

Handout for Lecture 2

Empirical Distribution and Measures of Central Tendency

ECON 340: Economic Research Methods

Instructor: Div Bhagia

1. You rolled a six-sided die 100 times and noted down how many times each of the six outcomes was realized. Fill in the rest of the table below:

Outcome	Count (n_k)	Relative frequency (f_k)	Cumulative frequency (F_k)
1	18		
2	18		
3	12		
4	16		
5	21		
6	15		
Total	100	1	

Note that

$$f_k = \frac{n_k}{n} = \frac{\text{observations in category } k}{\text{total observations}}$$

- (a) How many times did you get a die face with a value of at most 3?
- (b) Are the proportions close to what you would have predicted?
2. Find the mean and median for: 3, 4, 1, 6, 8

3. Amongst the mean and the median, which one is more affected by outliers? Explain.
4. We asked a sample of 10 individuals whether they like icecream or not. We then created a variable X that takes value 1 if the individual likes icecream, and 0 otherwise. Here is the data we collected:

1, 1, 0, 0, 0, 1, 0, 1, 1, 1

- (a) How many individuals like icecream in our sample?
- (b) What proportion of individuals like icecream in our sample?
- (c) Use the frequency distribution table and the following formula to calculate the mean of X .

$$\bar{X} = \frac{\sum_{k=1}^K n_k X_k}{n} = \sum_{k=1}^K f_k X_k$$

5. We have the following data on shoe sizes (X_i) for four individuals.

$$X = \{8, 6, 6, 8\}$$

(a) Calculate the mean:

$$\mu = \frac{\sum_{i=1}^N X_i}{N} =$$

(b) Calculate the weighted mean with weights $w = \{1, 1, 1, 1\}$.

$$\mu_{\text{Weighted}} = \frac{\sum_{i=1}^N w_i X_i}{\sum_{i=1}^N w_i} =$$

(c) Calculate the weighted mean with weights $w = \{1, 2, 2, 1\}$.

$$\mu_{\text{Weighted}} = \frac{\sum_{i=1}^N w_i X_i}{\sum_{i=1}^N w_i} =$$

(d) Calculate the weighted mean with weights $w = \{0.5, 0, 0, 0.5\}$.

$$\mu_{\text{Weighted}} = \frac{\sum_{i=1}^N w_i X_i}{\sum_{i=1}^N w_i} =$$