

# **Statistical Inference under Nonignorable Sampling and Nonresponse. An Empirical Likelihood Approach**

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When the sample selection probabilities and/or the response propensities are related to the values of the inference target variable, the distribution of the target variable in the sample may be very different from the distribution in the population from which the sample is taken. Ignoring the sample selection or response mechanism in this case may result in highly biased inference. Accounting for sample selection bias is relatively simple because the sample selection probabilities are usually known, and several approaches have been proposed in the literature to deal with this problem. On the other hand, accounting for a nonignorable response mechanism is much harder since the response probabilities are generally unknown, requiring assuming a stochastic structure on the response mechanism.

In this article we develop a new approach for modelling complex survey data, which accounts simultaneously for nonignorable sampling and nonresponse. Our approach combines the nonparametric empirical likelihood with a parametric model for the response probabilities, which contains the outcome variable as one of the covariates. The sampling weights also feature in the inference process after appropriate smoothing. We discuss estimation issues and propose a simple test statistic for testing the model.

Joint work with Dr. Moshe Feder