Detecting structural breaks in panel data models of social interactions with unknown networks*

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Abstract

This paper aims to detect structural break points in latent networks in a panel data setting. We consider panel models where the outcome of a unit depends on the outcomes and characteristics of other units. The latent network structure induces high-dimensional parameters and interactive outcomes generate endogeneity. Our goal is to detect breaks in high-dimensional network parameters associated with endogenous variables. We propose a two-step penalized nonlinear least squares approach to estimate the break points based on reduced forms, and show that the resulting estimator achieves superconsistency. This property allows us to estimate, and make inferences on, network and slope parameters as if the true break points were known.

Keyword: Social network; Structural break; Panel data; Nonlinear least squares; Penalized estimation

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