

Title Estimation of Population Total from Samples with  
Random Samples Sizes

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### Abstract

The purpose of this study is to compare the efficiency of two estimators total, namely,  $T_1$  (via Horvitz and Thompson) and  $T_2$  (proposed by Singh and Narain), under the situation that the probability of providing necessary information of each population unit is equal (binomial sampling) and unequal. The applied criterion is the relative efficiency. A pascal programming language is designed to simulate the data from normal distribution and to calculate the efficiency of the estimator  $T_1$  and  $T_2$  in 100 replications for each situations.

The result of this study with 10, 18, 20 and 30 samples sizes shows that the estimator  $T_2$  gets better relative efficiency than estimator  $T_1$ , either when each population unit has equal probability or unequal probability. This study with 10 sample sizes also shows that  $E_u$  (relative efficiency of estimator total when each unit of population has equal probability) gets better relative than  $E_u$  (relative efficiency of estimator total when each unit of population has unequal probability) when the number of units providing necessary information ( $m$ ) ranging from five to seven. But  $E_u$  gets less relative efficiency than  $E_u$ , if  $m$  is eight and nine. Moreover, this study points out that estimate of estimator  $T_1$  and  $T_2$  are equal when probability each unit of population are equal. if those probabilities are unequal the result is unequal too.