MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

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Weighted empirical minimum distance estimators in linear errors-in-variables regression models

Tuesday, February 2, 2021
10:20 AM - 11:10 AM Eastern Standard Time (EST)
Zoom

Abstract

We develop analogs of a class of weighted empirical minimum distance estimators of the underlying parameters in errors-in-variables linear regression models, when the regression error distribution and the conditional distribution of conditionally centered measurement error, given the surrogate, are symmetric around the origin. This class of estimators is defined as the minimizers of integrals of the square of a certain symmetrized weighted empirical process of the residuals. It includes the least absolute deviation and an analog of the Hodges-Lehmann estimators. We first develop this class of estimators when the distributions of the true covariates and measurement errors are known, and then extend them to the case when these distributions are unknown but validation data is available. An example of the distributions of the errors and covariate is given where the Pitman's asymptotic relative efficiency of m.d. estimators, relative to the bias corrected LSE, increases to infinity as ME variance increases to infinity.

Findings of a simulation study that is included show significant superiority of some members of the proposed class of estimators over the bias corrected least squares estimator, in finite samples. In particular, the analog of the Hodges-Lehmann estimator is seen to be much more robust against the increasing measurement error variance compared to the bias corrected least squares estimator, when the regression error distribution is t_2.

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Zoom details can be found at: https://stt.natsci.msu.edu/stt-colloquium-zoom-info/

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