

Coverage probability of a non-parametric estimator for a finite population total using edgeworth expansion

**Jacob Okungu , George Orwa and Romanus Odhiambo
Meru University of Science and Technology, Kenya.
Jomo Kenyatta University of Agriculture and Technology, Kenya.**

In survey sampling, the main objective is more often than not to establish information about any population parameter using the sample statistics. A nonparametric estimator of the finite population total is proposed. The nonparametric estimator of finite population total by Dorfman (1992) is developed and the coverage probabilities explored using the Edgeworth. The asymptotic properties; unbiasedness, efficiency and coverage rates of the estimator are analytically explored. In literature, a lot of work has been done on analyzing unbiasedness and efficiency of the estimators and more particularly for the population total estimators. This study departs from these studies by studying the tail properties using the confidence interval in more detail as opposed to just the unbiasedness, efficiency and mean squared error. An empirical analysis is done on three artificial functions; linear, quadratic and exponentially. It is observed that the coverage probabilities from Edgeworth expansion have higher coverage probabilities compared to design-based Horvitz-Thompson and Ratio estimators of the finite population total. The Edgeworth expansion also gave a tighter confidence interval length.

Keywords: Asymptotic normality; Coverage Probability; EdgeworthExpansion.