Structural Nonparametric Cointegrating Regression

by
Qiying Wang
The University of Sydney
School of Maths and Stats
The University of Sydney, NSW 2006, Australia
qiying@maths.usyd.edu.au

Abstract

Nonparametric estimation of a structural cointegrating regression model is studied. As in the standard linear cointegrating regression model, the regressor and the dependent variable are jointly dependent and contemporaneously correlated. In nonparametric estimation problems, joint dependence is known to be a major complication that affects identification, induces bias in conventional kernel estimates, and frequently leads to ill-posed inverse problems. In functional cointegrating regressions where the regressor is an integrated or near-integrated time series, it is shown here that inverse and ill-posed inverse problems do not arise. Instead, simple nonparametric kernel estimation of a structural nonparametric cointegrating regression is consistent and the limit distribution theory is mixed normal, giving straightforward asymptotics that are useable in practical work. It is further shown that use of augmented regression, as is common in linear cointegration modeling to address endogeneity, does not lead to bias reduction in nonparametric regression but there is an asymptotic gain in variance reduction. The results provide a convenient basis for inference in structural nonparametric regression with nonstationary time series when there is a single integrated or near-integrated regressor. The methods may be applied to a range of empirical models where functional estimation of cointegrating relations is required.

This is joint work with Peter Phillips.