Domain estimation for a censored study variable

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A non-negative study variable defined in a finite population which contains many zero values is called a censored variable. For example, an enterprise may have high environmental protection expenses or it may have no such expenses at all; a household may have expenses for luxury goods or it may have no such expenses at all; the area under crop that is grown not so often on farms, for example, rape in Lithuania. Usually, variables in a sampling frame may be correlated with positive values of the study variable, but there are no auxiliary variables in a sampling frame indicating that the value of a study variable may be equal to zero. The design-based estimator of the population total for such a variable usually has a high variance; the model-assisted estimator does not have a significantly lower variance. The censored regression (or tobit) model and the two-line (or change-point regression) model have been applied to the model-based and model-assisted estimator to estimate the total in previous studies of the author.

The aim of the current study is to use a unit-level model for domains for a study variable having many zero values with the application of the censored regression model, and to estimate it using Bayesian inference. The model-based estimator for domain totals is constructed afterwards.

Keywords: variable containing many zero values; unit-level model; Bayesian inference.