Current Research Interests and Abstracts

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My fields of interests include Econometric theory and methodology, Applied econometrics, Time series econometrics and Empirical finance. My current interests are (i) Moment restriction models (empirical likelihood and entropy approaches); (ii) Quantile regression methods; (iii) Time series econometrics (financial econometrics).

My dissertation entitled "Essays on Maximum Entropy Principle with Applications to Econometrics and Finance" has been conducted under the direction of Prof. Anil Bera. These three essays used the entropy measure to study estimation and inference procedures for some econometric models. My current topics of interests are: empirical likelihood estimators; quantile regression; spatial econometrics; density forecast evaluation; portfolio selection; multivariate density construction among others. And I am also quite interested in modeling empirical issues in various fields. Followings are abstracts of some of my current working or working-in-progress papers.

Generalized Empirical Likelihood Specification Test Robust to Local Misspecification (with Haiqi Li)

Abstract It is well known that many of the standard specification tests may not robust when the alternative is misspecified. This paper analyzes a robust specification test in Generalized Empirical Likelihood (GEL) estimators setting. GEL estimators are first order equivalent to generalized method of moment (GMM) estimators and have better finite sample properties. We show the usual LM specification test has a noncentral chi-square distribution asymptotically under the local misspecification in the GEL framework. Thus, it spuriously reject the null hypothesis too frequently. We propose a robust LM specification test which has a central chi-square distribution asymptotically under the local misspecification, and therefore, it has asymptotically correct size.

Which Quantile is the Most Informative : Maximum Entropy Quantile Regression (with Anil Bera, Antonio Galvao and Gabriel Montes-Rojas)

Abstract This paper studies the connections among quantile regression, the asymmetric Laplace distribution, and the maximum entropy. We show that the maximum likelihood problem is equivalent to the solution of a maximum entropy problem where we impose moment constraints given by the joint consideration of the mean and median. Using the resulting score functions we develop a maximum entropy quantile regression estimator. This approach delivers estimates for the slope parameters together with the associated "most informative" quantile. Similarly, this method can be seen as a penalized

quantile regression estimator, where the penalty is given by deviations from the median regression. We derive the asymptotic properties of this estimator by showing consistency and asymptotic normality under certain regularity conditions. Finally, an application to the U.S. wage data to evaluate the effect of training on wages illustrates the usefulness and implementation of our methodology.

Information Theoretic Approaches to Income Density Estimation with an Application to the U.S. Personal Income Data (with Anil Bera)

Abstract The size distribution of income is the basis of income inequality measures which in turn are needed for evaluation of social welfare. Therefore, proper specification of the income density function is of special importance. In this paper, using information theory, first, we provide maximum entropy characterization of some well-known income distributions. Then, we suggest a class of flexible parametric densities which satisfy certain stylized facts of personal income data such as the weak Pareto law and a decline of the income-share elasticities. Our empirical results using the U.S. personal income data show that maximum entropy principle provides economically meaningful and a very parsimonious specifications of the income density function.

Quantile Autoregressive Distributed Lag Model with an Application to Housing Price Returns (with Antonio Galvao and Gabriel Montes-Rojas)

Abstract This paper studies quantile regression in an autoregressive dynamic framework with exogenous stationary covariates. Hence, we develop a quantile autoregressive distributed lag model (QADL). We show that these estimators are consistent and asymptotically normal. Inference based on Wald and Kolmogorov-Smirnov tests for general linear restrictions is proposed. An extensive Monte Carlo simulation is conducted to evaluate the properties of the estimators. We demonstrate the potential of the QADL model with an application to house price returns in the United Kingdom. The results show that house price returns present a heterogeneous autoregressive behavior across the quantiles. The real GDP growth and interest rates also have an asymmetric impact on house prices variations.

Robust Portfolio Selection with S-shaped Utility (with Zhihuang Shuai)

Abstract In portfolio selection problem, the target return, the benchmark portfolio return, or the endogenously determined location of returns can be regarded as reference points. With reference points investor's behavior can be risk seeking or loss averse. In this paper, we propose a series of S-shaped utilities which are mixture of risk-seeking and risk aversion to analyze asset allocation problem. By maximizing the expected value of the compound utilities, we derive robust portfolio policies that

possess several advantages: (i) it can easily deal with higher order moments; (ii) it is an one-step optimization process. Computation of covariance, coskewness, cokurtosis matrices are not needed and, therefore, it does not face the problem of non-invertible or ill-conditioned covariance matrix; (iii) it is feasible when the number of sample periods is relatively small compared to the number of assets.

Density Forecast Evaluation Using Data-Driven Smooth Test (with Yupeng Zhang) (Working in progress)

Abstract In this paper, we develop a data-driven smooth test for out-of-sample density forecast evaluation. We develop a joint test for uniformity and serial independence using data-driven Neyman's smooth test. Our test has the following appealing properties: (i) it directly reflects the effect of estimation uncertainty on the performance of density forecast evaluation; (ii) we can accommodate general estimation procedures in the derivation of forecasts including Bayesian and semi- and nonparametric estimation methods; (iii) it can be easily computed, whereas the existing tests are difficult to compute or have limiting distributions that are context specific.

Estimation of Conditional Value at Risk Under Regression Quantiles (Working in progress)

Abstract Quantile regression model provides excellent tool to estimate well known risk measure. In this paper, a simple version of a quantile generalized autoregressive conditional heteroskedasticity (QGARCH) model is proposed to estimate the conditional Value at Risk. Because of high degree of nonlinearity, implementation of quantile regression into GARCH-type model is complicate. We construct QGARCH model using statistical characteristics of the asymmetric Laplace distribution (ALD). An application to the index stock returns illustrates the usefulness of our approach.