TAOSONG DENG

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EDUCATION

Ph.D. in Economics, Boston University, Boston MA, 2021 (expected)
Dissertation Title: *Econometric Essays on Predictive regressions and Nonlinear Dynamic Stochastic General Equilibrium Models*
Dissertation Committee: Zhongjun Qu, Pierre Perron, and Jean-Jacques Forneron

M.A. Student in Statistics, Boston University, Boston MA, 2014
M.A. in Economics, Boston University, Boston MA, 2013
B.A. in Economics, Hunan University, Changsha, China, 2012

FIELDS OF INTEREST

Primary Fields: Econometrics

Secondary Fields: Quantitative Macroeconomics, Empirical Finance

WORKING PAPERS

"Inference in Predictive Regressions with Persistent Predictors", (Job Market Paper 1), September 2020

"A New Particle Filter for Analyzing Nonlinear Dynamic Stochastic General Equilibrium Models", (Job Market Paper 2), (with Zhongjun Qu), September 2020

"Theory of Low Frequency Contamination from Nonstationarity and/or Misspecification: Consequences for HAR Inference", (with Alessandro Casini and Pierre Perron), September 2020

WORKING IN PROGRESS

"Images of Countries: A Cross-National Comparison of Media Coverage during the Covid-19 Pandemic", (with Meng Wu)

"Option Pricing Implication of Learning"

PRESENTATIONS

BU Econometrics Seminar, Boston, MA, Fall 2020
BU Econometrics Seminar, Boston, MA, Spring 2020
BU Econometrics Seminar, Boston, MA, Spring 2019
BU Econometrics Seminar, Boston, MA, Spring 2018
BU Econometrics Seminar, Boston, MA, Fall 2016

WORK EXPERIENCE

Research Assistant for Prof. Pierre Perron, Boston University, Spring 2020
Research Assistant for Prof. Marianne Baxter, Boston University, Fall 2019
Research Assistant for Prof. Pierre Perron, Boston University, Spring 2019
Research Assistant for Prof. Zhongjun Qu, Boston University, Spring 2018 - Fall 2018
Research Assistant for Prof. Pierre Perron, Boston University, Fall 2015 - Fall 2017

RESEARCH GRANTS

Summer Research Grant, Department of Economics, Boston University, Summer 2018

FELLOWSHIPS AND AWARDS

Doctoral Research Fellowship, Boston University, Fall 2015 - Spring 2020

Dean's Fellowship, Boston University, Fall 2014 - Spring 2015

LANGUAGES: English (fluent), Chinese (native)

COMPUTER SKILLS: MATLAB, R, Python, GAUSS, Stata, Mathematica, C/C++, LaTeX

CITIZENSHIP/VISA STATUS: China/F1

DATE OF BIRTH: October 19, 1990

REFERENCES

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TAOSONG DENG

Inference in Predictive Regressions with Persistent Predictors (Job Market Paper 1)

Conventional tests of predictive regressions exhibit large size distortions: they reject the null hypothesises too frequently when a predictor is nearly integrated and its innovations are highly correlated with the outcome variable. Existing valid inference procedures such as Stambaugh (1999), Amihud and Hurvich (2004), Lewellen (2004), Campbell and Yogo (2006), e.t.c., all require multiple steps for their implementation. Motivated by these procedures that make use of the correlation information to create valid tests, we propose a simple procedure based on augmented regressions that only needs one shot to conservatively estimate and test coefficients in predicative regressions with a nearly integrated predictor. Using the local-to-unity asymptotics, we show that the limiting distribution of the t-statistic on the parameter capturing the predictability is the same as that in Lewellen (2004), i.e., the sup-bound Q-test in Campbell and Yogo (2006). Therefore, the usual t-test using conventional normal critical values is conservative. Moreover, the limiting distribution of the t-statistic on the parameter capturing the correlation between innovations is standard normal, always free from the unknown level of persistence. To deal with the situation where the predicative test becomes uninformative due to possible outlying events or regime changes, we propose a class of robust tests and study their asymptotic properties. Empirically, we find some evidence about predictability of NYSE/AMEX returns using nearly integrated predictors such as log dividend-price ratio or log earning-price ratio. The tests yield similar results to those of the popular Q-test.

A New Particle Filter for Nonlinear Dynamic Stochastic General Equilibrium Models (Job Market Paper 2) (with Zhongjun Qu)

There is an increasing demand for filters that are applicable to nonlinear dynamic stochastic general equilibrium models. One of the popular choices is particle filter. However, it is commonly known by researchers and practitioners that this filter requires adding measurement errors to the model for its implementation. Otherwise, singularity appears and consequently such algorithm breaks down. Measurement errors are not a feature of DSGE models. We develop a new particle filter to remedy this issue by classifying state variables into two groups: observable states that directly contribute to observations and unobservable states that do not. By only sampling and propagating particles of unobservable states, no measurement error is required. To evaluate the density of the observables conditional on unobservable states, we propose two approaches: one is a local approximation approach based on kernel density smoothing and the other is a global approximation approach based on series expansions. The method also allows us to study singular DSGE models using the composite likelihood, therefore providing a unified treatment of both singular and nonlinear DSGE models. Finally, we confront DSGE models with data using our newly proposed filter.

Theory of Low Frequency Contamination from Nonstationarity and/or Misspecification: Consequences for HAR Inference (with Alessandro Casini and Pierre Perron)

We establish theoretical results on the low frequency contamination induced by nonstationarity for estimates such as the sample autocovariance and the periodogram. We show that for short memory nonstationarity data these estimates exhibit features that correspond to long memory. We present explicit expressions for the asymptotic bias of these estimates. This bias increases with the degree of heterogeneity. The sample autocovariances display hyperbolic decay rather than exponential decay while the periodogram becomes unbounded around the origin. We distinguish cases where this contamination only occurs as a small-sample problem and cases where the contamination continues to hold asymptotically. We show theoretically that nonparametric smoothing over time is robust to low frequency contamination in that the sample local autocovariance and the local periodogram are unlikely to exhibit long memory features. Simulations confirm that our theory provides excellent approximations. Since the autocovariances and the periodogram are key elements for heteroskedasticity and autocorrelation robust (HAR) inference, our results provide new insights on the debate between consistent versus inconsistent long-run variance estimation. Existing long-run variance estimators tend to be inflated when the data are nonstationarity. This results in HAR tests that can be undersized and exhibit dramatic power losses or no power. Our theory indicates that long bandwidths or fixed-b HAR tests suffer more from low frequency contamination relative to HAR tests based on HAC estimators, whereas recently introduced double kernel HAC estimators do not suffer from this problem. Provided intuition and a simulation study support such theoretical results.

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