

Clarifications on Group Assignment 1

This document will get updated regularly based on the feedback I get from students. Please check this file very often to see if there is any new clarification that can help you with the assignment.

Point 1. In case of interaction effect in regression model, we should be careful to account for interaction coefficient in the model. For example, let say we have the following regression model:

$$y = \alpha + \beta_1 X + \beta_2 Z + \beta_3 X \times Z + \epsilon$$

Which is a regression model with an interaction term between X and Z. Now if we are interested in the interpretation of variables, we should note that if X goes up by unit, y does no longer changes by β_1 units but it changes by $\beta_1 + \beta_3 \bar{Z}$ where \bar{Z} is the mean of Z. To see the reason behind this, we can look at the derivative of y with respect to X:

$$\frac{dy}{dX} = \beta_1 + \beta_3 Z$$

This value depends on the exact value of Z which is not desirable to report. Therefore, we report it at the average of Z instead. As a result, whenever you face interaction terms and you want to interpret variables, pay attention to the impact of the interaction term on interpretation as well.

In case of non-linearities such as $y = \alpha + \beta_1 X + \beta_2 X^2 + \epsilon$, as we discussed in the slides, the impact on 1 unit change in X on y, is based on the result of the derivative again:

$$\frac{dy}{dX} = \beta_1 + 2\beta_2 X$$

This value depends on the exact value of X which is not desirable to report. Therefore, we report it at the average of X instead. So if X goes up by 1 unit, y changes by $(\beta_1 + 2\beta_2 \bar{X})$ units.