Accepted Manuscript

Consistent model check of errors-in-variables varying-coefficient model with auxiliary variable

Zhifan Liu, Chunling Liu, Zhihua Sun

PII: S0378-3758(18)30028-4
DOI: https://doi.org/10.1016/j.jspi.2018.03.002
Reference: JSPI 5636

To appear in: *Journal of Statistical Planning and Inference*

Received date : 30 May 2017
Revised date : 5 February 2018
Accepted date : 5 March 2018

Please cite this article as: Liu Z., Liu C., Sun Z., Consistent model check of errors-in-variables varying-coefficient model with auxiliary variable. *J. Statist. Plann. Inference* (2018), https://doi.org/10.1016/j.jspi.2018.03.002

Consistent model check of errors-in-variables varying-coefficient model with auxiliary variable [1]

Zhifan LIU[a], Chunling LIU[b], Zhihua SUN[a,c]

[a] *University of Chinese Academy of Sciences, Beijing, 100049, China*
[b] *The Hong Kong Polytechnic University Kowloon, Hong Kong*
[c] *Key Laboratory of Big Data Mining and Knowledge Management of CAS, Beijing, 100049, China*

Abstract

In this paper, we consider the adequacy check of the varying-coefficient model when covariates are measured with error and some auxiliary variable is available. With the help of auxiliary variable, we calibrate the measurement error and obtain an estimator of the unobservable true variable. The empirical-process-based test is built by applying the calibrated estimator of the model error. The asymptotic properties of the proposed test are rigorously investigated under the null hypothesis, local and global alternatives. It is shown that the proposed test is consistent and has good properties of power. We illustrate that the naive method cannot control Type I error and loses effect completely. But the proposed calibrated method performs well in terms of the empirical sizes close to the test level and high empirical powers. Simulation studies and two real data analyses are conducted to demonstrate the performance of the proposed approach.

KEY WORDS: Varying-coefficient model; Measurement error; Auxiliary variable; Model check; Empirical process

Short Title: Test of EV varying-coefficient model with auxiliary variable

[1]The corresponding author is Dr. Zhihua Sun. Email: sunzh@amss.ac.cn. The research was supported by the National Natural Science Foundation of China (Grant Nos. 11571340, 11401502, U1430103) and the Open Project of Key Laboratory of Big Data Mining and Knowledge Management, CAS.