

# Quantile Regression for Dynamic Panel Data with Fixed Effects

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## Abstract

This paper studies estimation and inference in a quantile regression dynamic panel model with fixed effects. Panel data fixed effects estimators are typically biased in the presence of lagged dependent variables as regressors. To reduce the dynamic bias in the quantile regression fixed effects estimator I suggest the use of the instrumental variables quantile regression method of Chernozhukov and Hansen (2006, 2008) along with lagged regressors as instruments. I show that the instrumental variables estimator is consistent and asymptotically normal when  $N^a/T \rightarrow 0$ , for some  $a > 0$ . In addition, Wald and Kolmogorov-Smirnov type tests for general linear restrictions are proposed. Monte Carlo studies are conducted to evaluate the finite sample properties of the estimators and tests. The simulation results show that the instrumental variables approach sharply reduces the dynamic bias, and turns out to be especially advantageous in terms of the bias, root mean square error, and power of the test statistics when innovations are non-Gaussian and heavy-tailed. Finally, I illustrate the procedures by testing for the presence of time non-separability in utility using household consumption panel data. The results show evidence of asymmetric persistence in consumption dynamics, and important heterogeneity in the determinants of consumption.

Key Words: Quantile regression, dynamic panel, fixed effects, instrumental variables

JEL Classification: C14, C23, D12, E21

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