Three Estimators for Poisson Regression Model with Measurement Error

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Abstract

Three estimators are proposed for the regression coefficients in Poisson regression model where the covariates are measured with error. The measurement errors are assumed to be normally distributed, while the correlation coefficient between the latent covariate and the observe covariate is assumed to be known. The adjusted estimator is obtained by adjusting the naive estimator without considering the measurement error. The calibration estimator is obtained by regression calibration, in which the latent covariate in the naive estimating function is replaced by the conditional expectation of the latent covariate given the observe covariate. The structural quasi-score likelihood estimator is obtained by the quasi-score for the mean-variance model. The consistencies of the three estimators are checked; the asymptotic covariance matrices are compared when the correlation coefficient between the latent covariate and the observe covariate is close to one; some cases in misspecification are also considered. Finally the simulation study is given for examining the consistency, the approximation for the covariance matrices, and the misspecification.