Journal of Applied Probability and Statistics
2020, Vol. 15, No. 1, pp. 25-47

ESTIMATING THE POPULATION MEDIAN USING MULTISTAGE MEDIAN RANKED SET SAMPLING

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SUMMARY

In this paper, multistage median ranked set sampling (MMRSS) is used for estimating the median of a distribution. Five estimators of the population median based on MMRSS are proposed. The performance of the new proposed estimators are compared with their conventional counterpart in simple random sampling. The comparison is carried out by a simulation study based on two measures of performance; bias and efficiency. Moreover, the impact of the set size, number of cycles, and the number of stages on the efficiency of the proposed estimators is studied.

Keywords and phrases: Median estimation, ranked set sampling, relative efficiency, simple random sampling.

2010 Mathematics Subject Classification: Primary 62G30, secondary 62D05.

1 Introduction

Data collection is one of the keys to any statistical inference. One of the most common approaches of data collection is that of a simple random sample (SRS). Other more structured sampling designs, such as stratified sampling or probability sampling, are also available to help make sure that the obtained data collection provides a good representation of the population of interest. Any such additional structure of this type revolves around how the sample data themselves should be collected in order to provide an informative image of the larger population. With any of these approaches, once the sample items have been chosen the desired measurement(s) is collected from each of the selected items. Hence many efforts are paid to develop statistical techniques for data collection that generally leads to more representative samples (a sample whose characteristics accurately reflect those of the underlying population). To this end, ranked set sampling and some of its variations were developed.