**ISOM 2600 Introduction to Business Analytics**

**Weekly Exercise 5**

Q1. A simple regression model with the predictor x1 is run, and the output is given below.

Table

Description automatically generated

Which of the following statement is correct?

1. The slope of X1 is statistically insignificant at the 0.05 level.
2. 17.8% of variation of Y can be explained by the model.
3. 14.9% of the variations of Y is explained by the model.
4. At the 0.05 significance level, it is reasonable to say that the intercept of the model is .

Note that it is simple linear regression model and we use R2 not adjusted R2

A is incorrect, the slope of X1 is negative with p-value < 0.05, it means the slope is statistically significant (or statistically smaller than 0) at the 0.05 level.

C is incorrect, the variations of Y explained by the model is quantified by R-squared, but not adjusted R-squared.

D is incorrect, the 95% confidence interval for the intercept is [4.037,6.123], which does not contain 3.

[Q2 – 3].

An equity analyst would like to build a Single Index Model (SIM) for Tesla Inc. He regressed the return of Tesla Inc.’s stock price on SP500 index returns at the same period. The result of data analysis is given below:

Table

Description automatically generated

Q2. Which of the following statement about the model is incorrect?

1. Tesla outperforms the SP500.
2. Tesla is significantly more aggressive than SP500.
3. Tesla is significantly more defensive than SP500.
4. Tesla exposure to SP500 is significantly above 1.

Solution: Note that the slope of SP500 is significantly larger than 1 (can be proved by hypothesis testing H1: b1 > 1, test statistic = (1.8739 – 1)/0.236), indicates that Teala is more variable than SP500, i.e., one unit change in SP500 will be related to 1.8739 unit change in Tesla on average. So, C is incorrect.

Q3. Given that the daily return of SP500 = 2%, what is the predicted daily return of Teala?

1. 3.79%
2. 1.87%
3. 7.93%
4. 4.02%

Solution: Tesla = 0.004 + 1.8739\*0.02 = 3.79%

[Q4 – Q6] A business analyst would like to build a multiple regression model for a chain pharmacy company. He regressed profits of the stores on a set of predictors. Results of data analysis are given below:

Table

Description automatically generated

Q4.

According to the regression output, the most insignificant predictor is:

1. %65 or older
2. Income
3. Soc Security (per 1,000)
4. CV Death (per 100,000)

Solution: Soc Security is the most insignificant predictor since it has the highest p value.

Q5.

What is the overall effect on profit per percent increase on people aged 65 above?

1. 7713.8 B. 1316.20 C. 1703.86 D. 563.73

Q6.

Chart

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Given the four-in-one plot, which assumption of linear regression is violated?

* 1. Normality
  2. Linearity
  3. Constant variance
  4. None of the above