

Small Area Estimation for Semicontinuous Data

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Survey data often contain variables which are semicontinuous in nature, i.e. they either take a single fixed value (typically 0) or they have a continuous, often skewed, distribution on the positive real line. This type of variables is very common in agricultural, environmental, ecological, epidemiological and economic surveys. Standard methods for small area estimation based on the use of linear mixed models can be inefficient for such variables. We discuss small area estimation techniques for semicontinuous variable under a two part random effects model which takes care of presence of excess zeros as well as skewed nature of the non-zero values of the responses variable. Empirical results suggest that the proposed method works well and produces an efficient set of small area estimates. An application to real survey data from the Australian Agricultural Grazing Industry Survey demonstrates the satisfactory performance of the method. We also propose a parametric bootstrap method to estimate the mean squared error (MSE) of the proposed estimator of small areas. The bootstrap estimates of the MSE are compared to the true MSE in simulation study.

Key Words: Skewed data, zero-inflated, small area estimation, mixture model, mean squared error, parametric bootstrap