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Study of Yadav and Kadilar's improved exponential type ratio estimator of population variance in two-phase sampling

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Abstract

This paper presents a double sampling version of Yadav and Kadilar (2013) estimator alongwith its properties under large sample approximation. Cost aspect is also discussed. We have compared the proposed estimator with usual unbiased estimator and usual double sampling ratio estimator and shown that the proposed estimator is better than usual unbiased estimator and other existing estimators under some realistic conditions to two-phase sampling.

Keywords: Auxiliary variable, Bias, Efficiency, Mean squared error, Double sampling.

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1. Introduction

The use of auxiliary information has been dealt with at great length for improving estimators of population parameters in sample surveys. Various estimation procedures in sample surveys need advance knowledge of some auxiliary variable which is then used to increase the precision of estimates. For example, the ratio - type estimator due to Isaki (1983) need the advance knowledge of population variance S_x^2 of the auxiliary variable x. When the population variance $S_x^2$is not known, it is sometimes estimated from a preliminary large sample on which only the auxiliary characteristic x is observed. The value of S_x^2in the estimator is then replaced by its estimate. A smaller second phase sample of the variate under study y is then taken. This technique, known as double sampling or two-phase sampling, is especially appropriate if the x values are easily accessible and much cheaper to collect than the y_i values see. Hidiroglou and Sarandal (1998). The use of double sampling is necessary if the x - value is obtained by performing a non-destructive experiment where as to obtain a y - value of a unit, a destructive experiment has to be performed, see UnniKrishan and Kunte (1995). Double sampling is also an able alternative to simple random sampling when there are expected to be gains from using

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