

## **Debiased calibration estimation using generalized entropy in survey sampling**

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Incorporating the auxiliary information into the survey estimation is a fundamental problem in survey sampling. Calibration weighting is a popular tool for incorporating the auxiliary information. The calibration weighting method of Deville and Särndal (1992) uses a distance measure between the design weights and the final weights to solve the optimization problem with calibration constraints. In this talk, we propose a new framework using generalized entropy as the objective function for optimization. Design weights are used in the constraints, rather than in the objective function, to achieve design consistency. The new calibration framework is attractive as it is general and can produce more efficient calibration weights than the classical calibration weights. Furthermore, we identify the optimal choice of the generalized entropy function that achieves the minimum variance among the different choices of the generalized entropy function under the same constraints. Asymptotic properties, such as design consistency and asymptotic normality, are presented rigorously. The results of a limited simulation study are also presented. We demonstrate a real-life application using agricultural survey data collected from Kynetec, Inc.

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