

Analysis of Survey Data under Informative Sampling Design and Nonignorable Nonresponse Mechanism

*Department of Mathematics, Al-Quds University
Abu-Dies Campus, Palestine
P.O. Box 20002, Jerusalem
E-mail: msabdul@science.alquds.edu*

Abstract: In this paper, we study, within a modeling framework, the joint treatment of not missing at random response mechanism and informative sampling for survey data, by specifying the probability distribution of the observed measurements when the sampling design is informative. This is the most general situation in surveys and other combinations of sampling informativeness and response mechanisms can be considered as special cases. The sample distribution of the observed measurements model is extracted from the population distribution model, such as the normal distribution. The sample distribution is derived first by identifying and estimating the conditional expectations of first order sample inclusion probabilities, given the study variable, based on a variety of models, such as linear, exponential, logit and probit. Next, we consider a logistic model, probit and other models for the not missing at random response mechanism. The proposed method combines two methodologies used in the analysis of sample surveys for the treatment of informative sampling and not missing at random response mechanism. One incorporates the dependence of the first order inclusion probabilities on the study variable, while the other incorporates the dependence of the probability of nonresponse on unobserved or missing observations. The main purpose here is to consider how to account for the joint effects of informative sampling designs and of not missing at random response mechanism in statistical models for complex survey data.

Keywords: response distribution, response likelihood.