, stat]*

Application

- Card, D. (1990). The impact of the mariel boatlift on the miami labor market. *ILR Review*, 43(2)
- Card, D. and Krueger, A. (1994). Minimum wages and employment: A case study of the fast-food industry in new jersey and pennsylvania. *American Economic Review*, 84(4)
- Gruber, J. (1994). The incidence of mandated maternity benefits. *American Economic Review*, 84(3)
- Eissa, N. and Liebman, J. B. (1996). Labor supply response to the earned income tax credit. *The Quarterly Journal of Economics*, 111(2)
- Jayaratne, J. and Strahan, P. E. (1996). The finance-growth nexus: Evidence from bank branch deregulation. *The Quarterly Journal of Economics*, 111(3)
- Card, D. and Krueger, A. B. (2000). Minimum wages and employment: A case study of the fast-food industry in new jersey and pennsylvania: Reply. *The American Economic Review*, 90(5)
- Donohue, III, J. J. and Levitt, S. D. (2001). The impact of legalized abortion on crime. *The Quarterly Journal of Economics*, 116(2)
- Duflo, E. (2001). Schooling and labor market consequences of school construction in indonesia: Evidence from an unusual policy experiment. *American Economic Review*, 91(4)
- Di Tella, R. and Schargrodsky, E. (2004). Do police reduce crime? Estimates using the allocation of police forces after a terrorist attack. *American Economic Review*, 94(1)
- Galiani, S., Gertler, P., and Schargrodsky, E. (2005). Water for life: The impact of the privatization of water services on child mortality. *Journal of Political Economy*, 113(1)
- Qian, N. (2008). Missing women and the price of tea in china: The effect of sex-specific earnings on sex imbalance. *The Quarterly Journal of Economics*, 123(3)
- Abadie, A. and Dermisi, S. (2008). Is terrorism eroding agglomeration economies in central business districts? Lessons from the office real estate market in downtown chicago. *Journal of Urban Economics*, 64(2)
- Bleakley, H. (2010). Malaria eradication in the americas: A retrospective analysis of childhood exposure. *American Economic Journal: Applied Economics*, 2(2)

- Butler, A. W. and Cornaggia, J. (2011). Does access to external finance improve productivity? Evidence from a natural experiment. *Journal of Financial Economics*, 99(1)
- Gormley, T. A. and Matsa, D. A. (2011). Growing out of trouble? Corporate responses to liability risk. *The Review of Financial Studies*, 24(8)
- Morse, A. (2011). Payday lenders: Heroes or villains? *Journal of Financial Economics*, 102(1)
- Becker, B. and Stromberg, P. (2012). Fiduciary duties and equity-debtholder conflicts. *The Review of Financial Studies*, 25(6)
- Hayes, R. M., Lemmon, M., and Qiu, M. (2012). Stock options and managerial incentives for risk taking: Evidence from FAS 123r. *Journal of Financial Economics*, 105(1)
- Naritomi, J. (2019). Consumers as tax auditors. *American Economic Review*, 109(9)
- Akey, P. and Appel, I. (2021). The limits of limited liability: Evidence from industrial pollution. *The Journal of Finance*, 76(1)

12 Synthetic Control

Method

- Abadie, A., Diamond, A., and 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)
- Abadie, A., Diamond, A., and Hainmueller, J. (2015). Comparative politics and the synthetic control method. *American Journal of Political Science*, 59(2)
- Li, K. T. (2020). Statistical inference for average treatment effects estimated by synthetic control methods. *Journal of the American Statistical Association*, 115(532)
- Abadie, A. (2021). Using synthetic controls: Feasibility, data requirements, and methodological aspects. *Journal of Economic Literature*, 59(2)
- Abadie, A. and L’Hour, J. (2021). A penalized synthetic control estimator for disaggregated data. *Journal of the American Statistical Association*, 116(536)
- Ben-Michael, E., Feller, A., and Rothstein, J. (2021). The augmented synthetic control method. *Journal of the American Statistical Association*, 116(536)
- Ferman, B. (2021). On the properties of the synthetic control estimator with many periods and many controls. *Journal of the American Statistical Association*, 116(536)

