IMPROVED ESTIMATION OF MEAN IN RANDOMIZED RESPONSE MODELS

Zawar Hussain and Javid Shabbir

Received 25:07:2009 : Accepted 08:07:2010

Abstract

The present investigation considers the problem of estimating the mean of a sensitive quantitative variable $\mu_A$ in a human population survey, using the scrambled response technique suggested by Ryu, Kim, Heo and Park (On stratified randomized response sampling, Model Assisted Statistics and Application 1(1), 31–36, 2005–2006). Specifically, using the prior estimate (or guessed mean) of the mean of a population, a family of estimators $\hat{\mu}_{Ak}$ is presented to estimate the population mean $\mu_A$, and its properties are examined. The optimum value of the degree $k (0 \leq k \leq 1)$ of the belief in the prior estimate depends, besides others, on the unknown population parameters, e.g. mean and variance, so the proposed family of estimators may have limited practical applications. In an attempt to overcome this problem, another estimator based on the estimated optimum value of $k$ has been proposed. The proposed estimator has been compared with the Ryu et al. and Hussain and Shabbir (Improved estimation procedure for the mean of a sensitive variable using randomized response model, Pakistan Journal of Statistics 25(2), 205–220, 2009) estimators assuming simple random sampling with replacement.

Keywords: Sensitive question, Estimation of mean, Simple random sampling with replacement, Scrambled response, Mean squared error, Prior estimate.

2000 AMS Classification: 62D05.