Marketing 4202 Final Exam Review

Covering chapters 8, 14, 15, 16, 17, 19
And sessions 11-16

Session 11
Review of statistics, part 2 (inferential statistics)
Chapters 14 & 16

In class case: Exporting jeans to the Netherlands
MDP- Should we export high end jeans to the Netherlands? Because they're so tall should we export large sized jeans? This may cause major changes in the production process
MRP- Obtain information on length of Dutch men. What is the proportion of customers that are taller than XX inches? Determine other demographic characteristics, in particular about income

The three fundamental distributions in statistics:

1. Population distribution: Frequency distribution (histogram) of the population elements for a certain variable (height or income); generally a smooth line; it is unknown; mean of population distribution is mu; and standard deviation is σ

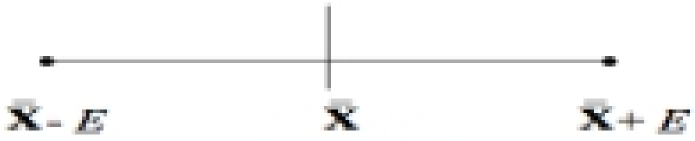
2. Sample distribution: Frequency distribution (histogram) of the sample elements, for example, height; known once we have our sample; mean of the sample distribution is the sample mean X bar and standard deviation is S

3. Sampling distribution: Distribution (histogram) of all possible sample means (X bar) you could get; it is theoretical distribution a. Take many samples from a population b. compute x bar for each sample and then c. construct a frequency distribution (histogram) from all computed sample means; when sample size to compute the sample means is large, sampling distribution is a normal distribution (bell shaped) with mean: mu, standard deviation S/sq. rt. Of n; this result is the **Central Limit theorem**.

The sampling distribution is the theoretical foundation for confidence intervals and hypothesis testing

If your sampling distribution is *'fat'* (s/sq. rt. N is large), sample mean is far from the mu. If your sampling distribution is *'skinny'* (s/sq. rt. N is small), sample mean is likely to be closer to mu

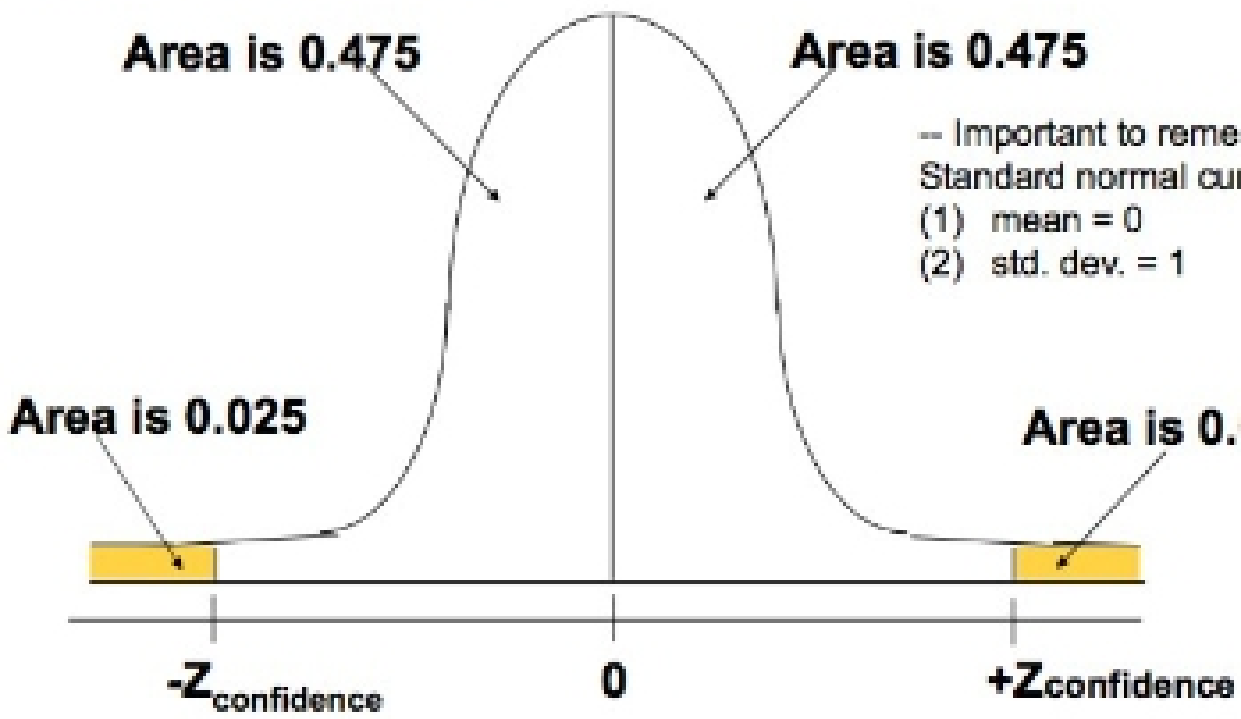
Confidence interval: Tells you how large the random error is and is more informative than a point estimate
-To estimate population mean use sample mean
-X bar will not be exactly equal to mu, so x bar = mu + random sampling error



