MODEL-ASSISTED ESTIMATION OF POPULATION MEAN IN TWO- STAGE CLUSTER SAMPLING

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Abstract

Estimation of finite population parameters has been an area of concern to statisticians for decades. This paper presents an estimation of the population mean under a model-assisted approach. Dorfman (1992), Breidt and Opsomer (2000) and Ouma *et al* (2010) carried out the estimation of finite population total on the assumption that the sample size is large and the sampling distribution is approximately normal. Unlike their researches, this paper considered a case when the sample size is small under a model-assisted approach. A model-assisted regression model was considered in a case where the cluster sizes are known only for the sampled clusters in order to predict the unobserved part of the population mean. Under mild assumptions, the proposed estimator is asymptotically unbiased and its conditional error variance tends to zero. Simulation studies show that model assisted estimation performs better than model based estimation of a finite population mean in a case where the sample size is small.

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