Chapter 6 Homework

Due 2-18-2018

Problem 6.13

a) Complete a Hypothesis Test for μ_1-μ_2; $\alpha = 0.05$

Hypothesis

$H_0 : \mu_1 - \mu_2 = 0$
$H_A : \mu_1 - \mu_2 \neq 0$

Assumptions:

1) Independent Samples.
2) Equal Variances. ($\sigma_F^2 = 1.4136, \sigma_M^2 = 1.0077$)

Test Statistic:

$$t_0 = \frac{\bar{y_1} - \bar{y_2} - D_0}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$
$$t_0 = \frac{(8.5333 - 9.6833) - 0}{1.0719\sqrt{0.0417 + 0.0278}}$$
$$t_0 = \frac{-1.15}{0.2826}$$
$$t_0 = -4.0708$$

Rejection Region

$|t_0| \geq t_{\frac{\alpha}{2},58}; t_{\frac{\alpha}{2},58} = 2.0017$
Thus, $|-4.0708| = 4.0708 \geq 2.0017$

P-Value

The p-value on a t-score of -4.0708 = $7.1822x10^{-5}$.
Therefore, with out p-value is less than our α of 0.025.

Conclusion

Since the absolute value of our t-score is greater than our Rejection Bound, there is sufficient evidence to reject our Null Hypothesis. There is evidence to suggest that the two mean pays between the Male and Female group are different.

b) Complete a 95% C.I. for $\mu_1 - \mu_2$

Assumptions

1) We are still under the assumption that these two groups were chosen independently.
2) We are also under the assumption that the Variances are equal and holding from the last section.

Confidence Interval Equation

$$C.I. = \bar{y_1} - \bar{y_2} \pm t_{\frac{\alpha}{2},df}(\frac{s_1^2}{\sqrt{n_1}} + \frac{s_2^2}{\sqrt{n_2}})$$
$$C.I. = (8.5333 - 9.6833) \pm 2.0017(\frac{1.4136}{4.8990} + \frac{1.0077}{6})$$
$$C.I. = -1.15 \pm 2.0017(0.4565)$$
$$C.I. = -1.15 \pm 0.9138$$
$$C.I \approx (-2.0638, -0.2362)$$

Conclsion

Since 0 is not in our confidence interval, we can conclude we have strong enough evidence to suggest that the population mean pays between men and women at this firm are different. This supports the hypothesis test we did in a).