

Asymptotics Versus Bootstrapping in Errors-in-variables Models with Dependent Errors

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An intensive research in actuarial and financial science has sprung up for methods to handle measurement errors or disturbances in input and output data simultaneously. *Errors-in-variables* (EIV) serve as a regression modeling technique, where both dependent and independent variables are considered to be measured with errors.

An EIV regression model with *dependent errors* is considered and a total least squares (TLS) estimate is constructed. Its consistency and asymptotic normality for weak dependent observations (α - and φ -mixing) are proved [2] TLS estimate is highly nonlinear and, moreover, the asymptotic variance depends on unknown quantities, which cannot be estimated. Because of this, many statistical procedures for constructing confidence intervals and testing hypotheses cannot be applied. One possible solution to this dilemma is bootstrapping [3] Justification for use of the *moving block bootstrap* (MBB, [1]) technique is given.

The results are illustrated through a simulation study. An application of this approach to real data is presented.

References

- [1]. S. N. Lahiri, Resampling Methods for Dependent Data, Springer-Verlag, New York, 2003.
- [2]. M. Pešta, Asymptotics for Weakly Dependent Errors-in-variables. Submitted, 2011.
- [3]. M. Pešta, Total least squares and bootstrapping with application in calibration. *Statistics: A Journal of Theoretical and Applied Statistics*, DOI: 10.1080/0233 1888. 2012.658806, 2012.