

Xiyu Jiao

Year of Birth: 1989.

Nationality: China.

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Research Interests

Econometric and Statistical Theory; Time Series; Empirical Processes; Outlier Detection Algorithms; Non-linear Cointegration; Model Selection; Specification Tests.

Higher Education

University of Oxford, UK **2013 - Present**
MPhil and DPhil in Economics, Department of Economics
Thesis: Essays on Asymptotic Analysis of Outlier Detection Algorithms
Advisor: Bent Nielsen

London School of Economics and Political Science, UK **2011 - 2012**
MSc in Statistics (Research) with Distinction, Department of Statistics
Dissertation: Time Series Analysis and Forecasts of Child Mortality Rates in Hong Kong
Advisor: Clifford Lam

Northwest University, China **2007 - 2011**
BSc in Computational Mathematics, Department of Mathematics

Honours and Prizes

Royal Statistical Society Prize for Best Graduate on an Accredited Course 2012

LSE Best Graduate Prize for Excellence in MSc Statistics (Research) 2012

Teaching Experience

Teaching Associate, Department of Economics, University of Oxford **2015 - Present**
Econometrics for the First Year MPhil:

Module:	Instructor:
Introduction to Econometrics (Probability)	Bent Nielsen, Vanessa Berenguer-Rico
Estimation and Inference in Linear Models (Regression)	Steve Bond, Bent Nielsen
IV, GMM and MLE	James Duffy
Discrete Choice Models	Michael Keane

Papers/Working Papers

- [1] Jiao, X. (2018). A simple robust procedure in instrumental variables regression. *Job Market Paper*.

Abstract: Due to the frequent concern that outliers may invalidate the empirical findings, in practical applications of instrumental variables regression the common practice is to first run ordinary two stage least squares and remove observations with residuals beyond a chosen cut-off value that classifies outliers. 2SLS is subsequently re-calculated with non-outlying observations, and this procedure is iterated until robust results are obtained. In this paper we analyze this simple robust algorithm asymptotically, then provide consistent estimation and valid inferential procedures for practical implementation given the cut-off value. Moreover, this paper provides asymptotic theory for setting the cut-off, which is chosen to control the gauge (proportion of outliers wrongly discovered). Asymptotics are derived under the null hypothesis that there is no contamination in the cross-sectional i.i.d. data. The established weak convergence result, involving empirical processes and fixed points, provides a starting point for statistical tests that assess model misspecification. Thus this paper also establishes the uniform and weak law for a new class of weighted and marked empirical processes, allowing for estimation errors of parameters in the structural IV equation.

- [2] Jiao, X. and Pretis, F. (2018). Testing the presence of outliers to assess misspecification in regression models. *Working Paper*.

Abstract: The presence of outlying observations in a regression model can be indicative of model misspecification, consequently, it is important to check for possible outlier contamination. However, algorithms used to detect outliers have a positive probability of finding outliers even when, in fact, the data generation process has no outliers. Deriving distributional results on the expected retention rate of falsely discovered outliers, we propose two set of tests for the overall presence of outliers: first, tests on whether the observed proportion and number of detected outliers deviate from their expected values. Second, ‘scaling’ tests on whether the number of detected outliers decreases proportionally with the level of significance used to detect outliers. We derive the asymptotic distribution of the tests based on iterated 1-step Huber-skip M-estimators. The first set of tests has power against the number of outliers present, while the second set of tests has power against both outlier magnitude and number. In applications of the tests we consider a cross-sectional macroeconomic model of economic growth, and re-visit a set of previous studies using indicator saturation. The tests are valid for stationary as well as (stochastically) trending regressors and can readily be implemented using *Autometrics* in PcGive or the R-package *gets*.

- [3] Jiao, X. (2017). Uniform convergence of marked empirical processes in location and scale model. *Working Paper*.

Abstract: We consider the residual empirical process for the location and scale model. This paper gives a new proof for uniform convergence results. Then the refining argument requires the simpler and weaker assumptions needed in Johansen and Nielsen (2016) and Jiao and Nielsen (2017).

- [4] Jiao, X. and Nielsen, B. (2017). Asymptotic analysis of iterated 1-step Huber-skip M-estimators with varying cut-offs. In Antoch, J., Jurečková, J., Maciak, M. and Pešta, M. (eds.) *Analytical Methods in Statistics: AMISTAT, Prague, November 2015*. Springer Proceedings in Mathematics and Statistics 193, 23-52.

Abstract: We consider outlier detection algorithms for time series regression based on iterated 1-step Huber-skip M-estimators. This paper analyses the role of varying cut-offs in such algorithms. The argument involves an asymptotic theory for a new class of weighted and marked empirical processes allowing for estimation errors of the scale and the regression coefficient.

Professional Services

Referee for: Scandinavian Journal of Statistics

Professional Memberships

Graduate Statistician of Royal Statistical Society and American Statistical Association

Member of Econometric Society, American Economic Association, Royal Economic Society, European Economic Association

Internships

Zurich Life Insurance Company Limited (Hong Kong)

2009

References

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