



Econ 311: Statistical Method and
Interpretation I

Chapter 1

Why Study Statistics?



Chapter Goals

After completing this chapter, you should be able to:

- Explain how decisions are often based on incomplete information
- Explain key definitions:
 - ◆ Population vs. Sample
 - ◆ Parameter vs. Statistic
 - ◆ Descriptive vs. Inferential Statistics
- Describe random sampling
- Explain the difference between Descriptive and Inferential statistics



Dealing with Uncertainty

Everyday decisions are based on incomplete information

Consider:

- The price of IBM stock *will* be higher in six months than it is now.
- If the federal budget deficit is as high as predicted, interest rates *will* remain high for the rest of the year.



Dealing with Uncertainty

(continued)

Because of uncertainty, the statements should be modified:

- The price of IBM stock is *likely* to be higher in six months than it is now.
- If the federal budget deficit is as high as predicted, it is *probable* that interest rates will remain high for the rest of the year.



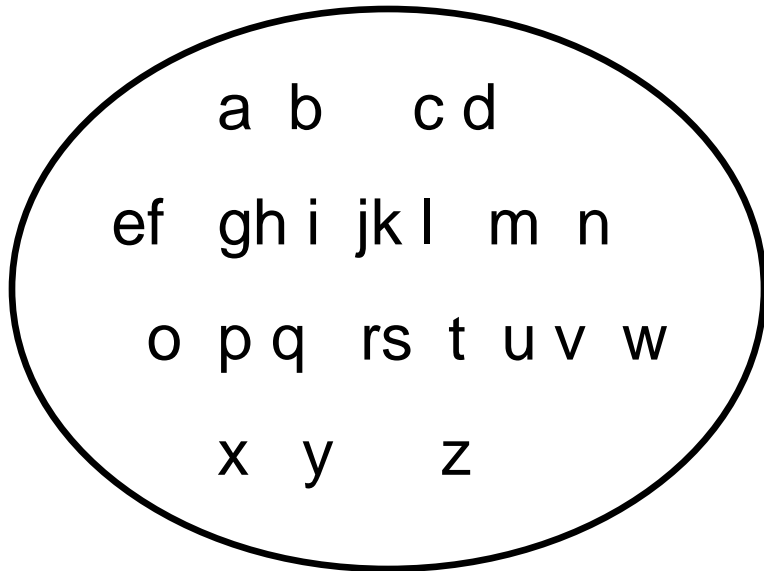
Key Definitions

- A **population** is the collection of all items of interest or under investigation
 - N represents the population size
 - A **sample** is an observed subset of the population
 - n represents the sample size
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- A **parameter** is a specific characteristic of a population
 - A **statistic** is a specific characteristic of a sample



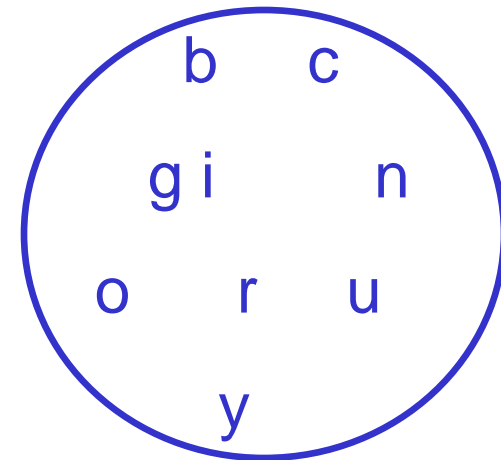
Population vs. Sample

Population



Values calculated using population data are called **parameters**

Sample



Values computed from sample data are called **statistics**



Examples of Populations

- Names of all registered voters in the United States
- Incomes of all families living in Daytona Beach
- Annual returns of all stocks traded on the New York Stock Exchange
- Grade point averages of all the students in your university



Random Sampling

Simple random sampling is a procedure in which

- each member of the population is chosen strictly by chance,
 - each member of the population is equally likely to be chosen,
- and
- every possible sample of n objects is equally likely to be chosen

The resulting sample is called a **random sample**



Descriptive and Inferential Statistics

Two branches of statistics:

- **Descriptive statistics**

- Collecting, summarizing, and processing data to transform data into information

- **Inferential statistics**

- provide the bases for predictions, forecasts, and estimates that are used to transform information into knowledge



