

Errors-in-variables beta regression models

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Beta regression models provide an adequate approach for modeling continuous outcomes limited to the interval $(0,1)$. This paper deals with an extension of beta regression models that allow for explanatory variables to be measured with error. We follow the structural approach, in which the covariates measured with error are assumed to be random variables. We present three estimation methods, namely maximum likelihood, maximum pseudo-likelihood and regression calibration. Monte Carlo simulations are used to evaluate the performance of the proposed estimators and the naïve estimator. Also, a residual analysis for beta regression models with measurement errors is proposed. Our results are illustrated in a real data set.

Keywords: Beta regression model, errors-in-variables model, Gauss-Hermite quadrature, maximum likelihood, maximum pseudo-likelihood, regression calibration.