

Xu Cheng

Home Address:

Apt 5, 462 Humphrey Street
New Haven, CT 06511-3730

Office Address:

Department of Economics
Yale University
P.O. Box 208268
New Haven, CT 06520-8268
Fax: (203) 432-2630

Telephone: (203) 535-3093 (Cell)

E-mail: xu.cheng@yale.edu

Webpage: <http://www.econ.yale.edu/~xc38/>

Citizenship: China (F-1 Visa)

Fields of Concentration:

Econometric Theory
Applied Econometrics

Desired Teaching:

Econometrics and Applied Econometrics
Microeconomics
International Economics
Financial Economics

Comprehensive Examinations Completed:

2007 (Oral): Econometrics (*with distinction*), International Economics.
2006 (Written): Macroeconomics, Microeconomics.

Dissertation:

Robust Inference in Nonlinear Regression and Semiparametric Cointegrating Rank Selection

Committee:

Professor Donald W. K. Andrews (co-chair)
Professor Peter C. B. Phillips (co-chair)
Professor Xiaohong Chen
Professor Yuichi Kitamura

Expected Completion Date: May 2009

Degrees:

Ph.D., Economics, Yale University, expected May 2009.
M.S., Applied Economics, University of Wisconsin-Madison, 2005.
B.A., Economics, Peking (Beijing) University, China, 2003.
Summa Cum Laude, Ranked 1st in Graduation Class.

Fellowships, Honors and Awards:

Carl Arvid Anderson Prize, Cowles Foundation, 2008-2009.
Dissertation Fellowship, Yale University, 2008-2009.
Overbrook Fellowship, Yale University, 2007-2008.
Distinction in Econometrics Field Exam, Yale University, 2007.
University Fellowship, Yale University, 2005-2009.
IMF-Japan Scholarship, International Monetary Fund, 2005-2007.
Outstanding Undergraduate Student Award, Peking University, 2000-2003.
Antai Scholarship, Peking University, 2002-2003.
Sumitomo-Mitsui Scholarship, Peking University, 2000-2002.

Teaching Experience:

Teaching Fellow at Department of Economics, Yale University:

Econometrics II	(1 st Year Ph.D. Course)	2008 Spring
Microeconomic Theory I	(1 st Year Ph.D. Course)	2007 Fall
Introduction to Microeconomics	(Undergraduate Course)	2007 Summer
Introduction to Econometrics	(Undergraduate Course)	2006 Fall

Working Papers:

“Robust Confidence Intervals in Nonlinear Regression under Weak Identification”
(*Job Market Paper*), 2008.

“GMM Confidence Intervals in Nonlinear Regression with Endogeneity”
(with Donald W. K. Andrews), 2008.

“Semiparametric Cointegrating Rank Selection” (with Peter C. B. Phillips), 2008,
The Econometrics Journal, forthcoming.

“Cointegrating Rank Selection in Models with Time-Varying Variance”
(with Peter C. B. Phillips), 2008.

“Semiparametric Re-evaluation of Long-Run Exchange Rate Dynamics”, 2008.

“The Rate of Time Preference and the Long-Run Level of International Debt”
(with Koichi Hamada and Takashi Kamihigashi), 2008.

Conference Presentations:

Southern Economic Association Meeting, Washington D.C., November 2008.
Model Selection Workshop, University of Vienna, Austria, July 2008.
Far East and South Asian Meeting of the Econometric Society, Singapore, July 2008.
Conference in Honor of Peter C. B. Phillips, Singapore, July 2008.

Languages: English (Fluent), Mandarin (Native)

References:

Professor Donald Andrews
Cowles Foundation
Yale University
P.O. Box 208281
New Haven, CT 06520-8281
Phone: (203) 432-3698
Fax: (203) 432-6167
E-mail: donald.andrews@yale.edu

Professor Peter Phillips
Cowles Foundation
Yale University
P.O. Box 208281
New Haven, CT 06520-8281
Phone: (203) 432-3695
Fax: (203) 432-6167
E-mail: peter.phillips@yale.edu

Professor Xiaohong Chen
Cowles Foundation
Yale University
P.O. Box 208281
New Haven, CT 06520-8281
Phone: (203) 432-5852
Fax: (203) 432-6167
E-mail: xiaohong.chen@yale.edu

Professor Yuichi Kitamura
Cowles Foundation
Yale University
P.O. Box 208281
New Haven, CT 06520-8281
Phone: (203) 432-3699
Fax: (203) 432-6167
E-mail: yuichi.kitamura@yale.edu

Professor Truman Bewley (Teaching)
Cowles Foundation
Yale University
P.O. Box 208281
New Haven, CT 06520-8281
Phone: (203) 432-3719
Fax: (203) 432-6167
E-mail: truman.bewley@yale.edu

Dissertation Abstract:

Economic theory and empirical studies often suggest nonlinear relationships among economic variables. These relationships are commonly specified in a parametric form involving several nonlinear component functions with unknown transformation parameters and loading coefficients that measure the importance of each component. Examples include Box-Cox type transformation of expenditures in Engel curve estimation, logistic/exponential transformations in smooth transition models, and neural network models of nonlinear responses. When such regressions have components with small loading coefficients the signal from the respective nonlinear regressor may be weak, affecting estimation of the transformation parameters. In such cases, standard asymptotic theory can provide a poor approximation to finite-sample behavior and failure to address the problem can produce misleading inferences.

