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Education

Ph.D. in Economics, University of California, Riverside, CA, USA, June 2012 (Expected)
M.A. in Economics, University of California, Riverside, CA, USA, June 2009
M.A. in Statistics, Peking University, Beijing, China, July 2007
B.Sc. in Management Science, China Agricultural University, Beijing, China, July 2002

Dissertation

Dissertation Title: “*Essays on Nonparametric and Semiparametric Models and Continuous Time Models*”
Committee: Prof. Aman Ullah (Chair), Prof. Gloria Gonzalez-Rivera, Prof. Jang-Ting Guo,
Prof. Tae-Hwy Lee

Research Interests

Econometrics Theory, Nonparametrics, Finite Sample Econometrics, Applied Econometrics

Publications

- Nonparametric and Semiparametric Volatility Models: Specification, Estimation, and Testing. With Liangjun Su, Aman Ullah, and Santosh Mishra. In *Handbook in Financial Engineering and Econometrics: Volatility Models and Their Applications* (editors: L. Bauwens, C. Hafner, and S. Laurent). Wiley, New York, April 2012. (Forthcoming)
- A Comparison Study on the Spatial Dependence of Economic Growth in Yangtze River Delta and Pearl River Delta. With Liangjun Su. *Journal of Quantitative and Technical Economics*, 2007 (12). (In Chinese)

Papers Under Submission

- Nonparametric Regression Estimation with General Parametric Error Covariance: A More Efficient Two-step Estimator (With Liangjun Su and Aman Ullah)
- On Efficiency Properties of an R-square Coefficient Based on Final Prediction Error

Completed Papers

- Nonparametric and Semiparametric Estimation of the Seemingly Unrelated Regression Models: An Application on Return to Public Capital in U.S. (Job Market Paper)
- Bias in the Mean Reversion Estimator in the Continuous Time Gaussian and Lévy Processes (with Aman Ullah and Jun Yu)
- Exact Distribution and Density of Mean Reversion Estimator in Continuous Time Model (with Yong Bao and Aman Ullah)

Paper in Progress

- Nonparametric Testing in Seemingly Unrelated Regressions

Honors, Scholarships, and Fellowships

- Chancellor’s Distinguished Dissertation Year Fellowship, University of California, Riverside, 2011-

2012

- Outstanding Teaching Assistant Award, University of California, Riverside, 2010-2011
- GSA Conference Travel Grants, University of California, Riverside, 2010, 2011
- Graduate Division Fellowship, University of California, Riverside, 2007-2012
- Guanghua Scholarship, Peking University, 2006

Conference and Seminar Presentations

- Econometrics Colloquium at University of California, Riverside, USA, December 2011
- The 2011 Annual Conference of the Canadian Economics Association, Ottawa, Canada, June 2011
- The 2011 CES China Conference, Beijing, China, June 2011
- Econometrics Colloquium at University of California, Riverside, USA, November 2010
- The 20th Annual Meetings of the Midwest Econometrics Group, Washington University in St. Louis, USA, October 2010
- The 2010 International Symposium on Econometric Theory and Applications (SETA 2010), Singapore, April 2010

Teaching Experience

Instructor (University of California, Riverside)

- Introductory Econometrics, Summer 2011

Teaching Assistant (University of California, Riverside)

- Graduate Courses: Econometric Methods II, Econometric Methods III
- Undergraduate Courses: Introductory Econometrics, Statistics for Economics, Intermediate Macroeconomics, Introductory Macroeconomics

Teaching Assistant (Peking University)

- Graduate Courses: Advanced Mathematical Statistics, Applied Statistics

Research Assistant at Department of Business Statistics and Econometrics, Guanghua School of Management, Peking University, China, January 2006-July 2007

Referee for Journal of Quantitative Economics (3), International Regional Science Review (1), Empirical Economics (1)

Computer Skills MATLAB, STATA, EVIEWS, GAUSS, SAS, R

Languages English (fluent), Chinese (native)

