

## Abstract

An improved method for finite population total estimation is proposed using a multiplicative semi-parametric bias reduction density function. The density is first applied to estimate a non-parametric regression model which describes the relationship between the study variable and the auxiliary variable. For each value of the study variable, there exist a corresponding value of the auxiliary variable in the population. The proposed estimator is compared to the expansion estimator and the Nadaraya-Watson estimator using bandwidths ( $h = 0.25, 0.5, 0.75$ ) respectively through a simulation study on the Ghana Living Standards Survey Round Six data. The proposed estimator performed better than its competitors yielding the lowest Root Average Squared Error (ARE). The estimator can be applied to datasets with high variances without transformation. Its optimum efficiency and precision are achieved when the sample size is large