

Generalized Structure Preserving Estimation Models for Small Areas

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Abstract

The structure preserving estimation (SPREE) method improves the small area estimates when no auxiliary information other than from past census is available. In this paper we generalise the SPREE in two ways. The first model adds coefficients in association with census values to allow for possible changes in the association structure. Area random effect is included to account for the variation that is not explained by auxiliary information in the second model. The random effects are allowed to vary with response category levels

Estimates of the parameters in the models are obtained by using maximum likelihood and residual/restricted maximum likelihood methods. The small area estimates are called empirical best linear unbiased-type (EBLUP-type) estimates. The approach is applied to Italian Labour Force Survey (LFS) and Italian household composition at NUTS3 level. We report results from simulation study of the performance of the new method. In this study the area random effect is a normal variable with a general variance-covariance structure between response category levels.

Key words: EBLUP, Labour Force Survey, REML, Structure Preserving Estimation