Nearly semiparametric efficient estimation of quantile regression

Yuan Yuan Lin

Department of Statistics, The Chinese University of Hong Kong

Abstract

As a competitive alternative to the least squares regression, the quantile regression is a popular statistical tool for the modeling and inference of conditional quantile function. In conventional quantile regression models, major complications involve in the semiparametric efficient estimation arise from density estimation and computational difficulty. This paper proposes a semiparametric efficient estimation and inference procedure for the quantile regression models with global linearity assumption. The basis of the procedure is an efficient score function derived from a least favorable submodel method. The key ingredients are curve estimation and a numerical algorithm. The resulting estimator is proved to be (nearly) semiparametric efficient, with asymptotic variance achieves the semiparametric efficiency lower bound. Numerical studies with supportive evidence are presented.