

DSS Statistics Seminar

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<https://uniroma1.zoom.us/j/86881977368?pwd=SWRFcVFjMDZTa0lXZk05TE1zNm5adz09>

Passcode: 432940

Semi-parametric best
prediction for unit-level
small area proportions

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Many survey variables are binary or categorical in nature and SAE methods based on generalised linear mixed models represent a frequent tool of analysis for predictions. Jiang (2003) developed an Empirical Best Prediction (EBP) method for general responses in the Exponential Family, based on the use of area-specific, Gaussian, random effects. However, some drawbacks of this approach entail the computational burden required to derive estimates, compute the EBP and, in particular, provide the corresponding measure of reliability. For non-Gaussian responses, we need to deal with (possibly) multiple integrals that do not admit a closed form and, therefore, need to be approximated. Monte Carlo integration and parametric bootstrap are frequently considered. Here, we introduce a semiparametric EBP for proportions. This is obtained by leaving the distribution of the random effects unspecified and estimating it from the data via a NonParametric Maximum Likelihood (NPML) approach. This leads to the estimate of a discrete mixing distribution which helps avoid unverifiable parametric assumptions and heavy integral approximations. We also derive an analytic approximation to its MSE. Finite sample properties of the proposal are tested via simulation and unit-level data from the 2012 Italian Labor Force Survey are used to estimate unemployment incidence in Italy.



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