

Averaging Estimators for Autoregressions with a Near Unit Root

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Abstract:

This paper reopens the question of selection between unit root and stationary autoregressions. Rather than approaching the question from the vantage of hypothesis testing, we attack the question from the viewpoint of mean-squared error and forecast loss. Our view is that if the purpose of autoregressive estimation is for forecasting, then model selection methods should be designed to minimize forecast loss. As a general rule, hypothesis testing is inappropriate for this purpose, and we find that this rule remains true in the context of near non-stationary time series.

We consider an autoregressive model, and study the asymptotic mean-squared error and forecast loss using a local-to-unity asymptotic framework. We study the asymptotic performance of the unconstrained least-squares estimator, the estimator imposing the unit root restriction, an optimal weighted average, Dickey-Fuller pre-test estimator, the Mallows selection estimator, and finally the Mallows averaging estimator. In the local-to-unity framework, the normalized asymptotic loss of all of these estimators depends exclusively on the local-to-unity parameter, facilitating graphical comparisons. The conclusions are clear. On one side, we find that the classic Dickey-Fuller pre-test estimator has very poor MSE and forecast loss. On the other side, we find that our new Mallows averaging estimator has the best MSE performance. It is the preferred estimation method among those considered.