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Panel models with interactive effects

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**Panel Models with Interactive Effects\*****Cheng Hsiao\*\*****July 8, 2018****Abstract**

The multiplication of individual specific effects,  $\lambda_i$ , and time-specific effects,  $f_t, \lambda_i' f_t$ , provides a more general formulation than the traditionally used additive form to capture the unobserved heterogeneity in panel data modeling. It is also a useful approach for dimension reduction for modeling cross-section dependence. However,  $\lambda_i$  and  $f_t$  are unobservable. We explore the implications for econometric modeling under various formulations of the interactive effects models and suggest a quasi-likelihood approach as a common framework to study issues of estimation and statistical inference when regressors are either strictly exogenous or predetermined and under different combinations of the data size of cross-sectional dimension,  $N$ , and time series dimensions,  $T$ . We also suggest some computationally simpler estimation methods in light of the quasi-likelihood approach. Monte Carlo studies are conducted to highlight the issues involved.

Keywords: Interactive Effects; Static and Dynamic Models; Initial Observations; Asymptotic Bias

JEL Classifications: C01; C13; C23

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