References

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RESEARCH SUMMARY

YUN WANG

I. Estimation, Hypothesis Testing, and Model Selection in Nonparametric and Semiparametric Models

(1). Nonparametric and Semiparametric Estimation of the Seemingly Unrelated Regression Models: An Application on Return to Public Capital in U.S. (Job Market Paper)

Summary The objective of this paper is to systematically develop a new set of results for seemingly unrelated regression (SUR) analysis within nonparametric and semiparametric framework. We study the properties of conventional local linear least squares (LLLS) and local linear weighted least squares (LLWLS) estimators in nonparametric SUR, provide an efficient two-step estimation for the system and establish the corresponding asymptotic theorems under both unconditional and conditional error variance-covariance cases. The theoretical results show that our two-step estimator is more efficient than the LLLS estimator. The procedures of estimation for various nonparametric or semiparametric SUR models are proposed, such as, the model with error components, partially linear semiparametric model, model with nonparametric autocorrelated errors, additive nonparametric model, varying coefficient model, and the model with endogeneity, etc. In addition, two nonparametric goodness-of-fit measures for the system are given, which provide a fundamental knowledge that can be used to develop various tests based on R-square for SUR system. To examine the finite sample properties, we conduct a small set of Monte Carlo simulations to compare our two-step estimator with LLLS, LLWLS estimators, and a class of two-step estimator. The simulation results show that our two-step estimator outperforms other estimators in the sense of having the smallest absolute bias and the lowest mean squared errors in general. An empirical analysis on return to public capital in U.S. is presented to illustrate the practical use of our two-step estimation for nonparametric random effect model and nonparametric SUR model with error components. It provides some interesting results that cannot be revealed by using parametric analysis. The main findings of the empirical analysis include: first, the public capital has a significantly positive return across the states and examined years; second, the government tends to play a more effective role in spurring the economy during the recessions than the normal periods; third, the states with negative public capital returns tend to overinvest on infrastructures.

(2). Nonparametric Regression Estimation with General Parametric Error Covariance: A More Efficient Two-step Estimator

with Liangjun Su and Aman Ullah (submitted)

Summary In this paper we propose a two-step estimator of nonparametric regression function with general parametric error covariance for the multivariate case and demonstrate that it is more efficient than the local linear least squares estimator. We establish the asymptotic theorems for both local function estimator and the slope estimators. A small set of Monte Carlo study shows the outperformance of our estimator in comparison with the conventional LLLS and some other two-step estimator in nonparametric regression with either AR(2) errors or heteroskedastic errors. Finally, we apply the newly proposed estimator to a real data setting.

(3). Nonparametric and Semiparametric Volatility Models: Specification, Estimation, and Testing

with Liangjun Su, Aman Ullah, and Santosh Mishra. In *Handbook in Financial Engineering and Econometrics: Volatility Models and Their Applications* (editors: L. Bauwens, C. Hafner, and S. Laurent). Wiley, New York, April 2012. (Forthcoming)

Summary The estimation and prediction of the parametric conditional variance (volatility) models have higher convergence rates, but may suffer from misspecification problem that yields inconsistent estimators (thus misleading statistical inference). In view of these, in recent years the consistent nonparametric and semiparametric estimation methods have been developed for the volatility models and our purpose here is to provide a survey of this literature. A detailed review of the univariate nonparametric and semiparametric volatility models is presented which includes, among others, the additive models, varying coefficients models, single index models, and multiplicative combined semiparametric models. A review of the recent

developments in the multivariate volatility models is also done. Further, the testing procedures for a correctly specified parametric univariate and multivariate volatility models are also incorporated. Finally, in an empirical analysis, we apply some of the above discussed nonparametric (NP) and semiparametric (SP) univariate and multivariate volatility models to real data, the Dow Jones Industrial Average Index (DJIA) and Standard & Poor's 500 Index (SPX) daily returns, and compare them with some of the parametric models. In addition, a nonparametric test is conducted for testing the correct specification of parametric conditional covariance model in the real data. The empirical findings include the followings. First, all NP/SP models can always reduce both the in-sample and out-of-sample MSE loss values. Second, the SP combined estimators perform better than the NP estimators. Third, during the recession period from December 2007 through June 2009, the forecasted volatility by the SP combined dynamic conditional correlation (SP-DCC) model captures well the structure in true volatility. However, the pure DCC forecasted volatility is too smooth compared with the structure of the true one. Fourth, the nonparametric test conducted for the correct specification of parametric conditional covariance model shows that DCC model may suffer misspecification issue for the multivariate volatility analysis.

