

2013 Advanced Workshop on Research Design for Causal Inference

Detailed Workshop Schedule

Dates and Location: Monday August 12 (9:00 – Wednesday August 14 (ending at 4:00), 2013, at Northwestern Law School, 375 East Chicago Ave., Chicago IL 60611.

All sessions will be in the “Rubloff” building, in Room 150. The Rubloff building is the “new” law building, closest to Lake Michigan, Rubloff 150 is roughly midway between Chicago Ave. on the north side and Superior Ave on the south side.

Registration and meals: Breakfast will be available each morning from 8:30. A registration table will be open on Monday beginning at 8:00. Lunch will be provided between the morning and afternoon sessions. Snacks and liquids (coffee, tea, sodas, juice, water) will be available throughout the day in Rubloff 155.

Conference url: www.law.northwestern.edu/faculty/conferences/causalinference/advanced/

Monday August 12, 2013 (Don Rubin)

Introduction (9:00-9:15) (Bernie Black)

Main lectures: Don Rubin (9:15-12:00; 1:00-2:45)

Reading: Imbens and Rubin, *Causal Inference in Statistics and Social Sciences* (draft 2013), chapters 1-8 (chapter 2 is background and can be skipped).

Stata-based examples (3:00-4:00) (Bernie Black)

Reception: (4:30 – 5:30 or so) Law school: Central outdoor courtyard, weather permitting

Topics: Choosing estimands (the science). Implications of choice of estimand for choice of method. Principal stratification. Flexible matching methods. Multiple imputation of missing potential outcomes. And whatever else Don thinks he should cover, in the allotted time.

Suggested readings (all are posted):

Imbens, Guido, and Donald Rubin (2013), *Causal Inference in Statistics and Social Sciences*, chs. xx-yy [specific chapter suggestions to come] (BSB note: We posted the full draft book).

On estimands:

Rubin, Donald (2005), Causal Inference Using Potential Outcomes: Design, Modeling, Decisions, 100 *Journal of the American Statistical Association* 322-331.

On principal stratification:

Comment: Principal stratification was first used (although the term was developed later) in the context of instrumental variable estimates of “local average treatment effects” for treatment with non-compliance. See Angrist, Joshua, Guido Imbens, and Donald Rubin (1996), 91 *Journal of the American Statistical Association* 444-455. The groups relevant for this analysis (always takers, never takers, compliers, and defiers) can be understood as principal strata. If you are not familiar with this use of principal stratification, please read Imbens and Rubin chs. 24-25.

Meulli, Fabrizia, and Donald Rubin (2003), Assumptions Allowing the Estimation of Direct Causal Effects, 112 *Journal of Econometrics* 79-87. [*Note:* we have not posted the long, complex paper by Peter Adams et al. that Meulli and Rubin are commenting on; you need to know only that they estimate something they call a “direct” causal effect of wealth on mortality by conditioning on health.]

Frumento, Paolo, Fabrizia Mealli, Barbara Pacini, and Donald Rubin (2012), Evaluating the Effect of Training on Wages in the Presence of Noncompliance, Nonemployment, and Missing Outcome Data, 107 *Journal of the American Statistical Association* 450-466.

On other topics:

Rubin, Donald B. (2008), For Objective Causal Inference, Design Trumps Analysis, 2 *Annals of Applied Statistics* 808-840.

Tuesday August 13, 2013 (Ben Hansen) (9:00-12:00, 1:00-3:45)

Advanced Matching: This session focuses on the use of propensity-score based, optimal matching methods to reliably secure covariate balance and, with additional assumptions, consistency and robustness of causal effect estimation. Methods are demonstrated with code and exercises in R. Propensity score matching is the best known of a number of techniques that play roles both in study design and in statistical analysis; the session includes a comparative discussion of alternative matching and weighting methods.

Suggested readings (all are posted):

Rosenbaum, Paul R. (2009), *Design of Observational Studies*, ch. 13 (Matching in R); ch. 18 (After Matching, Before Analysis) (BSB note: We posted these chapters, but you ought to buy the whole book. When I did so though Northwestern, it came with a pdf version, which I find very useful.)

Imbens and Rubin (2013), ch. 23 (Sensitivity Analysis and Bounds).

Hosman, Carrie, Ben Hansen and Paul Holland (2010), The sensitivity of linear regression coefficients' confidence limits to the omission of a confounder, 4 *Annals of Applied Statistics* 849-870, esp. §§ 1, 2.1, and 4.3.

Wednesday August 14, 2013 (Justin McCrary) (9:00-12:00, 1:00-3:45)

Topics: Conducting simulation studies. Generalized method of moments (GMM) as a tool for estimating treatment effects and standard errors, including adjusting standard errors for two-step estimation (e.g., reweighting). Inference and testing using the bootstrap. Topics in regression discontinuity design: nonparametric estimation; Local linear regression and density estimation; choosing bandwidth and assessing sensitivity to bandwidth choice.

Suggested readings (all are posted):

Cameron, A. Colin, and Praveen Trivedi (2010), *Microeconometrics Using Stata*, chs. 4, 13 (BSB note: We posted these chapters).

An additional source for simulation in Stata is Adkins, Lee, and Mary Gade (2012), Monte Carlo Experiments Using Stata: A Primer with Examples.

Hansen, Bruce (2013), *Econometrics*, chs. 10-12, 14 (We posted the full book).

Questions about the workshop: Please email Bernie Black (bblack@northwestern.edu) or Mat McCubbins (mmcubbins@law.usc.edu) for substantive questions or fee waiver requests, and Michael Cooper (causalinference@law.northwestern.edu) for logistics and registration questions.