

Q3-Part 3. (8 marks) The goal of this part is to compare the accuracy of the estimate from SRS with one obtained in Part 1. (c) and (d). We assume that the individuals in the selected households had been selected by simple random sampling directly from the population of size M .

- (a) (2 marks) How would we estimate the total τ . let $\hat{\tau}_{\text{srs}}$ be the obtained estimator.
- (b) (2 marks) What would be the estimated variance of $\hat{\tau}_{\text{srs}}$?
- (c) (2 marks) Find the relative efficiency of the estimator in Part 1 (c) $\hat{\tau}$ relative to $\hat{\tau}_{\text{srs}}$. What do you conclude?
- (c) (2 marks) Find the relative efficiency of the estimator in Part 1 (d) $\hat{\tau}_r$ relative to $\hat{\tau}_{\text{srs}}$. What do you conclude?