II. Continuous Time Models

(1). Bias in the Mean Reversion Estimator in the Continuous Time Gaussian and Lévy Processes

with Aman Ullah and Jun Yu (completed)

Summary Due to the effectiveness of the continuous time models in financial studies, an extensive literature has been developed on using diffusion processes to model the dynamic characterization of financial securities. One issue with utilizing diffusion processes is estimation bias. Especially, the difficulty of estimating the mean reversion parameter precisely which is useful for pricing financial assets, has been well documented in previous studies. To the best of our knowledge, the current paper is the first one that works on the bias in continuous time Lévy processes. The interests on the continuous time Lévy processes just start growing as these processes can capture the infinite jump activities in financial securities while the conventional Gaussian processes fails to do so. The objective of the paper is to approximate the bias of the mean reversion estimator ($\hat{\kappa}$) under the Lévy measure and study the effects of non-normality on the estimation bias. We have the following results: The bias of $\hat{\kappa}$ is approximated and two bias expressions are obtained for the Lévy-based Ornstein-Uhlenbeck (OU) process. The approximate bias of $\hat{\kappa}$ under normality is also derived as a special case. The two bias expressions indicate that both the skewness and kurtosis of the Lévy measure affect the bias when the time span and the sample size are not very large. The initial condition, the long term mean (μ), and the volatility parameter (σ) also enter the bias expressions. A bias corrected estimator of κ is proposed. Monte Carlo studies are conducted to compare four different estimators of κ . Simulation results suggest that our proposed estimator of κ outperforms other bias corrected estimators proposed in the literature.

(2). Exact Distribution and Density of Mean Reversion Estimator in Continuous Time Model

with Yong Bao and Aman Ullah (completed)

Summary Due to the lack of efficient algorithms for studying the exact behavior of estimated mean reversion parameter, the estimator tends to have larger bias and slower convergence rate than the rest of estimated parameters in the model. And the literature has shown that the asymptotic normal distribution of the estimator gives misleading results. To address these problems, we employ the techniques of finite sample econometrics and evaluate the exact distribution and density of the mean reversion parameter estimator. The numerical results demonstrate that the true behavior of the sample estimator can be captured very well by our evaluation of its exact distribution.

III. Other Topic

On Efficiency Properties of an R-square Coefficient Based on Final Prediction Error (submitted)

Summary The literature has shown that using R-square coefficient based on final prediction error (R_{FPE}^2) as a model selection criterion is perfectly consistent with using AIC, and is closest with the criterion BIC than R^2 and adjusted R-square (R_a^2). Thus, R_{FPE}^2 can be simultaneously devoted to both aims of goodness-of-fit measure and model selection, which is practical in extensive empirical work. Motivated by this, we study the efficiency of the coefficient of determination based on final prediction error, and compare it with conventional goodness-of-fit measures in linear regression models with both normal and non-normal disturbances. The theoretical findings incorporate the followings. First, the exact bias of R_{FPE}^2 is always less than the exact biases of R^2 and R_a^2 for all the distributions, and the asymptotic approximations of biases have identical results with those of exact biases. Second, the exact MSE of R_{FPE}^2 can behave better only when some conditions hold. Third, since the exact MSE of R_{FPE}^2 depends on the exact moments of R^2 and R_a^2 , we develop the approximate MSE expressions for the MSE of R_{FPE}^2 . This results shows that under some non-normal cases, and the population goodness of fit is very large (greater than 0.9) or very low (less than 0.4), R_{FPE}^2 behaves better in the sense of having lower MSE. Therefore, this R-square coefficient based on final prediction error is a useful tool as a measure of goodness-of-fit.