

Statistical Inference for Panel Dynamic Simultaneous Equations Models*

Cheng Hsiao[†] Qiankun Zhou[‡]

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Abstract

We study the identification and estimation of panel dynamic simultaneous equations models. We show that the presence of time-persistent individual-specific effects does not lead to changes in the identification conditions of traditional Cowles Commission dynamic simultaneous equations models. However, the limiting properties of the estimators depend on the way the cross-section dimension, N , or the time series dimension, T , goes to infinity. We propose three limited information estimator: panel simple instrumental variables (PIV), panel generalized two stage least squares (PG2SLS), and panel limited information maximum likelihood estimation (PLIML). We show that they are all asymptotically unbiased independent of the way of how N or T tends to infinity. Monte Carlo studies are conducted to compare the performance of the PLIML, PIV, PG2SLS, the Arellano-Bond type generalized method of moments and the Akashi-Kunitomo least variance ratio estimator and to demonstrate the sensitivity of statistical inference to the asymptotic bias of an estimator.

Keywords: Panel dynamic simultaneous equations, Maximum likelihood, Instrumental variable, Generalized method of moments, Multi-dimensional asymptotics

JEL classification: C01, C30, C32

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[†]Department of Economics, University of Southern California, University Park, Los Angeles, California 90089 chsiao@usc.edu, Department of Quantitative Finance, National Tsing Hua University and WISE, Xiamen University, China.

[‡]Department of Economics, University of Southern California, University Park, Los Angeles, California 90089 qiankunz@usc.edu.