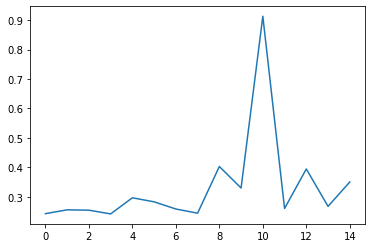
**Topics: Descriptive Statistics and Probability**

1. Look at the data given below. Plot the data, find the outliers and find out

|  |  |
| --- | --- |
| **Name of company** | **Measure X** |
| Allied Signal | 24.23% |
| Bankers Trust | 25.53% |
| General Mills | 25.41% |
| ITT Industries | 24.14% |
| J.P.Morgan & Co. | 29.62% |
| Lehman Brothers | 28.25% |
| Marriott | 25.81% |
| MCI | 24.39% |
| Merrill Lynch | 40.26% |
| Microsoft | 32.95% |
| Morgan Stanley | 91.36% |
| Sun Microsystems | 25.99% |
| Travelers | 39.42% |
| US Airways | 26.71% |
| Warner-Lambert | 35.00% |

ANSWERS:

PLOT: -



Measure X

count = 15.00

mean = 0.332713 = 33.27%

std = 0.169454 = 16.94%

var 2 = 0.028715 = 2.87%

min = 0.241400 = 24.14%

25% = 0.254700 = 25.47%

50% = 0.267100 = 26.71%

75% = 0.339750 = 33.97%

max = 0.913600 = 91.36% ∴ this is an outlier.



Answer the following three questions based on the box-plot above.

1. What is inter-quartile range of this dataset? (please approximate the numbers) In one line, explain what this value implies.
2. What can we say about the skewness of this dataset?
3. If it was found that the data point with the value 25 is actually 2.5, how would the new box-plot be affected?

ANSWERS:

1. IQR = 12 – 5 = 7 This is the range in which 50% of the datapoints are present.
2. Right skewed dataset
3. No significant effect on the box-plot if the value 25 was actually 2.5
4. 

Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?
2. Comment on the skewness of the dataset.
3. Suppose that the above histogram and the box-plot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset.

ANSWERS:

1. MODE lies between 5 and 8 from looking at the histogram chart
2. This dataset seems to be right skewed
3. Both histograms and box plots are used to explore and present the data in an easy and understandable manner. Histograms are preferred to determine the underlying probability distribution of a data. Box plots on the other hand are more useful when comparing between several data sets. They are less detailed than histograms and take up less space. One can use histograms and box plots to verify whether an improvement has been achieved by exploring the data before and after the improvement initiative. Both tools can be helpful to identify whether variability is within specification limits, whether the process is capable, and whether there is a shift in the process over time.
4. AT&T was running commercials in 1990 aimed at luring back customers who had switched to one of the other long-distance phone service providers. One such commercial shows a businessman trying to reach Phoenix and mistakenly getting Fiji, where a half-naked native on a beach responds incomprehensibly in Polynesian. When asked about this advertisement, AT&T admitted that the portrayed incident did not actually take place but added that this was an enactment of something that “could happen.” Suppose that one in 200 long-distance telephone calls is misdirected. What is the probability that at least one in five attempted telephone calls reaches the wrong number? (Assume independence of attempts.)

ANSWER:

Probability of one misdirected call p= 1/200 therefore q = 199/200

Number of Calls = 5

P(x) = ⁿCₓpˣqⁿ⁻ˣ

n = 5

at least one in five attempted telephone calls reaches the wrong number

= 1  -  none of the call reaches the wrong number

= 1  - P(0)

= 1   -  ⁵C₀(1/200)⁰(199/200)⁵⁻⁰

= 1  -  (199/200)⁵

= 0.02475

Hence, the probability is 0.02475

1. Returns on a certain business venture, to the nearest $1,000, are known to follow the following probability distribution

|  |  |
| --- | --- |
| x | P(x) |
| -2,000 | 0.1 |
| -1,000 | 0.1 |
| 0 | 0.2 |
| 1000 | 0.2 |
| 2000 | 0.3 |
| 3000 | 0.1 |

1. What is the most likely monetary outcome of the business venture?
2. Is the venture likely to be successful? Explain
3. What is the long-term average earning of business ventures of this kind? Explain
4. What is the good measure of the risk involved in a venture of this kind? Compute this measure

ANSWERS:

1. Max. P = 0.3 for P(2000). So, most likely outcome is 2000
2. P(x>0) = 0.6, implies there is a 60% chance that the venture would yield profits or greater than expected returns. Hence, the venture is likely to be successful.
3. Weighted average = x\*P(x) = 800. This means the average expected earnings over a long period of time would be 800(including all losses and gains over the period of time)
4. P(loss) = P(x= -2000)+P(x=-1000)=0.2. So the risk associated with this venture is 20%.