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Ehsan Zamanzade, Xinlei Wang

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Estimation of population proportion for judgment post-stratification

Ehsan Zamanzade* and Xinlei Wang†

Abstract

This paper is concerned with the problem of estimating a population proportion p in a judgment post-stratification (JPS) sampling scheme. Different proportion estimators are considered, among which some are specifically designed to deal with JPS samples with empty strata; and asymptotic normality is established for each. A Monte Carlo simulation study and two examples using data from medical studies are employed to examine the performance of these proportion estimators under both perfect and imperfect ranking and for JPS data both with and without empty strata. It is shown that the JPS scheme improves estimation of the population proportion in a very wide range of settings as compared to simple random sampling (SRS). Also, findings about the relative performance of the different estimators are provided to help practitioners determine which estimator should be used under certain situations.

Keywords: Imperfect Ranking; Proportion Estimation; Judgment post stratification; Ranked set sampling; Relative efficiency

Mathematics Subject Classifications: 62D05; 62F03.

*Corresponding author. Department of Statistics, University of Isfahan, Isfahan, 81746-73441, Iran. Email: e.zamanzade@sci.ui.ac.ir; ehsanzamanzadeh@yahoo.com. Tel: (+98)37934573; Fax: (+98)37934601

†Department of Statistical Science, Southern Methodist University, 3225 Daniel Avenue, P O Box 750332, Dallas, Texas 75275-0332. Email:swang@smu.edu.