A KERNEL SMOOTHING METHOD TO ADJUST FOR UNIT NONRESPONSE IN SAMPLE SURVEYS

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ABSTRACT

Nonresponse is a common problem in survey statistics which, if left unaccounted for, can invalidate inferences from the survey results, and various weighting adjustments have been proposed to account for the effect nonresponse in survey estimation. Since the nonresponse mechanism is typically unobserved, a model is required for the formulation of the estimator. Nonparametric response models are attractive because they do not restrict the response function to belong to a specific parametric family. Kernel regression is used to estimate the unknown response probabilities, and the inverses of these estimated probabilities are applied as a weighting adjustment in the construction of the survey estimator. The estimator is shown to be consistent and we obtain its asymptotic distribution. We also propose a replication-based variance estimation method for the resulting estimator. The practical properties of the non-response adjusted estimator and its variance estimator are evaluated through simulation experiments.

Key Words: missing data, response probability, weighting adjustment, kernel regression, propensity scores, Jackknife.