Quasi-maximum Likelihood Estimation of Panel Markov Dynamic Probit Models with Unrestricted Error Covariance

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Abstract

Existing Monte Carlo studies have shown that simulated maximum likelihood (SML) methods often estimate the structural state dependence in panel Markov dynamic probit models with severe bias. This paper proposes an alternative, simple quasi-maximum likelihood (QML) estimator applicable to the models with unrestricted error covariance structure. The quasi-likelihood in the current approach consists of pooled recursive bivariate probit taking the whole periods' exogenous regressors as instruments. I examined the parametric identification conditions and derived an asymptotic covariance matrix of the estimator. I then investigated small sample performances of the QML and competing estimators through extensive Monte Carlo simulations. The result reveals that the QML outperforms the SML well in estimating key parameters. However I also found the QML inference to collapse in the case of theoretically proper but empirically weak identification.

JEL classification: C23, C25, C26.
Keywords: Panel data, dynamic probit, simulated maximum likelihood estimation, Monte Carlo study.

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