Eco 240 Handout : April 12. 2010.

Simple Linear Regression Model Estimation: Output of STATA program

Data:

| Y (Sales) | 350 | 380 | 400 | 420 |
|---|---|---|---|---|
| X (Price $100) | 6.5 | 6.0 | 6.5 | 5.0 |

| Source | SS | df | MS |
|---|---|---|---|
| Model | ⑥ 1350 | 1 | 1350 |
| Residual | ⑦ 1325 | 2 | ⑨ 662.5 |
| Total | ⑧ 2675 | 3 | 891.666667 |

| | |
|---|---|
| Number of obs | = 4 |
| F( 1, 2) | = 2.04 |
| Prob > F | = 0.2896 |
| ⑩ R-squared | = 0.5047 |
| Adj R-squared | = 0.2570 |
| Root MSE | = 25.739 |

| y | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| x | ① -30 | ② 21.01587 | ③ -1.43 | ④ 0.290 | ⑤ -120.424 | 60.42398 |
| _cons | ⑤ 567.5 | 126.7502 | 4.48 | 0.046 | 22.13771 | 1112.862 |

⓪ $b_0$

① $b_1$

② $s_{b_1} = \sqrt{\frac{s_e^2}{(n-1)s_x^2}}$

③ $t_{b_1} = \frac{b_1}{s_{b_1}} = \frac{①}{②}$

$H_0: \beta_1 = 0$, $H_1: \beta_1 \neq 0$

$\alpha = 0.05$ two tail test

$t_{2, 0.025} = 4.303$

since $-1.43 > -4.303$

Fail to reject $H_0$.

④ p-value.

At what % of confidence level can we reject $H_0$?

$100 - 29 = 71\%$

(14.5% each)

⑤ 95% confidence interval

$b_1 - t_{n-2, \alpha/2}\, s_{b_1} < \beta_1 < b_1 + t_{n-2, \alpha/2}\, s_{b_1}$

$① - 4.303 * ② < \beta_1 < ① + 4.303 * ②$

⑥ $SSR = \Sigma(\hat{Y}_i - \bar{Y})^2$

⑦ $SSE = \Sigma(Y_i - \hat{Y}_i)^2$

⑧ $SST = \Sigma(Y_i - \bar{Y})^2$

⑨ $s_e^2$ : model error variance

⑩ $R^2 = \frac{SSR}{SST} = \frac{⑥}{⑧}$