Nonstandard Asymptotics for Two-Step Semiparametric Estimators

Two-step semiparametric estimators are important in microeconometric theory and practice. The literature on (standard) asymptotics for such estimators and associated inference procedures is large. This course begins by reviewing some of the main results from that literature and then goes on to discuss more recent work on nonstandard asymptotics for two-step semiparametric estimators. The overall aim of the work on nonstandard asymptotics is to reduce the gap between the asymptotic theory and the finite sample "reality" the asymptotic theory is intended to approximate. In particular, the work is concerned with developing inference procedures that are valid under both standard and nonstandard asymptotics.

The lectures are intended to be self-contained and will follow a set of notes in the form of slides. PDF copies of these slides will be made available, as will PDF copies of those references that have not yet appeared in print.

A tentative course outline (including selective references) is as follows:

1. Standard asymptotics

   - Powell, J. L., J. H. Stock, and T. M. Stoker (1989). "Semiparametric Estimation of Index Coefficients". *Econometrica*, 57, 1403-1430.
   - Newey, W. K., and D. McFadden (1994). "Large Sample Estimation and Hypothesis Testing". *Handbook of Econometrics, Volume 4*, 2111-2245.
   - Newey, W. K. (1994). "The Asymptotic Variance of Semiparametric Estimators". *Econometrica*, 62, 1349-1382.
   - Chen, X., O. Linton, and I. van Keilegom (2003). "Estimation of Semiparametric Models When the Criterion Function is Not Smooth". *Econometrica*, 71, 1591-1608.

2. Nonstandard asymptotics I: nonstandard variances

   - Cattaneo, M. D., R. K. Crump, and M. Jansson (2014a). "Small Bandwidth Asymptotics for Density-Weighted Average Derivatives". *Econometric Theory*, 30, 176-200.
   - Cattaneo, M. D., R. K. Crump, and M. Jansson (2014a). "Bootstrapping Density-Weighted Average Derivatives". *Econometric Theory*, 30, 1135-1164.
   - Cattaneo, M. D., Jansson, M., and W. K. Newey (2015). "Alternative Asymptotics and the Partially Linear Model with Many Regressors", *Econometric Theory*, forthcoming
   - Cattaneo, M. D., Jansson, M., and W. K. Newey (2017). "Inference in Linear Regression Models with Many Covariates and Heteroskedasticity", *Journal of the American Statistical Association*, forthcoming.

3. Nonstandard asymptotics II: nonstandard biases

   - Cattaneo, M. D., R. K. Crump, and M. Jansson (2013). "Generalized Jackknife Estimators of Weighted Average Derivatives (with Discussion and Rejoinder)". *Journal of the American Statistical Association*, 108, 1243-1268.
   - Cattaneo, M. D. and M. Jansson (2018). "Kernel-Based Semiparametric Estimators: Small Bandwidth Asymptotics and Bootstrap Consistency". *Econometrica*, forthcoming.