

Averaging Estimators for Cointegrated Vector Autoregressive Models

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Abstract

Economic theory often implies equilibrium relationships between the levels of time series variables, described as cointegration relationships. The cointegration relationship, called the "error correction" term, is conventionally used as valuable information to improve the forecast accuracy of the level variables. However, the cointegration signal may be too weak in certain scenarios, the strength of which is often determined by pretests, to produce improved forecast. As an alternative to pretesting estimators, we consider the Mallows averaging estimator, a weighted average of (unconstrained) estimation of VAR in levels and (constrained) estimation of VAR in difference with weights suggested by Mallows criteria. This paper uses a local-to-error correction asymptotic framework, to evaluate the asymptotic mean-squared error (AMSE) and the asymptotic forecast risk (AFR) of unconstrained estimation (of VAR in levels), constrained estimation (of VAR in difference), pretesting estimation, Mallows selection estimation, and Mallows averaging estimation. The asymptotic risk depends on the strength of the cointegration signal, the number and location of unit roots in the multivariate non-stationary system. Our results strongly favor the averaging estimator with Mallows weights. In particular, the pretesting estimator is shown to behave worse than the unconstrained estimator in certain range of parameter space, while the Mallows averaging estimator uniformly and substantially outperforms the unconstrained estimator, and enjoys smaller risk than the pretesting estimator unless the cointegration signal is either too weak or too strong.

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