

UST700: RESEARCH METHODS I COMPUTER LAB #4 COBB-DOUGLAS PRODUCTION FUNCTION

Multiple Regression. Data on Taiwan production Y, labor X2, capital X3. Gujarati, pg 216.
The Cobb-Douglas production function is used to fit the data.

$$X := \begin{pmatrix} 275.5 & 17803.7 \\ 274.4 & 18096.8 \\ 269.7 & 18271.8 \\ 267 & 19167.3 \\ 267.8 & 19647.6 \\ 275 & 20803.5 \\ 283 & 22076.6 \\ 300.7 & 23445.2 \\ 307.5 & 24939. \\ 303.7 & 26713.7 \\ 304.7 & 29957.8 \\ 298.6 & 31585.9 \\ 295.5 & 33474.5 \\ 299 & 34821.8 \\ 288.1 & 41794.3 \end{pmatrix} \quad Y := \begin{pmatrix} 16607.7 \\ 17511.3 \\ 20171.2 \\ 20932.9 \\ 20406. \\ 20831.6 \\ 24806.3 \\ 26465.8 \\ 27403 \\ 28628.7 \\ 29904.5 \\ 27508.2 \\ 29035.5 \\ 29281.5 \\ 31535.8 \end{pmatrix}$$

$$i := 0..14$$

$$j := 0..1$$

$$\ln X_{i,j} := \ln(X_{i,j})$$

$$\ln Y_i := \ln(Y_i)$$

$$\text{regress}(\ln X, \ln Y, 1) = \begin{pmatrix} 3.00000 \\ 3.00000 \\ 1.00000 \\ 1.49877 \\ 0.48986 \\ -3.33846 \end{pmatrix}$$

$$\beta_0 := \text{regress}(\ln X, \ln Y, 1)_5$$

$$\beta_1 := \text{regress}(\ln X, \ln Y, 1)_3$$

$$\beta_2 := \text{regress}(\ln X, \ln Y, 1)_4$$

$$\beta_0 = -3.33846$$

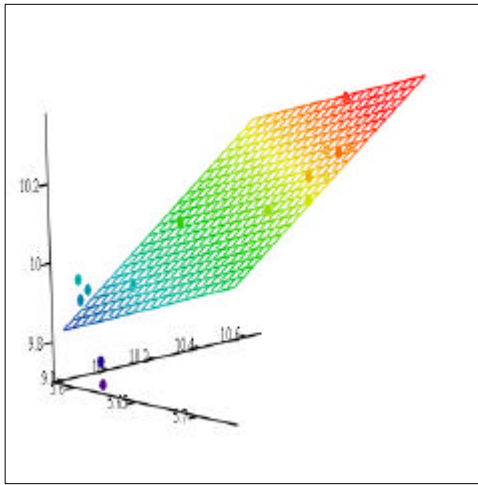
$$\beta_1 = 1.49877$$

$$\beta_2 = 0.48986$$

$$\text{Rsquare} := 1 - \frac{\sum_{i=0}^{14} (\ln Y_i - \beta_0 - \beta_1 \cdot \ln X_{i,0} - \beta_2 \cdot \ln X_{i,1})^2}{15 \cdot \text{var}(\ln Y)}$$

Rsquare = 0.88903

$$\text{LNY}_i := \beta_0 + \beta_1 \cdot \ln X_{i,0} + \beta_2 \cdot \ln X_{i,1}$$



$(\ln X^{(0)}, \ln X^{(1)}, \ln Y), (\ln X^{(0)}, \ln X^{(1)}, \text{LNY})$