Statistical analysis of voluntary survey data

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Abstract

Statistical analysis of voluntary survey data is an important area of research in survey sampling. We consider a unified approach to voluntary survey data analysis under the assumption that the sampling mechanism is non-informative. Generalised entropy calibration (GEC) is introduced as a unified tool for calibration weighting which is important in controlling the selection bias. We first establish the relationship between the generalised calibration weighting and its dual expression for regression estimation. The dual relationship is critical in identifying the implied regression model and developing model selection for calibration weighting. Also, if a linear regression model for an important study variable is available, then two-step calibration method can be used to smooth the final weights and achieve the statistical efficiency. Asymptotic properties of the proposed estimator are investigated rigorously. Results from a limited simulation study are also presented.

Keywords: selection bias, calibration weighting, duality, two-step calibration.

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