

Abstract

In a Swedish vehicle speed survey, data are collected for a stratified three-stage sample of road sites. Our concern here is whether the current allocation of the sample over sampling stages is the most efficient, or if there is room for improvements. The parameter of main interest is the average speed, R , on the roads. In order to evaluate the present sample allocation, we estimate the components, arising from each sampling stage, of the total variance of the estimator of R . The sampling design is such, that in all stages but the first one, only one sampling unit per stratum is selected. This makes the variance contributions from the first and second sampling stage inseparable. We circumvent this problem by utilizing a fictitious sampling design and some experimental data. In this way, the demanded variance component estimates are calculated for a domain of study.

Our results indicate that for an unchanged total sample size, the precision of the estimator of R would improve if the sample sizes in stage three were increased, and the sample size in stage one decreased correspondingly. Thus, re-allocation of the sample seems to be worth while, and formulas for doing this in an optimal manner are provided.

Key words: Survey, vehicle speeds, multi-stage sampling, optimal allocation.