

Centering the Markov Bootstrap

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May 2002

Abstract

Horowitz (2001) proposed the Markov Bootstrap (MCB) as an alternative to the block bootstrap for generalized method of moments (GMM) estimation of time-series data. The MCB nonparametrically estimates the transition density of the time-series using a nonparametric kernel density estimator. Due to the bias in kernel density estimation, the bootstrap parameter (the value induced by bootstrap sampling) is generally different from the sample GMM estimate. We show that the difference can be quite large. If bootstrap tests are mistakenly centered at the sample estimates rather than the correct bootstrap values, the bias can increase with sample size.

The bias in some cases can be eliminated through the use of a high-order kernel, but such estimators typically do not work well unless the sample size is very large.

For correct centering, implementation of the MCB requires calculation of the bootstrap parameter. We introduce a simple formula for its value for the linear regression. The paper also investigates methods to calculate the bootstrap parameter in more general GMM contexts.

A monte carlo simulation investigates the performance of the proposed centering methods and alternative kernels for some simple models.

Horowitz, Joel L. (2001) "Bootstrap methods for Markov processes," manuscript, Department of Econometrics, Northwestern University.

*This research was supported by a grant from the National Science Foundation.

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