

A Class of Chain Type Estimators for Population Mean Under Two Phase Sampling Using Available Information on Second Variable

BANDYOPADHYAY, Arnab^a and MAJUMDER, Sanjoy^b

^a Department of Basic Science & Humanities (Mathematics), Dr. B.C.Roy Engineering College, Durgapur-713206, India

^b Department of Mathematics & Statistics, Aliah University, New Town, Kolkata-700160, West Bengal

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ABSTRACT

We have considered a class of modified ratio-product estimators for finite population mean which make use of coefficient of skewness, coefficient of kurtosis and coefficient of variation of first auxiliary variables. The proposed estimators have been compared with conventional ratio estimator, product type estimators. The results obtained has been demonstrated with numerical illustration carried over the data set of natural population. Suitable recommendation has been put forward to the survey statistician for application in real life population.

KEYWORDS

Ratio estimator, product estimator, finite population mean, double sampling, study variable, auxiliary variable, chain-type, regression type, coefficient of skewness, coefficient of kurtosis, coefficient of variation, bias, mean squared error.

Introduction

It is well established in sample surveys that auxiliary information is often used to improve the precision of estimators of the population parameters. The use of auxiliary information at the estimation stage appears to have started with the work of Cochran (1940). He developed the ratio estimator to estimate the population mean or total of the study variable by using supplementary information on auxiliary variable, positively correlated with study variable. When the auxiliary variable is negatively correlated with the study variable, Robson (1957) proposed the product estimator of the population mean. Several authors including Murthy (1964), Singh and Espejo (2003) etc. contributed a lot in the field of estimation of population parameters in sample surveys through development of ratio and regression type estimators.

It may also be noted that a number of sampling strategies utilize the advance information about an auxiliary variable. When such information is lacking, it is sometimes relatively cheap to take a large preliminary sample in which auxiliary variable alone is measured. The aim of this sample is to obtain a good estimate of the population mean or total of the auxiliary variable or its frequency distributions (Prabhu - Ajaonkar,