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Identifying Latent Grouped Patterns in Panel Data Models with Interactive Fixed Effects*

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Abstract

We consider the estimation of latent grouped patterns in dynamic panel data models with interactive fixed effects. We assume that the individual slope coefficients are homogeneous within a group and heterogeneous across groups but each individual's group membership is unknown to the researcher. We consider penalized principal component (PPC) estimation by extending the penalized-profile-likelihood-based C-Lasso of Su, Shi, and Phillips (2016) to panel data models with cross section dependence. Given the correct number of groups, we show that the C-Lasso can achieve simultaneous classification and estimation in a single step and exhibit the desirable property of uniform classification consistency. The C-Lasso-based PPC estimators of the group-specific parameters also have the oracle property. BIC-type information criteria are proposed to choose the numbers of factors and groups consistently and to select the data-driven tuning parameter. Simulations are conducted to demonstrate the finite-sample performance of the proposed method. We apply our C-Lasso to study the persistence of housing prices in China's large and medium-sized cities in the last decade and identify three groups.

JEL Classification: C33, C38, C51

Key Words: Classifier Lasso; Cross section dependence; Dynamic panel; High dimensionality; Latent structure; Parameter heterogeneity; Penalized method

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