Statistical Analysis

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An Introduction to Business Statistics

1. Data
2. Data Sources
3. Populations and Samples
4. Descriptive Statistics and Statistical Inference
5. Process, Finite and Infinite Populations
6. Ratio, Interval, Ordinal, and Nominative Scales of Measurement

Functions of Statistics

Statistics is the science concerned with the

- Collection
- Organization
- Presentation
- Analysis
- Interpretation of Data

Data

Data: facts and figures from which conclusions can be drawn

Data set: the data that are collected for a particular study

Elements: may be people, objects, events, or other entries

Variable: any characteristic of an element

Statistic: describes a sample and serves as an estimate of the corresponding population parameter

Parameter: A descriptive measure of the entire population of all observations

Data *continued*

Measurement: a way to assign a value of a variable to the element

Quantitative: the possible measurements of the values of a variable are numbers that represent quantities

Qualitative: the possible measurements fall into several categories

Continuous numbers: any value within a given range, can be fractions and usually results from measurement

Discrete numbers: restricted to certain values, usually whole numbers, generally result from counting

Data Sources

Existing sources: data already gathered by public or private sources

- Internet
- Library
- US Government
- Data collection agency

Experimental and observational studies: data we collect ourselves for a specific purpose

- Response variable: variable of interest
- Factors: other variables related to response variable

Populations and Samples

Population: the set of all elements about which we wish to draw conclusions (people, objects or events)

Census: an examination of the entire population of measurements

Sample: a selected subset of the units of a population

Sampling Error: the difference between the unknown population parameter and the sample statistic used to describe the parameter

Sample Bias: the tendency to favor the selection of certain sample elements over others

Descriptive Statistics and Statistical Inference

Descriptive statistics: the science of describing the important aspects of a set of measurements

Statistical inference: the science of using a sample of measurements to make generalizations about the important aspects of a population of measurements

Process, Finite and Infinite Populations

Process: a sequence of operations that takes inputs and turns them into outputs

Finite population: a population of limited size

Infinite population: a population of unlimited size

Scales of Measurement

Ratio, Interval, Ordinal, and Nominative

Quantitative variables

- *Ratio variable*: a quantitative variable measured on a scale such that ratios of its value are meaningful and there is an inherently defined zero value
- *Interval variable*: a quantitative variable where ratios are not meaningful and there is no defined zero

Qualitative variables (categorical)

- *Ordinal variable*: a qualitative variable for which there is a meaningful ranking of the categories
- *Nominative variable*: a qualitative variable for which there is no meaningful ranking of the categories