

Lesson 21 - Multiple Linear Regression

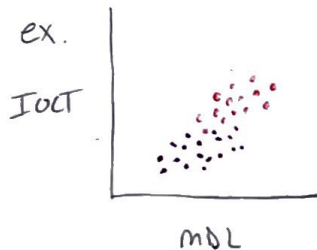
w/ Interactions

- When use interaction? \rightarrow if your answer includes "it depends"

ex. Price per sqft of a home. Well, it depends on location.

$$\text{Price} \sim \text{sqft} * \text{city}$$

use interaction what slopes are expected to be different.



Simple linear Regression

$$\widehat{\text{IOCT}} = \beta_0 + \beta_1(\text{mDL})$$

1 line
1 slope

Multiple (w/o interaction)

$$\widehat{\text{IOCT}} = \beta_0 + \beta_1(\text{mDL}) + \beta_2(\text{Sex} \times F)$$

2 line
same slope

Multiple linear Regression w/ interactions

(male and female line should have different slopes)

m
F

$$\widehat{\text{IOCT}} = \beta_0 + \beta_1(\text{mDL}) + \beta_2(\text{Sex} \times F) + \beta_3(\text{mDL} * \text{Sex} \times F)$$

$$\text{Male: } \widehat{\text{IOCT}} = \beta_0 + \beta_1(\text{mDL})$$

$$\text{Female: } \widehat{\text{IOCT}} = \beta_0 + \beta_1(\text{mDL}) + \beta_2(\text{Sex} \times F) + \beta_3(\text{mDL} * \text{Sex} \times F)$$

$$\widehat{\text{IOCT}} = (\beta_0 + \beta_2) + (\beta_1 + \beta_3)(\text{mDL})$$