SPLVC Modal Regression with Error-Prone Linear Covariate *

Tao Wang †

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Abstract

To broaden the scope of existing modal regressions, we in this paper propose two procedures, called B-splines-based procedure and stepwise-based procedure, to retrieve the estimates for a *semiparametric partially linear varying coefficient (SPLVC) modal regression with error-prone linear covariate* in which a linear covariate is not observed, but an ancillary variable is available. With B-splines-based procedure, varying coefficients are approximated through B-splines, and a deconvoluting kernel-based objective function is constructed straightly. For the stepwise-based procedure, by defining restricted regression mode via imposing a constrictive condition on model format, a two-step method is developed in which the varying coefficients are concentrated out by applying the "correction for attenuation" methodology in mean regression to alter the original model to a reduced parametric modal regression. Consistency and asymptotic properties of the estimators for these two newly proposed procedures are investigated under mild conditions according to the tail behavior of the characteristic function of the error distribution, either ordinary smooth distribution or super smooth distribution. Bandwidth selection in theory and practice are explored. For comparison, we also develop the asymptotic theorems for the SPLVC modal estimators with B-splines approximation without covariate measurement error. Monte Carlo simulations are conducted to examine the finite sample performance of the estimators and a pseudo data analysis is presented to further illustrated the proposed estimation procedures.

Keywords: Bandwidth, B-splines, Deconvoluting kernel, Error-prone linear covariate, Modal regression, SPLVC, Stepwise.

JEL Classification: C01, C14, C50.

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†Department of Economics at University of California, Riverside, CA 92521. E-mail: tao.wang@email.ucr.edu.