Sensitivity analysis of SAR estimators: a simulation study

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Abstract

Spatial autoregressive models come with a variety of estimators and it is interesting and useful to compare the estimators by location and covariance properties. We study the local sensitivity behavior of the main least squares estimator by using matrix derivatives results of Magnus and Neudecker (1999). Additionally we compare the estimators of the spatial autoregression (SAR) model using the covariance structure of the least squares estimators and we make efficiency comparisons using Kantorovich inequalities. Also, we calculate the Taylor approximation of the least squares estimator in the SAR model up to the second order. Finally, we demonstrate our approach by an example for GDP and employment in 239 European NUTS2 regions. We find a quite good approximation behavior of the SAR estimator in the neighborhood of $\rho = 0$, i.e. a small spatial correlation.

Keywords

Spatial autoregressive models, Least-squares estimators, Taylor approximations, Kantorovich inequality.

References

Magnus, J.R. and Neudecker, H. (1999). *Matrix Differential Calculus with Applications in Statistics and Econometrics.* (revised edition) Chichester: John Wiley and Sons.