

Bayesian estimation of a total population under linkage uncertainty

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Abstract

Given a finite population, suppose we want to estimate the total of a quantitative variable Y . We observe a first data set where information about a sample of a certain size is available for Y and other covariates. Further we have a second data set of units where we observe the same covariates (except Y) and another variable Z , where Z is the potential covariate of interest for Y . We also assume that the two samples are independent and the overlapping between them is unknown. We use record linkage techniques and propose a Bayesian hierarchical model to produce a posterior distribution for the total of Y under several different hypotheses. The results are compared with the existing classical solution based on GREG estimator.

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