

# LOCAL POLYNOMIAL REGRESSION ESTIMATORS IN SURVEY SAMPLING

by

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## Abstract

Estimation of finite population totals in the presence of auxiliary information is considered. A class of estimators based on local polynomial regression is proposed. Like generalized regression estimators, these estimators are weighted linear combinations of study variables, in which the weights are calibrated to known control totals, but the assumptions on the superpopulation model are considerably weaker. The estimators are shown to be asymptotically design-unbiased and consistent under mild assumptions. A variance approximation based on Taylor series linearization is suggested and shown to be consistent for the design mean squared error of the estimators. The estimators are robust in the sense of asymptotically attaining the Godambe-Joshi lower bound to the anticipated variance. Simulation experiments indicate that the estimators are more efficient than regression estimators when the model regression function is incorrectly specified, while being approximately as efficient when the parametric specification is correct.