- Ferman, B. and Pinto, C. (2021). Synthetic controls with imperfect pretreatment fit. *Quantitative Economics*, 12(4)
- Kellogg, M., Mogstad, M., Pouliot, G. A., and Torgovitsky, A. (2021). Combining matching and synthetic control to tradeoff biases from extrapolation and interpolation. *Journal of the American Statistical Association*, 116(536)

Application

- Abadie, A. and Gardeazabal, J. (2003). The economic costs of conflict: A case study of the basque country. *American Economic Review*, 93(1)
- Andersson, J. J. (2019). Carbon taxes and CO₂ emissions: Sweden as a case study. *American Economic Journal: Economic Policy*, 11(4)
- Peri, G. and Yasenov, V. (2019). The labor market effects of a refugee wave: Synthetic control method meets the mariel boatlift. *Journal of Human Resources*, 54(2)

13 Regression Discontinuity

Method

- Hahn, J., Todd, P., and Van der Klaauw, W. (2001). Identification and estimation of treatment effects with a regression-discontinuity design. *Econometrica*, 69(1)
- Cook, T. D. (2008). "waiting for life to arrive": A history of the regression-discontinuity design in psychology, statistics and economics. *Journal of Econometrics*, 142(2)
- Imbens, G. W. and Lemieux, T. (2008). Regression discontinuity designs: A guide to practice. *Journal of Econometrics*, 142(2)
- Lee, D. S. (2008). Randomized experiments from non-random selection in U.S. house elections. *Journal of Econometrics*, 142(2)
- Lee, D. S. and Lemieux, T. (2010). Regression discontinuity designs in economics. *Journal of Economic Literature*, 48(2)
- Frandsen, B. R., Frolich, M., and Melly, B. (2012). Quantile treatment effects in the regression discontinuity design. *Journal of Econometrics*, 168(2)
- Calonico, S., Cattaneo, M. D., and Titiunik, R. (2014). Robust nonparametric confidence intervals for regression-discontinuity designs. *Econometrica*, 82(6)

- Card, D., Lee, D. S., Pei, Z., and Weber, A. (2015). Inference on causal effects in a generalized regression kink design. *Econometrica*, 83(6)
- Cattaneo, M. D., Idrobo, N., and Titiunik, R. (2019). A practical introduction to regression discontinuity designs: Foundations. *arXiv:1911.09511 [econ, stat]*
- Bertanha, M. (2020). Regression discontinuity design with many thresholds. *Journal of Econometrics*, 218(1)
- Villamizar-Villegas, M., Pinzon-Puerto, F. A., and Ruiz-Sanchez, M. A. (2022). A comprehensive history of regression discontinuity designs: An empirical survey of the last 60 years. *Journal of Economic Surveys*, forthcoming

Application

- Angrist, J. D. and Pischke, J. (1999). Using maimonides' rule to estimate the effect of class size on scholastic achievement. *The Quarterly Journal of Economics*, 114(2)
- Anderson, M. and Magruder, J. (2012). Learning from the crowd: Regression discontinuity estimates of the effects of an online review database. *The Economic Journal*, 122(563)
- DiNardo, J. and Lee, D. S. (2004). Economic impacts of new unionization on private sector employers: 1984-2001. *The Quarterly Journal of Economics*, 119(4)
- Lee, D. S., Moretti, E., and Butler, M. J. (2004). Do voters affect or elect policies? Evidence from the U.S. House. *The Quarterly Journal of Economics*, 119(3)
- Chay, K. and Greenstone, M. (2005). Does air quality matter? Evidence from the housing market. *Journal of Political Economy*, 113(2)
- Oreopoulos, P. (2006). Estimating average and local average treatment effects of education when compulsory schooling laws really matter. *American Economic Review*, 96(1)
- Carpenter, C. and 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)
- Hoekstra, M. (2009). The effect of attending the flagship state university on earnings: A discontinuity-based approach. *The Review of Economics and Statistics*, 91(4)
- Dell, M. (2010). The persistent effects of peru's mining mita. *Econometrica*, 78(6)
- Keys, B. J., Mukherjee, T., Seru, A., and Vig, V. (2010). Did securitization lead to lax screening? Evidence from subprime loans. *The Quarterly Journal of Economics*, 125(1)