The first two chapters of my dissertation seek to tackle this problem in complementary ways. First, I develop new asymptotic theory that provides a uniform approximation to the finite-sample distribution irrespective of the magnitude of the loading coefficient. Second, standard confidence intervals (CIs) based on conventional normal or chi-squared approximations as well as subsampling-based CIs are shown to be prone to size distortions that can be severe. Third, a new confidence interval (CI) is constructed that has good finite-sample coverage probability.

Many macroeconomic and financial time series are documented to have time-varying variances, which invalidate standard unit root tests and likelihood ratio tests for cointegrating rank. The third chapter of my dissertation introduces a semiparametric cointegrating rank selection method that is robust to persistent volatility shifts of an unknown form and is easy to implement. The new methodology is used to analyze long-run exchange rate dynamics.

I. Robust Confidence Intervals in Nonlinear Regression under Weak Identification

(Job Market Paper)

When a loading coefficient is close to zero, the signal from the associated nonlinear component is reduced and this results in weak identification of the parameters in the nonlinear function. As in the weak

instruments literature, standard asymptotic approximations to the finite-sample distributions of statistical tests can be poor under such weak identification. For example, even though the t statistic has a standard normal distribution asymptotically, use of critical values from the standard normal distribution can lead to large size distortions in weakly identified situations.

To improve finite-sample behavior, my paper derives a new local limit theory for least squares estimators and test statistics when the loading coefficient is local to zero in the sense that the coefficient drifts to zero at a rate determined by the sample size. The localizing loading coefficient then characterizes the strength of identification. The local limit theory provides much better finite-sample approximations under weak identification. Explicit formulae are derived for the coverage probabilities of standard CIs and subsampling CIs, showing that these two types of CIs may or may not have correct asymptotic size depending on the nonlinear functional form.

The paper introduces a new robust CI whose asymptotic size is accurate irrespective of the strength of identification. The robust CI is based on a model-selection procedure that uses the data to determine whether the model is weakly identified. Specifically, we proceed with weak identification only if the statistic for model selection is smaller than a tuning parameter. The robust CI has correct asymptotic size provided this tuning parameter goes to infinity with the sample size. Suitable choices of the divergence rate are investigated by simulation. The paper also develops a sequential procedure to deal with multiple nonlinear regression functions under different identification scenarios. It is shown that weak identification of any particular nonlinear regressor can have serious negative implications on inference for all the parameters in the model when standard asymptotics are employed. New CIs that are robust to weak identification are developed to address this difficulty in the multiple regressor context.

II. GMM Confidence Intervals in Nonlinear Regression with Endogeneity

(joint with Donald W. K. Andrews)

To deal with weak identification as well as endogeneity, this chapter derives a local limit theorem for the generalized method of moments (GMM) estimator and associated test statistics. Our theory and simulation studies reveal size distortions in both the standard asymptotic and subsampling GMM CIs. This motivates the construction of robust CIs that have correct asymptotic size and better finite sample performance. Our limit theory relaxes the usual smoothness conditions on the nonlinear regression function and allows for the presence of kinks in the regression functions. The results are obtained using empirical process methods. An empirical application to nonlinear Engel curve estimation is presented to illustrate the finite-sample problems of the standard CIs and the robustness of the new CI.

III. Semiparametric Cointegrating Rank Selection

(joint with Peter C. B. Phillips)

The third chapter develops a new information criterion approach for cointegrating rank choice that allows for a semiparametric framework and is robust to variance changes of a very general form. Specifically, we show that in a general semiparametric error correction model, information criteria based on reduced rank regressions (RRRs) can consistently select the cointegrating rank provided that the penalty term goes to infinity at a rate slower than the sample size. In particular, RRRs may be implemented without explicitly taking into account weak dependence and persistent volatility shifts of the errors. The approach uses the simplest framework of a single lag vector autoregression, so it is extremely convenient for practical implementation. An empirical study assessing the information criteria-based approach is presented to evaluate long-run exchange rate dynamics among seven major currencies under both the fixed and flexible exchange rate regimes.