## **Point Estimation**

- **Definition.** A *point estimate* of a parameter  $\theta$  is a single number that can be regarded as a sensible value for  $\theta$ . A point estimate is obtained by selecting a suitable statistic and computing its value from the given sample data. The selected statistic (usually denoted by  $\hat{\theta}$ ) is called the *point estimator* of  $\theta$ .
- Unbiasedness. A point estimator  $\hat{\theta}$  is said to be an unbiased estimator of  $\theta$  if  $E(\hat{\theta}) = \theta$  for every possible value of  $\theta$ . If  $\hat{\theta}$  is not unbiased, the difference  $E(\hat{\theta}) \theta$  is called the *bias* of  $\hat{\theta}$ .

- Principle of Unbiased Estimation. When choosing among several different estimators of  $\theta$ , select one that is unbiased.
- Principle of Minimum Variance Unbiased Estimation. Among all estimators of  $\theta$  that are unbiased, choose the one that has minimum variance. The resulting  $\hat{\theta}$  is called the *minimum variance unbiased estimator (MVUE)* of  $\theta$ .

- The standard error of an estimator  $\hat{\theta}$  is its standard deviation  $\sigma_{\hat{\theta}} = \sqrt{V(\hat{\theta})}$ .
- Homework problems: Section 6.1: pp. 252-255; # 1, 3, 9, 13, 15.