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An information-theoretic approach to the effective usage of auxiliary information from survey data

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Abstract In this paper, we propose an information-theoretic approach to the effective usage of auxiliary information from survey data, which is suitable for both simple and complex survey data. Our estimator under simple random sampling without replacement will be consistent and asymptotically normal. We show that the resulting estimates have smaller asymptotic variances than the usual estimates which do not use auxiliary information. For more complex survey designs, the resulting estimator is in essence asymptotically equivalent to a pseudo empirical likelihood estimator. Results of a limited simulation study show that the proposed estimators perform well among a number of competitors.

Keywords Calibration · Entropy · Cross-entropy · Generalized regression estimator · Empirical likelihood · Optimal regression estimator · Jackknife