Asymptotic distribution of the bias corrected LSEs in measurement error linear regression models under long memory

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Abstract

This paper derives the consistency and asymptotic distribution of the bias cor- rected least squares estimators (LSEs) of the regression parameters in linear regression models when covariates have measurement error and errors and covariates form mu- tually independent long memory moving average processes. In the structural mea- surement error linear regression model, the nature of the asymptotic distribution of suitably standardized bias corrected LSEs depends on the range of the values of $D_{\max} = \max\{d_X + d_\varepsilon; d_X + d_u; d_u + d_u; 2d_u\}$ where d_X, d_u and d_ε are the long memory parameters of the covariate, measurement error and regression error processes, respectively. This limiting distribution is Gaussian when $D_{\max} < 1/2$ and non-Gaussian in the case$D_{\max} > 1/2$. In the former case some consistent estimators of the asymptotic variances of these estimators and a log(n)-consistent estimator of an underlying long memory parameter are also provided. They are useful in the construction of the large sample confidence intervals for regression parameters. The paper also discusses the asymptotic distribution of these estimators in some functional measurement error linear regression models, where the unobservable covariate is non-random. In these models, the limiting distribution of the bias corrected LSEs is always a Gaussian distribution determined by the range of the values of $d_\varepsilon \vee d_u$.