

Statistical inference for regression models with covariate measurement error and auxiliary information*

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Abstract

We consider statistical inference on a regression model in which some covariables are measured with errors together with an auxiliary variable. The proposed estimation for the regression coefficients is based on some estimating equations. This new method avoids some drawbacks of previously proposed estimations. This includes the requirement of undersmoothing the regressor functions over the auxiliary variable, the restriction on other covariables which can be observed exactly, among others. The large sample properties of the proposed estimator are established. We further propose a jackknife estimation, which consists of deleting one estimating equation (instead of one observation) at a time. We show that the jackknife estimator of the regression coefficients and the estimating equations based estimator are asymptotically equivalent. Simulations show that the jackknife estimator has smaller biases when sample size is small or moderate. In addition, the jackknife estimation can also provide a consistent estimator of the asymptotic covariance matrix, which is robust to the heteroscedasticity. We illustrate these methods by applying them to a real data set from marketing science.

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