

On Comparison of Local Polynomial Regression Estimators for $P = 0$ and $P = 1$ in a model based framework

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Abstract

This article discusses the local polynomial regression estimator for $P = 0$ and the local polynomial regression estimator for $P = 1$ in a finite population. The performance criterion exploited in this study focuses on the efficiency of the finite population total estimators. Further, the discussion explores analytical comparisons between the two estimators with respect to asymptotic relative efficiency. In particular, asymptotic properties of the local polynomial regression estimator of finite population total for $P = 0$ are derived in a model based framework. The results of the local polynomial regression estimator for $P = 0$ are compared with those of the local polynomial regression estimator for $P = 1$ studied by Kikechi et al (2018). Variance comparisons are made using the local polynomial regression estimator \bar{T}_0 for $P = 0$ and the local polynomial regression estimator \bar{T}_1 for $P = 1$ which indicate that the estimators are asymptotically equivalently efficient. Simulation experiments carried out show that the local polynomial regression estimator \bar{T}_1 outperforms the local polynomial regression estimator \bar{T}_0 in the linear, quadratic and bump populations.

Keywords: Asymptotic Properties, Asymptotic Relative Efficiency, Finite Population, Local Polynomial Regression, Model Based Framework, Nonparametric Regression, Sample Surveys