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Using shrinkage strategies to estimate parameters in Zero-Inflated Count Models

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Counting data with excess zeros is commonly encountered in various scientific fields such as public health, insurance, economics, and engineering. To handle this issue, zero-inflated count models such as zero-inflated Poisson (ZIP) and zero-inflated negative binomial (ZINB) models are widely used.

In the context of regression models, it can be beneficial to incorporate uncertain prior information about some of the predictor variables that do not significantly impact the response variable. By combining this prior information with the sample information, the performance of parameter estimation can be improved. The uncertain prior information is represented as a linear restriction on the parameters, and the estimators obtained from this method are known as shrinkage estimators, including linear shrinkage, preliminary test, shrinkage pretest, and Stein estimators.

This presentation will review our recent research on shrinkage estimators in ZINB and ZIP models, as well as suggest Liu-type shrinkage estimators in the presence of multicollinearity in ZINB and linear regression models. The performance of the shrinkage estimators will be examined and compared to the maximum likelihood estimator using Monte Carlo simulation and real data sets. Our results confirm that the proposed estimators outperform the maximum likelihood estimator in terms of relative efficiency criteria.

Type of presentation

Talk

Classification

Both methodology and application

Keywords

Linear Restriction, Shrinkage Estimators, Zero-inflated Count Models

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