



Empirical likelihood confidence intervals in the presence of unit non-response

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Suppose that the parameter of interest is a complex parameter defined as a solution of an estimating equation (Godambe, 1960). For example, this parameter could be a regression parameter, a quantile or a mean. The aim is to estimate, test and construct a confidence interval for this parameter. We assume that the data are based on a stratified sample of units selected with unequal probabilities. Suppose that we have unit non-response according to a uniform response mechanism within cells; that is, we assume that any units can be missing with the same response probability within cells. We consider a reverse approach (Fay, 1991); that is, we have a two-phase design with the response mechanism being the first phase and the second phase being a stratified unequal probability sampling design with negligible sampling fraction. We show how the empirical likelihood approach proposed by Berger and De La Riva Torres (2015) can be used to estimate complex parameters in the presence of unit non-response. The proposed estimator is based on response rates estimated within each cells. We also propose an empirical likelihood approach to construct a confidence interval which takes into account of (i) the design, (ii) the response mechanism, (iii) the randomness of the estimator of the response rates and (iv) the population level information. This confidence interval does not rely directly on the normality of the point estimator and does not require variance estimation, linearisation, re-sampling and estimation of a design effect.

Keywords: design-based inference, estimating equations, empirical likelihood, stratification, unequal inclusion probabilities.

References

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