1.3 Sampling and distributions

1.3.1 Terminology

To obtain information about a large population by examining only a small fraction of that population.

This saves cost and time.

1.3.2 Estimation

See examples below.

1.3.3 Sampling distributions

Simple Random Sampling (SRS)

- A fixed number of samples is selected from the population without replacement. Without replacement means no individual member will appear more than once in a sample.

  How many simple random samples of size 2 can be generated from the population: 1, 2, 1, 3, 2 ?

- Expected value of sample mean, variance of sample mean and sample variance.

  A coin is tossed 10 times and heads appears thrice. What is the standard error in the estimate of the probability of 0.3?

A coin is tossed 50 times and heads appears 15 times. What is the standard error in the estimate of the probability of 0.3?

Stratified Sampling

Method of sampling from a population which can be partitioned into subpopulations.

Proportionate allocation uses a sampling fraction in each of the strata that are proportional to that of the total population.

Optimum allocation uses a sampling fraction of each stratum that is proportionate to both the proportion and the standard deviation of the stratum.

Cluster Sampling

Total population is divided into groups (clusters) and a simple random sample of the groups is selected. The elements in each cluster are then sampled.

If all elements in each sampled cluster are sampled, then this is referred to as a "one-stage" cluster sampling.

If a simple random subsample of elements is selected within each of these groups, this is referred to as a "two-stage" cluster sampling.