January 22, 2018

Recitation Sample Problem

The data set **SP_2018-01-22.dta** contains information from 40 restaurants on last month's average Yelp review from 0-5 stars, "yelp_lstmo" and the percent change in their profits this month as compared to last month (where for example 10 means they made 10% more profit than last month), "perc_chg_profit".

Using Stata:

i. Calculate and report ($\overline{yelp\_lstmo}$). Explain what that number represents.

ii. For each restaurant calculate a variable called "deviation" that indicates the difference between that restaurants yelp score versus the average across all the restaurants. Then calculate and report the average of "deviation".

iii. Calculate the covariance between "yelp_lstmo" and "perc_chg_profit". Does this value have a real world interpretation? If yes, explain it. If no, explain why it does not.

iv. What is the correlation between last month's average Yelp review and the percent change in profits? Show using both the correlation function in Stata and the following definition of correlation:

$$\rho_{XY} = \frac{cov(X,Y)}{sd(X)sd(Y)}$$

v. Plot the relationship between last month's average Yelp review and the percent change in profits with last month's average Yelp review on the x-axis.

vi. Using the definition of $\widehat{\beta_1} = \frac{cov(X,Y)}{var(X)}$, calculate the regression slope coefficient you would get from a regression of last month's average Yelp review and the percent change in profits. Use the percent change in profits as the Y variable.

vii. Calculate and interpret the intercept, $\widehat{\beta_0} = \bar{Y} - \widehat{\beta_1}\bar{X}$

viii. By estimating the regression:

$$perc\_chg\_profit_i = \beta_0 + \beta_1 * yelp\_lstmo_i + u_i$$

calculate the ordinary least squares (OLS) estimates. Compare your estimate of β1 with the results you found in vi.

ix. Interpret your estimate of β_1

x. Give an intuitive explanation of what R^2 measures.

xi. What is the R^2 from the previous regression. Interpret this number.