

Stat 135

Stratified Sampling

Stratum	Stratum ID	Unit ID	value
Hennepin	1	1	2
Hennepin	1	2	2
Hennepin	1	3	4
Hennepin	1	4	4
Ramsey	2	1	4
Ramsey	2	2	8

- $N =$ population size.
- $\mu =$ population average.
- $\sigma^2 =$ population variance.
- $n = 4$ sample size.

- $M =$ number of strata
- $N_1 =$ units in stratum 1
- $N_2 =$ units in stratum 2

- $\mu_1 =$ stratum 1 average.
- $\mu_2 =$ stratum 2 average.

- $\sigma_1^2 =$ stratum 1 variance.
- $\sigma_2^2 =$ stratum 2 variance.

- $n_1 = 3$ stratum 1 sample size.
- $n_2 = 1$ stratum 2 sample size.

Probability Model

Take a simple random sample from each stratum. Take the strata samples independently of each other.

- $x_{i,j}$, $i = 1, \dots, M$, $j = 1, \dots, N_i$. Each unit in the population has a value, we use double subscripts to denote the unit, $x_{1,1}$ is the value for the first unit in the first stratum, $x_{2,1}$ is the value for the first unit in the second stratum, etc.
- $I_{i,j}$ = This is the index of the j th unit sampled from the i th stratum, $i = 1, \dots, M$ and $j = 1, \dots, N_i$.
- \bar{x}_1 = sample average from stratum 1.
- \bar{x}_2 = sample average from stratum 2.
- $E\bar{x}_1$ = expected value of sample average from stratum 1.
- $E\bar{x}_2$ = expected value of sample average from stratum 2.
- $\hat{\mu}$ = estimate of the population average.
- $E\hat{\mu}$ = expected value of estimator for population average.
- $SE\bar{x}_1$ = standard error of sample average from stratum 1.
- $SE\bar{x}_2$ = standard error of sample average from stratum 2.
- $SE\hat{\mu}$ = standard error of estimator for population average.