

Course Econ883-03: Causal Inference and Treatment Effects (10/16/18– 11/29/18)

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This module will cover the econometrics of treatment effects. The emphasis will be on the identification of treatment effects parameters, as well as on inference methods. We will discuss the standard methods used in the literature to evaluate social programs, including matching, instrumental variables, control function and panel data methods. We will pay special attention to the identifying assumptions underlying these different methods, which will be analyzed from a statistical and behavioral viewpoint. We will also examine some of the most recent methods allowing to draw inference on the distribution of treatment effects.

Validation of the course will be based on the presentation and discussion of a research paper, and on the production of a short research proposal (less than 5 pages). The proposed project may consist of an extension of one of the methods discussed in class, a new application to a specific economic question, or (ideally!) both.

Tentative course outline and reading list:

Lecture 1: Introduction, Point and partial Identification of treatment effects

Hotz, J., Mullin, C. and Sanders S. (1997), "Bounding causal effects using data from a contaminated natural experiment: analyzing the effects of teenage childbearing", *Review of Economic Studies*, Vol. 64, No.4, pp. 575-603.

Manski, C.F., and Pepper, J.V. (2000), "Monotone instrumental variables: with an application to the returns to schooling", *Econometrica*, Vol.68, No.4, pp. 997---1010.

Pepper, J. (2000), "The intergenerational transmission of welfare receipt: a nonparametric bound analysis", *Review of Economics and Statistics*, Vol. 82, No.3, pp. 472---488.

Rubin, D.B. (1974), "Estimating causal effects of treatments in randomized and nonrandomized studies", *Journal of educational Psychology*, Vol.66, No.5, pp.688---701.

Lecture 2: Marginal Treatment Effects and LATE

Björklund, A., and Moffitt, R. (1987), "The estimation of wage gains and welfare gains in self-selection models", *Review of Economics and Statistics*, Vol. 69, No.1, pp.42-49.

Brinch, C., Mogstad, M. and Wiswall, M. (2017) "Beyond LATE with a discrete instrument: heterogeneity in the quantity-quality interaction of children", *Journal of Political Economy*, Vol. 125, No. 4, pp. 985-1039.

Carneiro, P., Heckman, J. and Vytlacil, E. (2010), "Evaluating marginal policy changes and the average effect of treatment for individuals at the margin" *Econometrica*, Vol. 78, No.1, pp.

377-394.

Carneiro, P. and Lee, S. (2009), "Estimating distribution of potential outcomes using local instrumental variables with an application to changes in college enrollment and wage inequality", *Journal of Econometrics*, Vol. 149, pp. 191-208.

Heckman, J.J., and Pinto, R. (2018), "Unordered Monotonicity", *Econometrica*, Vol.86, No. 1, pp. 1-35.

Heckman, J.J., and Vytlacil, E. (2005), "Structural equations, treatment effects, and econometric policy evaluation", *Econometrica*, Vol.73, No.3, pp.669-738.

Imbens G., and Angrist, J. (1994), "Identification and Estimation of Local Average Treatment Effects ", *Econometrica*, Vol. 62, No.2, pp.467-475.

Lee, S. and Salanie, B. (2018), "Identifying Effects of Multivalued Treatments", *Econometrica*, Forthcoming,

Lecture 3: Matching

Abadie, A., and Imbens, G. (2016), "Matching on the estimated propensity score", *Econometrica*, Vol.84, No.2, pp. 781-807.

Dehejia R.H., and Wahba, S. (2002), "Propensity Score-Matching Methods for Nonexperimental Causal Studies", *Review of Economics and Statistics*, Vol.84, No.1, pp. 151-161.

Heckman, J., Ichimura, H., Smith, J. and Todd, P. (1998), "Characterizing selection bias using experimental data", *Econometrica*, Vol.66, No.5, pp. 1017-1098.

Hirano, K., Imbens, G. and Ridder, G. (2003), "Efficient estimation of average treatment effects using the estimated propensity score", *Econometrica*, Vol.71, No.4, pp. 1161-1189.

Rosenbaum, P. R., and Rubin, D.B. (1983), "The central role of the propensity score in observational studies for causal effects", *Biometrika*, Vol.70, No.1, pp.41-55.

Lecture 4: Randomized experiments

Attanasio, O., Meghir, C. and Santiago, A. (2012), "Education choices in Mexico: using a structural model and a randomized experiment to evaluate Progreso", *Review of Economic Studies*, Vol.79, pp.37-66.

Deaton, A. (2010), "Instruments, randomization, and learning about development", *Journal of Economic Literature*, Vol.48, pp.424-455.

Heckman, J., Moon, S., Pinto, R., Savelyev, P. and Yavitz, A. (2010), "Analyzing social experiments as implemented: a reexamination of the evidence from the HighScope Perry Preschool program", *Quantitative Economics*, Vol.1, pp. 1-46.

Lee, D.S. (2008), "Randomized experiments from non-random selection in U.S. House elections", *Journal of Econometrics*, Vol.142, pp. 675-697.

Pinto, R. (2015), Selection Bias in a Controlled Experiment: The Case of Moving to Opportunity. Working paper.

Lecture 5: Distribution of treatment effects

Aakvik, A., Heckman, J. and Vytlacil, E. (2005), "Estimating treatment effects for discrete outcomes when responses to treatment vary: an application to Norwegian vocational rehabilitation programs", *Journal of Econometrics*, Vol. 125, pp. 15-51.

Arellano, M. and Bonhomme, S. (2012), "Identifying Distributional Characteristics in Random Coefficients Panel Data Models", *Review of Economic Studies*, Vol. 79, No.3, pp. 987 - 1020.

Athey, S., and Imbens, G. (2006), "Identification and Inference in Nonlinear Difference-in-Differences Models", *Econometrica*, Vol. 125, pp. 15-51.

Carneiro, P., Hansen, K., and Heckman, J.J. (2003), " Estimating distributions of treatment effects with an application to the returns to schooling and measurement of the effects of uncertainty on college choice ", *International Economic Review*, Vol. 44, No.2, pp. 361 - 422.

Chernozhukov, V., and Hansen, C. (2005), "An IV Model of Quantile Treatment Effects", *Econometrica*, Vol.73, No.1, pp.245-261.

Cunha, F., and Heckman, J.J. (2007), "Identifying and estimating the distributions of ex post and ex ante returns to schooling", *Labour Economics*, Vol. 14, No.6, pp.870-893.

Heckman, J. J., Smith, J. and Clements, N. (1997), "Making the most out of programme evaluations and social experiments: Accounting for heterogeneity in programme impacts", *Review of Economic Studies*, Vol.64, No.4, pp.487-535.

Lecture 6: Dynamic treatment effects (time permitting)

Aguirregabiria, V. (2009), "Another look at the identification of dynamic discrete decision processes: an application to retirement behavior", *Journal of Business and Economic Statistics*, Vol. 28, No.2, pp. 201-218.

Ding, W. and Lehrer, S. (2010), "Estimating treatment effects from contaminated multiperiod education experiments: the dynamic impacts of class size reductions", *Review of Economics and Statistics*, Vol. 92, No.1, pp. 31-42.

Heckman, J.J., and Navarro, S. (2007), "Dynamic discrete choice and dynamic treatment effects", *Journal of Econometrics*, Vol.136, No.2, pp. 341-396.