

Ratio Benchmark for Multivariate Small Area Estimation with Parametric Bootstrap Mean Square Error

Abstract

Data is an important element that can be used for policy making in a country. There are several methods to collect the data with advantages and disadvantages. One of the methods that cost-effective and time-effective is sample survey, but the data collected is sample data. That sample is used to estimate a value. Direct estimation with a limited sample may have little precision because of the large sampling error. In order for the sample data to have a greater precision is by reducing the sampling error, it is necessary to do an indirect estimation. One way is with Small Area Estimation. Small Area Estimation (SAE) is an estimate of a small sample area by borrowing the power of the auxiliary variables so that a more efficient estimate is produced. The multivariate SAE model is a development of the univariate SAE model by utilizing the correlation between the response variable so that it is more efficient than the univariate model. The multivariate SAE model using the EBLUP estimation method is often called the Multivariate Fay-Herriot Model. In presenting the estimation results, the challenge of official statistics is to present data that is consistent with the direct and indirect aggregation of estimates for levels above it. One way is the ratio benchmarking method. The ratio benchmarking method is a method that multiplies the EBLUP estimate by a constant where direct and indirect aggregations will be the same. However, this method cannot calculate the Mean Square Error for evaluation, so MSE is estimated using a parametric bootstrap.

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