Estimation and testing for trending coefficient spatial panel data models

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Abstract

Spatial panel data models with time-varying coefficients are investigated. GMM-based estimators are first proposed using linear and quadratic moments after removing individual effects via time differencing. A trend-based estimator is also developed, and simulations confirm its solid finite-sample performance. As an application, the evolving air pollution spillover effects are examined across Chinese cities from 2015-2021. Building on this, a nonparametric U-statistic test is introduced for detecting time variation in spatial coefficients, regression coefficients, and time effects. The test accommodates various trend structures and is asymptotically normal under the null of parameter constancy.