

## **Exponential Ratio Type Estimators of Population Mean Under Non Response**

Lovleen Kumar Grover

Guru Nanak Dev University, Amritsar-143 005, Punjab, India [lovleen\\_2@yahoo.co.in](mailto:lovleen_2@yahoo.co.in)

Paramdeep Kaur\*

Guru Nanak Dev University, Amritsar-143 005, Punjab, India [kaurparamdeep@yahoo.com](mailto:kaurparamdeep@yahoo.com)

In survey sampling situations, auxiliary information is often used to improve the precision or accuracy of the estimator of unknown population parameter of interest under the assumption that all the observations in the sample are available. But in many survey sampling situations, it is not true, that is, the case of incomplete information which may arise due to some non-response in the given sample. There are various practical reasons for this incomplete information due to non-response like: unwillingness of the respondent to answer some particular questions, accidental loss of information caused by unknown factors, failure on the part of investigator to collect correct information, etc. Such type of incomplete information is very common in the studies related to medical research, market research surveys, opinion polls, socio economic investigations, etc. In survey sampling, when information about all the sampling units is available then it is conventional to estimate unknown population mean of study variable using ratio estimator provided that there is a positive correlation between study variable and auxiliary variable. But, when information about all the units is not available then traditional complete data estimating procedures could not be used straight forwardly to analyze the data. So, we proposed some exponential ratio type estimators of population mean under the situations when certain observations for some sampling units are missing. These missing observations may be for either auxiliary variable or study variable or both of these variables. The biases and mean square errors of these proposed estimators have been derived, up to first order of approximation. These proposed estimators are compared theoretically with that of the existing ratio type estimators. It has been found that the proposed exponential ratio type estimators perform better than the mean per unit estimator even for the low positive correlation between study variable and auxiliary variable. Moreover, we obtained the conditions for which our proposed estimators are better than the corresponding existed ratio type estimators. To verify these theoretical results obtained, a simulation study is carried out.

**Keywords:** Auxiliary variable, incomplete information, mean square error, study variable