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

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Proposal Description:

We provide methods for inference on a finite-dimensional parameter of interest, \( \theta \), 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 RA

Project Year: 2019

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