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George Kapetanios, James Mitchell, Yongcheol Shin

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A Nonlinear Panel Data Model of Cross-Sectional Dependence*

George Kapetanios
Queen Mary
University of London

James Mitchell
Warwick Business School
University of Warwick

Yongcheol Shin
University of York

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Abstract

This paper proposes a nonlinear panel data model which can endogenously generate both 'weak' and 'strong' cross-sectional dependence. The model's distinguishing characteristic is that a given agent's behaviour is influenced by an aggregation of the views or actions of those around them. The model allows for considerable flexibility in terms of the genesis of this herding or clustering type behaviour. At an econometric level, the model is shown to nest various extant dynamic panel data models. These include panel AR models, spatial models, which accommodate weak dependence only, and panel models where cross-sectional averages or factors exogenously generate strong, but not weak, cross sectional dependence. An important implication is that the appropriate model for the aggregate series becomes intrinsically nonlinear, due to the clustering behaviour, and thus requires the disaggregates to be simultaneously considered with the aggregate. We provide the associated asymptotic theory for estimation and inference. This is supplemented with Monte Carlo studies and two empirical applications which indicate the utility of our proposed model as a vehicle to model different types of cross-sectional dependence.

JEL Classification: C31, C33, C51, E31, G14.

Keywords: Nonlinear Panel Data Model, Clustering, Cross-section Dependence, Factor Models, Monte Carlo Simulations, Application to Stock Returns and Inflation Expectations

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