Local and Omnibus Tests in Classical Measurement Error Models

Abstract

We consider functional measurement error models, i.e., models where covariates are measured with classical error, and yet no distributional assumptions are made about the mismeasured variable. We propose and study a score-like local test and a series expansion based omnibus test in this context, although no likelihood function is available or calculated-that is, all the tests are proposed in the semiparametric model framework. We demonstrate that our tests have optimality properties and computational advantages similar to those of the classical score tests in the parametric model framework. The test procedures are applicable to several semiparametric extensions of measurement error models, including when the measurement error distribution is estimated nonparametrically as well as for generalized partially linear models. The performance of the local and omnibus tests is demonstrated through simulation studies and analysis of a nutrition data set.