Sieve “Parametric" Likelihood Ratio Bootstrapped Confidence Sets for Semiparametric Likelihood Models Under Partial Identification

Faculty Member: Xiaohong Chen

Proposal Description:

We provide methods for inference on a finite-dimensional parameter of interest, $\theta \in \mathbb{R}^d$, in a semiparametric probability model when an infinite-dimensional nuisance parameter, $g$, is present. We construct confidence sets for $\theta$ that are robust to the model parameter $(\theta, g)$ being partially-identified or irregular (i.e., slower than root-$n$ estimable). This allows practitioners to examine the sensitivity of their estimates of $\theta$ to more relaxed assumptions on $g$ in a general likelihood setup. To construct these robust confidence sets for $\theta$, we invert a (penalized) sieve (log-)likelihood ratio (LR) statistic. We derive the asymptotic null distribution of the sieve LR under partial-identification, which is nonstandard when $\theta$ is not point-identified. We present conditions under which a sieve “parametric” bootstrapped LR statistic consistently estimates the complicated limiting null distribution of the original-sample sieve LR. Our robust confidence sets are asymptotically efficient when the true $\theta$ parameter belongs to the interior of the parameter space and is by chance point-identified and regular.

This proposal seeks a Tobin RA (or Robin RAs) to run some Monte Carlo studies to check the performance of the bootstrapped LR procedure in finite samples.

Requisite Skills and Qualifications:

a good programmer in R or Matlab; knows some basic statistics and econometrics.

Award: Shawn Luciani

Tobin Application Link: Tobin Application

Project Type: Tobin

Project Year: 2019

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