

Heteroscedastic Nested Error Regression Models with Variance Functions

Shonosuke Sugasawa* and Tatsuya Kubokawa†

Abstract

The article considers a nested error regression model with heteroscedastic variance functions for analyzing clustered data, where the normality for the underlying distributions is not assumed. Classical methods in normal nested error regression models with homogenous variances are extended in the two directions: heterogeneous variance functions for error terms and non-normal distributions for random effects and error terms. Consistent estimators for model parameters are suggested, and second-order approximations of their biases and variances are derived. The mean squared errors of the empirical best linear unbiased predictors are expressed explicitly to second-order. Second-order unbiased estimators of the mean squared errors are provided analytically in closed forms. The proposed model and the resulting procedures are numerically investigated through simulation and empirical studies.

*Graduate School of Economics, University of Tokyo

†Faculty of Economics, University of Tokyo