Model Averaging in a Multiplicative Heteroscedastic Model

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Abstract : In recent years, the body of literature on frequentist model averaging in statistics has grown significantly. Most of this work focuses on models with different mean structures but leaves out the variance consideration. In this paper, we consider a regression model with multiplicative heteroscedasticity and develop a model averaging method that combines maximum likelihood estimators of unknown parameters in both the mean and variance functions of the model. Our weight choice criterion is based on a minimisation of a plug-in estimator of the model average estimator's squared prediction risk. We prove that the new estimator possesses an asymptotic optimality property. Our investigation of finite-sample performance by simulations demonstrates that the new estimator frequently exhibits very favourable properties compared to some existing heteroscedasticity-robust model average estimators. The model averaging method hedges against the selection of very bad models and serves as a remedy to variance function misspecification, which often discourages practitioners from modeling heteroscedasticity altogether. The proposed model average estimator is applied to the analysis of two real data sets.

Keywords : heteroscedasticity-robust, model averaging, multiplicative heteroscedasticity, plug-in, squared prediction risk

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