Editorial

Advance in theoretical econometrics—Essays in honor of Takeshi Amemiya

'Editors' introduction'

This Annals issue is dedicated to Professor Takeshi Amemiya in recognition of his fundamental contributions to econometrics and leadership in advancing econometric research. The creative and rigorous work of Professor Takeshi Amemiya has influenced generations of econometricians in the past half a century. The collection of papers in this volume grew out of the presentations by Zongwu Cai, Mei-Yuan Chen, Songnian Chen, Liyuan Cui, Miguel Delgado, Qingliang Fan, Ying Fang, Zhonghao Fu, Jiti Gao, Han Hong, Yongmiao Hong, Cheng Hsiao, Hidehiko Ichimura, Dongseok Kim, Naoto Kunitomo, Lung-Fei Lee, Qi Li, Tong Li, Roger Moon, Kusumitsu Nawata, James Powell, Peter Robinson, Keunkwan Ryu, Yusuyuki Sawada, Yan Shen, Matt Shum, Liangjun Su, Yundong Tu, Cindy Wang, Xia Wang, Thomas Wansbeek, Jingjing Yang, among others in the conference organized by the Wang Yanan Institute for Studies in Economics (WISE) and the School of Economics, Xiamen University in June 2015 to celebrate Professor T. Amemiya's 80th birthday. The diversity of topics cannot be gathered under any one or two single categories. However, they do reflect the aspirations of econometricians that share a common core of Professor Amemiya's approach: rigorous solutions to complex problems.

The paper "Inference on Trending Panel Data" by Robinson and Velasco (2018) deals with semiparametric panel data modeling and statistical inference with fractional stochastic trends, nonparametrically time-trending individual effects, and general cross-sectional correlation and heteroscedasticity in innovations. The main focus is on estimation of the time series parameters. Two methods are considered. They obtain standard asymptotics for their methods, with a central limit theorem, over a wide range of possible parameter values, unlike the nonstandard asymptotics for autoregressive parameter estimates at a unit root.

The paper by Graham et al. (2018) considers "A Quantile Correlated Random Coefficients Panel Data Model". They extend the linear quantile regression model to allow the dependence between the regressors and random coefficients. They use a panel "fixed effects" approach that treats the coefficients as fixed for a given quantile. They show when the number of time periods (T) exceeds the number of random coefficients (P), identification is regular, and their estimates are $\sqrt{N}$-consistent. When $T = P$, their identification results make special use of the subpopulation of *stayers* — units whose regressor values change little over time. In this just-identified case they study asymptotic sequences which allow the frequency of stayers in the population to shrink with the sample size. When the mass of stayers shrinks with N, identification is irregular and their estimates converge at a slower than $\sqrt{N}$ rate, but continue to have limiting normal distributions. They find that applying their methods to study the effects of collective bargaining coverage on earnings using the National Longitudinal Survey of Youth 1979 yields sharply lower estimates of union wage premia.

The paper by Jin and Lee (2018) considers "Irregular N2SLS and LASSO Estimation of the Matrix Exponential spatial Specification Model" with the Durbin and endogenous regressors. They find that the nonlinear two-stage least squares (N2SLS) estimator is in general consistent and asymptotically normal. However, when the Durbin and endogenous regressors are irrelevant, the gradient vector of the N2SLS criterion function has a singular covariance matrix with probability approaching one (w.p.a.l.). The distance difference and gradient test statistics, which have irregular asymptotic distributions, are derived to test for the irrelevance of the Durbin and endogenous regressors. They propose the adaptive group LASSO, which penalizes the coefficients of the Durbin and endogenous explanatory variables and show that the estimator has the oracle properties, so the true model can be selected w.p.a.l. and the estimator always has the $\sqrt{n}$-rate of convergence and asymptotic normal distribution.

The paper by Cheng et al. (2018) considers "A Frequentist Approach to Bayesian Asymptotics". They extend the posterior mean idea to the conditional mean case, which is conditioning on a given vector of summary statistics of the original data.

They establish a new asymptotic theory for the conditional mean estimator for the case when both the sample size of the original data concerned and the number of Markov Chain Monte Carlo iterations go to infinity. They employ the conditional mean estimator to estimate a GARCH(1,1) model for S&P 500 stock returns and find that the conditional mean estimator performs better than quasi-maximum likelihood estimation in terms of out-of-sample forecasting.

The paper by Hong and Li (2018) considers "the Numerical Delta Method". They show that for an appropriately chosen sequence of step sizes, the numerical derivative based Delta method provides consistent inference for functions of parameters that are only directionally differentiable. Additionally, it provides uniformly valid inference for certain convex and Lipschitz functions. They also extend their results to the second order Delta method and illustrate its applicability to inference for moment inequality models.

They paper by Callaway et al. (2018) considers "Estimation of Quantile Treatment Effects in Difference in Difference Models under Dependence Restrictions and with only Two time Period". They consider estimation and inference with discrete covariates and propose a uniform inference procedure based on the exchangeable bootstrap.

The paper by Sun et al. (2018) considers "Threshold Autoregressive Models for Interval-valued Time Series (ITS) Data". They propose a new class of threshold autoregressive interval (TARI) models and develop a minimum-distance estimation method. They show that the threshold parameter estimator is T-consistent and follows an asymptotic compound Poisson process as the sample size $T \rightarrow \infty$. They show that incorporating the asymmetric effect yields better out-of-sample forecasts than a variety of popular models available in the literature.