- Chen, Y., Ebenstein, A., Greenstone, M., and Li, H. (2013). Evidence on the impact of sustained exposure to air pollution on life expectancy from china's huai river policy. *Proceedings of the National Academy of Sciences*, 110(32)
- Abdulkadiroglu, A., Angrist, J., and Pathak, P. (2014). The elite illusion: Achievement effects at boston and new york exam schools. *Econometrica*, 82(1)
- Almeida, H., Fos, V., and Kronlund, M. (2016). The real effects of share repurchases. *Journal of Financial Economics*, 119(1)
- Cohen, P., Hahn, R., Hall, J., Levitt, S., and Metcalfe, R. (2016). Using big data to estimate consumer surplus: The case of uber. *Working Paper*
- Malenko, N. and Shen, Y. (2016). The role of proxy advisory firms: Evidence from a regression-discontinuity design. *The Review of Financial Studies*, 29(12)
- Ebenstein, A., Fan, M., Greenstone, M., He, G., and Zhou, M. (2017). New evidence on the impact of sustained exposure to air pollution on life expectancy from china's huai river policy. *Proceedings of the National Academy of Sciences*, 114(39)
- Dell, M., Lane, N., and Querubin, P. (2018). The historical state, local collective action, and economic development in vietnam. *Econometrica*, 86(6)
- Dube, A., Giuliano, L., and Leonard, J. (2019). Fairness and frictions: The impact of unequal raises on quit behavior. *American Economic Review*, 109(2)
- Bleemer, Z. and Mehta, A. (2022). Will studying economics make you rich? A regression discontinuity analysis of the returns to college major. *American Economic Journal: Applied Economics*, forthcoming

14 Structural Estimation

- Heckman, J. J. (2000). Causal parameters and policy analysis in economics: A twentieth century retrospective. *The Quarterly Journal of Economics*, 115(1)
- Heckman, J. J. (2005). The scientific model of causality. *Sociological Methodology*, 35(1)
- Sobel, M. E. (2005). Discussion: 'the scientific model of causality'. *Sociological Methodology*, 35(1)
- Heckman, J. J. and Vytlacil, E. J. (2007a). Econometric evaluation of social programs, part I: Causal models, structural models and econometric policy evaluation. In Heckman, J. J. and Leamer, E. E., editors, *Handbook of Econometrics*, volume 6. Elsevier

- Heckman, J. J. and Vytlacil, E. J. (2007b). Econometric evaluation of social programs, part II: Using the marginal treatment effect to organize alternative econometric estimators to evaluate social programs, and to forecast their effects in new environments. In Heckman, J. J. and Leamer, E. E., editors, *Handbook of Econometrics*, volume 6. Elsevier
- Abbring, J. H. and Heckman, J. J. (2007). Econometric evaluation of social programs, part III: Distributional treatment effects, dynamic treatment effects, dynamic discrete choice, and general equilibrium policy evaluation. In Heckman, J. J. and Leamer, E. E., editors, *Handbook of Econometrics*, volume 6. Elsevier
- Reiss, P. C. and Wolak, F. A. (2007). Structural econometric modeling: Rationales and examples from industrial organization. In Heckman, J. J. and Leamer, E. E., editors, *Handbook of Econometrics*, volume 6. Elsevier
- Keane, M. P. (2010). A structural perspective on the experimentalist school. *Journal of Economic Perspectives*, 24(2)
- Nevo, A. and Whinston, M. D. (2010). Taking the dogma out of econometrics: Structural modeling and credible inference. *Journal of Economic Perspectives*, 24(2)
- Strebulaev, I. A. and Whited, T. M. (2012). Dynamic models and structural estimation in corporate finance. *Foundations and Trends(R) in Finance*, 6(1)
- Pearl, J. (2015). Trygve haavelmo and the emergence of causal calculus. *Econometric Theory*, 31(1)
- Low, H. and Meghir, C. (2017). The use of structural models in econometrics. *Journal of Economic Perspectives*, 31(2)
- Andrews, I., Gentzkow, M., and Shapiro, J. M. (2020a). On the informativeness of descriptive statistics for structural estimates. *Econometrica*, 88(6)
- Andrews, I., Gentzkow, M., and Shapiro, J. M. (2020b). Transparency in structural research. *Journal of Business & Economic Statistics*, 38(4)
- Iskhakov, F., Rust, J., and Schjerning, B. (2020). Machine learning and structural econometrics: contrasts and synergies. *The Econometrics Journal*, 23(3)

