

Parametric and Semiparametric Prediction of Finite Population Total under Informative Sampling and Nonignorable Nonresponse

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Abstract

It is known that informative sampling and nonignorable nonresponse mechanism bias standard estimators of population parameters characterized superpopulation model and predictors of finite population total. Pfeffermann and Sverchkov(1999) and Sverchkov and Pfeffermann (2004) studied the parametric and semiparametric prediction of finite population totals under informative sampling. In this seminar we develop parametric and semiparametric prediction of finite population total under informative sampling and nonignorable nonresponse. Prediction of finite population total, requires specification of nonsampled and nonresponse models. For this aim we combines two methodologies used in the model-based survey sampling: the prediction of finite population total T , under informative sampling, and full response, and the prediction of T when the sampling design is noninformative and nonresponse mechanism is nonignorable, see Eideh (2012). 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. Accordingly, we use the response distribution and relationships between moments of the superpopulation, sample, sample-complement, response, and non-response distributions, for the prediction of finite population totals, see Eideh (2016). The seminar is purely mathematical that focus on the role of informativeness of sampling design and informativeness of nonresponse in adjusting various predictors for bias reduction. Further experimentation (simulation and real data problem) with this kind of predictors is therefore highly recommended. I hope that the new mathematical results obtained will encourage further theoretical, empirical and practical research in these directions.

References

- Eideh, A.H. (2016). Estimation of finite population mean and superpopulation parameters when the sampling design is informative and nonresponse mechanism is nonignorable. *Pakistan Journal of Statistics and Operation Research (PJSOR)*. *Pak.j.stat.oper.res. Vol.XII No.3, 2016*, pp467-489.
- Eideh A.H. (2012). Estimation and Prediction under Nonignorable Nonresponse via Response and Nonresponse Distributions. *Journal of Indian Society of Agriculture Statistics*. *66(3)2012*, pp 359-380.
- Fuller W.A. (2009). *Sampling Statistics*. Wiley.
- Pfeffermann, D. and Sverchkov, M.(1999). Parametric and semi-parametric estimation of regression models fitted to survey data. *Sankhya*, 61, B, pp 166-186.
- Sverchkov, M., and Pfeffermann, D. (2004). Prediction of finite population totals based on the sample distribution. *Survey Methodology*, 30, pp 79-92.