Descriptive Statistics

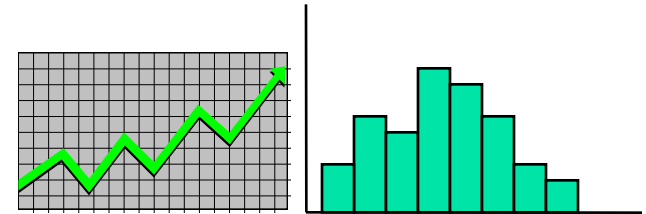
- Collect data

- e.g., Survey



- Present data

- e.g., Tables and graphs



- Summarize data

- e.g., Sample mean = $\frac{\sum X_i}{n}$



Inferential Statistics

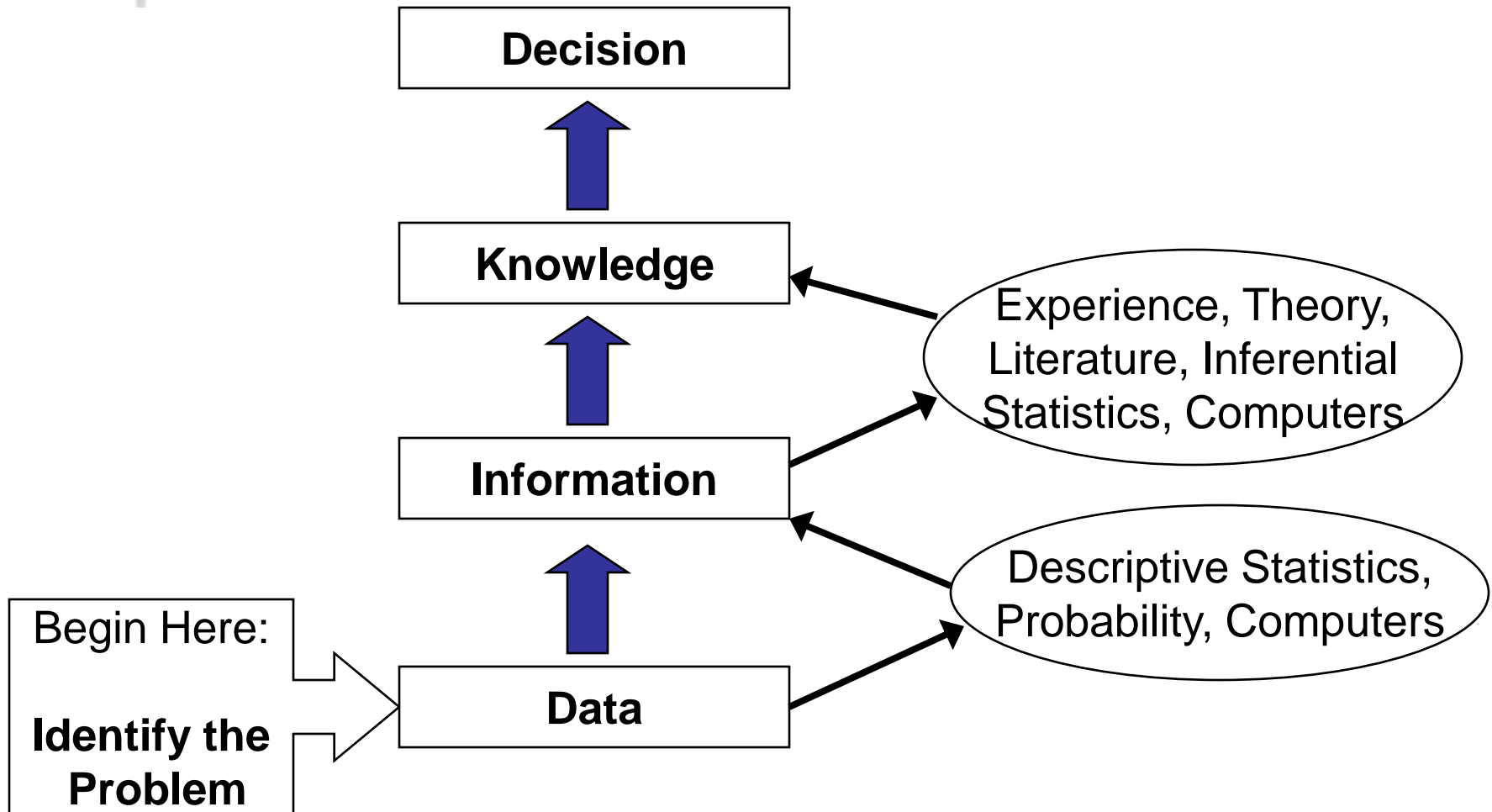
- Estimation
 - e.g., Estimate the population mean weight using the sample mean weight
- Hypothesis testing
 - e.g., Test the claim that the population mean weight is 120 pounds



Inference is the process of drawing conclusions or making decisions about a population based on sample results



The Decision Making Process





Chapter Summary

- Reviewed incomplete information in decision making
- Introduced key definitions:
 - Population vs. Sample
 - Parameter vs. Statistic
 - Descriptive vs. Inferential statistics
- Described random sampling
- Examined the decision making process