15 Dynamic Discrete Choice Models

Method

- Hotz, V. J. and Miller, R. A. (1993). Conditional choice probabilities and the estimation of dynamic models. *The Review of Economic Studies*, 60(3)
- Keane, M. P. and Wolpin, K. I. (1994). The solution and estimation of discrete choice dynamic programming models by simulation and interpolation: Monte carlo evidence. *The Review of Economics and Statistics*, 76(4)
- Aguirregabiria, V. and Mira, P. (2002). Swapping the nested fixed point algorithm: A class of estimators for discrete markov decision models. *Econometrica*, 70(4)
- Magnac, T. and Thesmar, D. (2002). Identifying dynamic discrete decision processes. *Econometrica*, 70(2)
- Aguirregabiria, V. and Mira, P. (2007). Sequential estimation of dynamic discrete games. *Econometrica*, 75(1)
- Bajari, P., Benkard, C. L., and Levin, J. (2007). Estimating dynamic models of imperfect competition. *Econometrica*, 75(5)
- Pesendorfer, M. and Schmidt-Dengler, P. (2008). Asymptotic least squares estimators for dynamic games¹. *The Review of Economic Studies*, 75(3)
- Imai, S., Jain, N., and Ching, A. (2009). Bayesian estimation of dynamic discrete choice models. *Econometrica*, 77(6)
- Norets, A. (2009). Inference in dynamic discrete choice models with serially orrelated unobserved state variables. *Econometrica*, 77(5)
- Aguirregabiria, V. and Mira, P. (2010). Dynamic discrete choice structural models: A survey. *Journal of Econometrics*, 156(1)
- Arcidiacono, P. and Ellickson, P. B. (2011). Practical methods for estimation of dynamic discrete choice models. *Annual Review of Economics*, 3(1)
- Arcidiacono, P. and Miller, R. A. (2011). Conditional choice probability estimation of dynamic discrete choice models with unobserved heterogeneity. *Econometrica*, 79(6)
- Keane, M. P., Todd, P. E., and Wolpin, K. I. (2011). The structural estimation of behavioral models: Discrete choice dynamic programming methods and applications. In Ashenfelter, O. and Card, D., editors, *Handbook of Labor Economics*, volume 4. Elsevier