To compute confidence interval for the mean use the formula:

$$\bar{X} \pm \underbrace{Z_{confidence} \times \frac{S}{\sqrt{n}}}_{\text{'Error' (E)}}$$

For a 95% confidence interval: Z confidence corresponds to 95% area under the standard normal curve



The corresponding Z-value (use exhibit 2, A-27) is 1.96

Confidence interval interpretation: In the long run, 90% of the confidence intervals constructed in the same way as before will contain the true value mu; or we are 90% sure that the interval (,) contains the true population mean for _________.

Testing a hypothesis about a population mean:

1. Formulate the null and alternative hypothesis
   a. Null: what you want to test, specifies that population mean mu is equal to a single value Ho: Mu =
   b. Alternative: states that the population mean is different from the value specified in the null Ha: Mu doesn't =
2. Choose the significance level
3. Compute the test-statistic
   a. Measures how close the sample has come to the null. Should follow a well-known distribution such as the normal, t-, or chi-square distribution

$$Z_{test} = \frac{\bar{X} - \mu_0}{S/\sqrt{n}}$$

4. Prepare a statistical decision (p-value)
    a. When is Z test too large that I do not believe anymore that the null is true? > confidence interval. If null is true, then frequency distribution is a standard normal distribution
    b. P-Value: The probability of observing a value for Z test that is at least as contradictory to the null as the one actually computed
5. Make a statistical decision: reject or not reject the null
    a. Compare P value to significance level. Significance level is the critical probability in choosing between the null hypothesis and the alternative hypothesis, usually 1, 5, or 10%. If P Value is less, REJECT; if P-Value is more, DO NOT REJECT
6. Make a managerial decision/interpretation

Distribution	**Mean**	**Standard deviation**	**Description**	**Status**
Population	μ	σ	Frequency distribution of population	Unknown – 'the truth'
Sample	$\overline{X}$	S	Frequency distribution of sample	Can be computed from sample, represents 'the truth'
Sampling	μ	$\frac{S}{\sqrt{n}}$	Theoretical frequency distribution of sample means	If we were to draw (say) 1000 samples, then the frequency distribution of the 1000 sample means will be a normal (CLT)

Session 12
Frequency tables and cross tabs for nominal and ordinal data: Part 1
Chapters 15 & 16

Inferential statistics for population proportions:

Sample proportions (p) are used to infer about population proportions (pi)

Testing a hypothesis about population proportions

1. Formulate a null and alternative hypothesis
    a. For nominal and ordinal data these are stated in terms of population proportions
2. Choose the significance level
    a. Significance level is the critical probability in choosing between the null and alternative hypothesis. When P-Value is less that Sig. level, REJECT, and when it is larger, DO NOT REJECT
3. Compute the test-statistic
    a. Test-statistic measures how close the sample has come to the null hypothesis