

# Causal inference with observational data

Austin Nichols  
Urban Institute  
Washington, DC  
austinnichols@gmail.com

**Abstract.** Problems with inferring causal relationships from nonexperimental data are briefly reviewed, and four broad classes of methods designed to allow estimation of and inference about causal parameters are described: panel regression, matching or reweighting, instrumental variables, and regression discontinuity. Practical examples are offered, and discussion focuses on checking required assumptions to the extent possible.

**Keywords:** st0136, xtreg, psmatch2, nnmatch, ivreg, ivreg2, ivregress, rd, lpoly, xtoverid, ranktest, causal inference, match, matching, reweighting, propensity score, panel, instrumental variables, excluded instrument, weak identification, regression, discontinuity, local polynomial