- Aguirregabiria, V. and Magesan, A. (2013). Euler equations for the estimation of dynamic discrete choice structural models. *Advances in Econometrics*, 31
- Norets, A. and Tang, X. (2014). Semiparametric inference in dynamic binary choice models. *Review of Economic Studies*, 81(3)
- Egedal, M., Lai, Z., and Su, C.-L. (2015). Estimating dynamic discrete-choice games of incomplete information. *Quantitative Economics*, 6(3)
- Chiong, K. X., Galichon, A., and Shum, M. (2016). Duality in dynamic discrete-choice models. *Quantitative Economics*, 7(1)
- Arcidiacono, P. and Miller, R. A. (2019). Nonstationary dynamic models with finite dependence. *Quantitative Economics*, 10(3)
- Abbring, J. H. and Daljord, O. (2020). Identifying the discount factor in dynamic discrete choice models. *Quantitative Economics*, 11(2)
- An, Y., Hu, Y., and Xiao, R. (2021). Dynamic decisions under subjective expectations: A structural analysis. *Journal of Econometrics*, 222(1)
- Arcidiacono, P. and Miller, R. A. (2020). Identifying dynamic discrete choice models off short panels. *Journal of Econometrics*, 215(2)
- Igami, M. (2020). Artificial intelligence as structural estimation: Deep blue, bonanza, and AlphaGo. *The Econometrics Journal*, 23(3)
- Buchholz, N., Shum, M., and Xu, H. (2021). Semiparametric estimation of dynamic discrete choice models. *Journal of Econometrics*, 223(2)
- Bugni, F. A. and Bunting, J. (2021). On the iterated estimation of dynamic discrete choice games. *The Review of Economic Studies*, 88(3)
- Kalouptsi, M., Scott, P. T., and Souza-Rodrigues, E. (2021). Linear IV regression estimators for structural dynamic discrete choice models. *Journal of Econometrics*, 222(1)
- Kristensen, D., Mogensen, P. K., Moon, J. M., and Schjerning, B. (2021). Solving dynamic discrete choice models using smoothing and sieve methods. *Journal of Econometrics*, 223(2)

Application

- Rust, J. (1987). Optimal replacement of GMC bus engines: An empirical model of harold zurcher. *Econometrica*, 55(5)
- Pakes, A. and McGuire, P. (1994). Computing markov-perfect nash equilibria: Numerical implications of a dynamic differentiated product model. *RAND Journal of Economics*, 25(4)
- Ericson, R. and Pakes, A. (1995). Markov-perfect industry dynamics: A framework for empirical work. *The Review of Economic Studies*, 62(1)
- Keane, M. P. and Wolpin, K. I. (1997). The career decisions of young men. *Journal of Political Economy*, 105(3)
- Benkard, C. L. (2004). A dynamic analysis of the market for wide-bodied commercial aircraft. *The Review of Economic Studies*, 71(3)
- Lee, D. and Wolpin, K. I. (2006). Intersectoral labor mobility and the growth of the service sector. *Econometrica*, 74(1)
- Das, S., Roberts, M. J., and Tybout, J. R. (2007). Market entry costs, producer heterogeneity, and export dynamics. *Econometrica*, 75(3)
- Erdem, T., Keane, M. P., and Sun, B. (2008). A dynamic model of brand choice when price and advertising signal product quality. *Marketing Science*, 27(6)
- Artuc, E., Chaudhuri, S., and McLaren, J. (2010). Trade shocks and labor adjustment: A structural empirical approach. *American Economic Review*, 100(3)
- Goettler, R. L. and Gordon, B. R. (2011). Does AMD spur intel to innovate more? *Journal of Political Economy*, 119(6)
- Holmes, T. J. (2011). The diffusion of wal-mart and economies of density. *Econometrica*, 79(1)
- Kennan, J. and Walker, J. R. (2011). The effect of expected income on individual migration decisions. *Econometrica*, 79(1)
- Gowrisankaran, G. and Rysman, M. (2012). Dynamics of consumer demand for new durable goods. *Journal of Political Economy*, 120(6)
- Ryan, S. P. (2012). The costs of environmental regulation in a concentrated industry. *Econometrica*, 80(3)

-
- Scott, P. (2014). Dynamic discrete choice estimation of agricultural land use. *Working Paper*
 - Kang, A., Lowery, R., and Wardlaw, M. (2015). The costs of closing failed banks: A structural estimation of regulatory incentives. *The Review of Financial Studies*, 28(4)
 - Caliendo, L., Dvorkin, M., and Parro, F. (2019). Trade and labor market dynamics: General equilibrium analysis of the china trade shock. *Econometrica*, 87(3)