

Improvement of the Preliminary Test Estimator When Stochastic Restrictions are Available in Linear Regression Model

Arumairajan, S. And Wijekoon, P.

Abstract

Ridge type estimators are used to estimate regression parameters in a multiple linear regression model when multicollinearity exists among predictor variables. When different estimators are available, preliminary test estimation procedure is adopted to select a suitable estimator. In this paper, two ridge estimators, the Stochastic Restricted Liu Estimator and Liu Estimator are combined to define a new preliminary test estimator, namely the Preliminary Test Stochastic Restricted Liu Estimator (PTSRLE). The stochastic properties of the proposed estimator are derived, and the performance of PTSRLE is compared with SRLE in the sense of mean square error matrix (MSEM) and scalar mean square error (SMSE) for the two cases in which the stochastic restrictions are correct and not correct. Moreover the SMSE of PTSRLE based on Wald (WA), Likelihood Ratio (LR) and Lagrangian Multiplier (LM) tests are derived, and the performance of PTSRLE is compared using WA, LR and LM tests as a function of the shrinkage parameter d with respect to the SMSE. Finally a numerical example is given to illustrate some of the theoretical findings.