

Censored Quantile Regression with Covariate Measurement Errors

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Censored quantile regression has become an important alternative to the Cox proportional hazards model in survival analysis. In contrast to the central covariate effect from the mean-based hazard regression, quantile regression can effectively characterize the covariate effects at different quantiles of the survival time. When covariates are measured with errors, it is known that naively treating mismeasured covariates as error-free would result in estimation bias. Under censored quantile regression, we propose corrected estimating equations to obtain consistent estimators. We establish consistency and asymptotic normality for the proposed estimators of quantile regression coefficients. Compared with the naive estimator, the proposed method can eliminate the estimation bias under various measurement error distributions and model error distributions. We conduct simulation studies to examine the finite-sample properties of the new method and apply our model to a lung cancer study.

Key Words: Check function; corrected estimating equations; measurement errors; kernel smoothing; regression quantiles; semiparametric method; survival data