Lecture 5

Chapters 1.5-1.6

1.5 Results from OLS

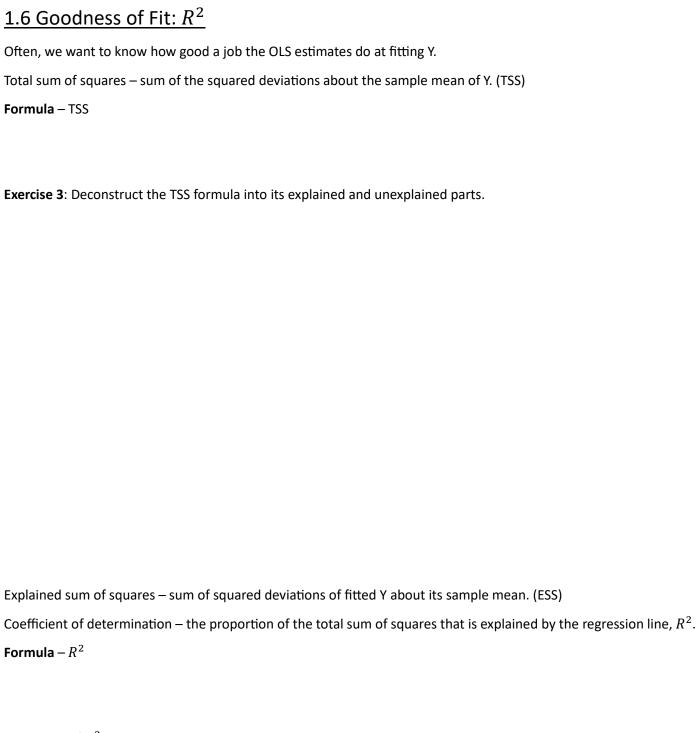
Review from yesterday:

- 1. Simple linear regression model –
- 2. Fitted regression model –
- 3. Normal equations for $\widehat{\beta_1}$ and $\widehat{\beta_2}$ –

Exercise 1: Show that the mean value of the residuals is zero.

Note that we can also show that $ ho_{\it e, \hat{\it Y}}=0.$		

Exercise 2: Show that the sample correlation coefficient between X and e is zero.



Properties of \mathbb{R}^2

- 1. It always lies between 0 and 1.
- 2. When it is 1, RSS is 0.
- 3. When it is 0, ESS is 0, and TSS=RSS.

Exercise 4: Rewrite the R^2 formula in terms of the RSS.

Exercise 5: Find the \mathbb{R}^2 given the following information.

Observation	Χ	Υ	Ŷ
1	1	4	2.9
2	2	3	4.3
3	3	5	5.7
4	4	8	7.1
Mean	2.5	5	5

Exercise 6 : If the fitted regression line does a good job, then the fitted values of Y should be highly correlated with the true values of Y. Show that $r_{Y,\hat{Y}} = \sqrt{R^2}$