The paper by Delgado and Song (2018) proposes omnibus tests for symmetry of the conditional distribution of a time series process about a nonparametric regression function. The test statistic is a weighted version of the integrated squared difference between the restricted and unrestricted estimators of the joint characteristic function of nonparametric residuals and explanatory variables, whose critical values are estimated with the assistance of a bootstrap technique. They show their test is sensitive to local alternatives converging to the null at the parametric rate $T^{-1/2}$, with T the sample size.

The paper by Chiou et al. (2018) suggests a local constant estimator for a nonparametric regression model with multiple thresholds. They also suggest a testing procedure to determine the number of thresholds and apply their procedure to study the 401(k) retirement savings plan with income threshold.

The paper by Chen and Wang (2018) considers some semiparametric estimators of panel data models without imposing the monotonicity or separability restriction. Under regularity conditions, they show their estimators are consistent and asymptotically normal.

The paper by Cai et al. (2018) considers a "Semiparametric Quantile panel Data Model". They propose a three-stage estimation procedure based on quasi-maximum (local) likelihood estimation (QMLE) to estimate both constant and functional coefficients. They show that the estimator of constant coefficients is $\sqrt{N}$ consistent and the estimator of varying coefficients converges in a nonparametric rate. A simple and easily implemented procedure for making inferences such as constructing confidence intervals for constant parameters and testing the hypothesis of varying coefficients is also proposed. Using the cross-country/region data from 1970 to 1999, they find a strong empirical evidence of the existence of the absorptive capacity hypothesis and FDI has much stronger growth effects for countries with fast economic growth than for those with slow economic growth.

The paper by Li et al. (2018) considers "Quasi Maximum Likelihood Analysis of High Dimensional Constrained Factor Model". They decompose the loadings matrix by a high-dimensional known matrix multiplying with a low-dimensional unknown matrix. They propose using the quasi maximum likelihood method to estimate the model and a new statistic for testing the null hypothesis of constrained factor models against the alternative of standard factor models. They also consider the extension to an approximate constrained factor model where the idiosyncratic errors are allowed to be weakly dependent processes.

The paper by Su and Ju (2018) considers the identification of "Latent Grouped Patterns in Panel Data Models with Interactive Fixed Effects". They assume that the individual slope coefficients are homogeneous within a group and heterogeneous across groups but each individual's group membership is unknown to the researcher. They suggest a penalized principal component (PPC) estimation and show that given the correct number of groups, the C-Lasso can achieve simultaneous classification and estimation in a single step and exhibit the desirable property of uniform classification consistency. The C-Lasso-based PPC estimators of the group-specific parameters also have the oracle property. BIC-type information criteria are also proposed to choose the numbers of factors and groups consistently and to select the data-driven tuning parameter.

The paper by Moon et al. (2018) considers "Estimation of Random Coefficients Logit Demand Models with Interactive Fixed Effects". They propose a two-step least squares-minimum distance (LS-MD) procedure to calculate the estimator. Monte Carlo simulations show that it performs well. They also illustrate their approach with the estimation of the US automobile demand.

The paper by Hsiao (2018) considers "Panel Models with Interactive Effects". The paper explores the implications for econometric modeling under various formulations of the interactive effects models and suggests 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. Monte Carlo studies are also conducted to highlight the issues involved.

References

Cai, Zongwu, Chen, Linna, Fang, Ying, 2018. A semiparametric quantile panel data model with an application to estimating the growth effect of FDI.

Callaway, Brantly, Li, Tong, Oka, Tatsushi, 2018. Quantile treatment effects in difference in differences models under dependence restrictions and with only two time periods.

Chen, Songnian, Wang, Xi, 2018. Semiparametric estimation of panel data models without monotonicity or separability.

Cheng, Tingting, Gao, Jiti, Phillips, Peter C.B., 2018. A frequentist approach to bayesian asymptotics.

Chiou, Yan-Yu, Chen, Mei-Yuan, Chen, Jau-er, 2018. Nonparametric regression with multiple thresholds: Estimation and inference.

Delgado, Miguel A., Song, Xiaojun, 2018. Nonparametric tests for conditional symmetry.

Graham, Bryan S., Hahn, Jinyong, Poirier, Alexandre, Powell, James L., 2018. A quantile correlated random coefficients panel data model.

Hong, Han, Li, Jessie, 2018. The numerical delta method.

Hsiao, Cheng, 2018. Panel models with interactive effects.

Jin, Fei, Lee, Lung-fei, 2018. Irregular N2SLS and LASSO estimation of the matrix exponential spatial specification model.

Li, Kunpeng, Li, Qi, Lu, Lina, 2018. Quasi maximum likelihood analysis of high dimensional constrained factor models.

Moon, Hyungsik Roger, Shum, Matthew, Weidner, Martin, 2018. Estimation of random coefficients logit demand models with interactive fixed effects.

Robinson, Peter,M., Velasco, Carlos, 2018. Inference on trending panel data.

Su, Liangjunm, Ju, Gaosheng, 2018. Identifying latent grouped patterns in panel data models with interactive fixed effects.

Sun, Yuying, Han, Ai, Hong, Yongmiao, Wang, Shouyang, 2018. Threshold autoregressive models for interval-valued time series data.

Zongwu Cai [*]
Department of Economics, University of Kansas, Lawrence, KS 66045,
United States
E-mail address: caiz@ku.edu.

Yongmiao Hong
Department of Economics, Cornell University, Ithaca, NY 14853,
United States

Cheng Hsiao
Department of Economics, University of Southern California, Los Angeles,
CA 90089,
United States

Available online 28 June 2018

[*] Corresponding editor.