

AN OPTIMAL ALLOCATION FOR MULTIVARIATE SURVEYS WHEN AN AUXILIARY INFORMATION IS USED

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There are several or even a lot of study variables in one survey in nowadays, thus seeking a high accuracy of all estimates, an auxiliary information is used not only for the estimation, but also for a survey design. However, most of the time, the auxiliary information is used only to define the boundaries of a strata for a stratified sample, but not for selecting sample size in each strata. Actually, in the literature (see Cochran 1977, Bethel 1985, 1989 and Brito et al. 2015) an optimal sample allocation is always based on the study variables. Thus, in this research the focus on the use of the auxiliary information for the optimal sample allocation is made.

The optimal allocation of the overall sample size n to the strata seeks one of the following goals: to minimize the total survey cost C while the coefficients of variation for the estimates of the totals of the m survey variables are below specified thresholds or to minimize a weighted sum of variances of the estimates of the totals for the m survey variables when the total sample size is fixed in advance.

In this research the study variables, which are used for the optimal sample allocation in literature, but are unknown in practice, are replaced by the auxiliary information. A main goal of this, is to adapt theoretical formulas for the practice use and to identify original rules to find the best auxiliary information for the optimal sample allocation.

References

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