REFLECTION METHOD OF ESTIMATION FOR MEASUREMENT ERROR MODELS

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SUMMARY

This paper proposes an estimation method based on the reflection of the (*manifest*) explanatory variable to estimate the parameters of a simple linear regression model when both response and explanatory variables are subject to measurement error (ME). The *reflection method* (RM) uses all observed data points, and does not exclude or ignore part of the data or replace them by their ranks. The RM is straightforward, and easy to implement. We show that the RM is equivalent or asymptotically equivalent to the orthogonal regression (OR) method. Simulation studies show that the RM produces estimators that are nearly asymptotically unbiased and efficient under the assumption that the ratio of the error variances equals one. Moreover, it allows to define the sum of squares of errors uniquely, the same way as in the case of no measurement error. Simulation based numerical comparisons of the RM with the ordinary least square (OLS) and OR methods are also included.

Keywords and phrases: Linear regression models; Reflection of point; Ratio of error variances; Orthogonal regression; Mean absolute error, Method of moments.

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