

Econometrics Problem Set 2

1) Consider the following data on consumption (Y) and income (X).

X : 150 60 100 80 120 130

Y : 105 54 80 68 90 95

Find out the estimated value of parameters. Then fit the consumption function

2) The following table shows 12 pairs of obs. on X (price) and Y (quantity supplied)

X : 9 12 6 10 9 10 7 8 12 6 11 8

Y : 69 76 52 56 57 77 58 55 67 53 72 64

(i) Fit a estimated regression line which shows as supply function.

(ii) Comment on the coefficients (\hat{a} , and \hat{b}) estimated in this model.

3) The given information shows quantity demanded and price levels of different years.

Year : 1991 1992 1993 1994 1995 1996

Q^d : 8 3 4 7 8 10

P : 2 4 3 1 3 5

(i) Estimate the demand function assuming the linear demand function

(ii) Estimate the elasticity of demand when price level equal to 5.

(iii) Forecast the level of demand when price rises from 4 to 6.

4) The following informations are given

$$\sum Y = 21.9 \quad \sum (Y_i - \bar{Y})^2 = 86.9$$

$$\sum X = 186.2 \quad \sum (X_i - \bar{X})^2 = 215.4$$

$$\sum (X_i - \bar{X})(Y_i - \bar{Y}) = 106.4, \quad n = 20.$$

(i) Estimate the two variable linear regression model as

$$Y_i = \alpha + \beta X_i + u_i$$

(ii) Estimate the variances of $\hat{\alpha}$ and $\hat{\beta}$.

(iii) Test whether $\hat{\alpha}$ and $\hat{\beta}$ are significant or not ($t_{0.025, 18} = 2.101$)

(iv) Construct the confidence intervals of $\hat{\alpha}$ and $\hat{\beta}$ at 95% level of confidence.

5) Estimated regression equation is given

$$\text{as } \hat{Y} = 15 + 0.81X, \quad n = 19$$

$$SE(\hat{\alpha}) = 3.1$$

$$SE(\hat{\beta}) = 18.7$$

$$t_{0.025, 17} = 2.11$$

$$t_{0.005, 17} = 2.90$$

(i) Test whether $\hat{\alpha}$ and $\hat{\beta}$ are significant or not.

(ii) confidence interval of $\hat{\alpha}$ and $\hat{\beta}$ → construct at 1% level of significance.

6) Find out the value of R^2 from the following information and comment

$$\sum x_i y_i = 3347.60 \quad \sum x^2 = 604.80$$

$$\sum y_i^2 = 19837, \quad n = 20.$$

7) The estimated regression line is given as

$$\hat{y}_i = 0.7437 + 0.6146 x_i$$

$$SE = (0.8355) + (\quad)$$

$$t = (\quad) (9.6536)$$

$$R^2 = 0.8944, \quad n = 13.$$

(i) Find out the missing numbers

(ii) Find out adjusted R^2 .

where adjusted R^2 (\bar{R}^2)

$$= 1 - \frac{RSS/(n-k)}{TSS/(n-1)}$$

8)

Here it is given that $\sum Y_i^2 = 526$
 $\sum X_i^2 = 657$ $\sum X_i Y_i = 492$ $\sum Y_i = 63$
 $\sum X_i = 96$ $n = 16$

(i) Estimate the parameters in the model by - estimate the regression line.

(ii) Comment on the value of the parameters -

(iii) Estimate r^2 and comment on the validity of the model.

9) A sample of 20 obs. on x and y is to be used for estimating the linear function $Y = \alpha + \beta X + u$. The first 10 obs. yield the following results

$$\bar{x} = 15.3 \quad \bar{y} = 160 \quad \sum (x_i - \bar{x})^2 = 78$$

$$\sum (y_i - \bar{y})^2 = 45600 \quad \sum (x_i - \bar{x})(y_i - \bar{y}) = -1568$$

The ten subsequent pairs of value of x and y yields

$$\bar{x} = 14.08 \quad \bar{y} = 106 \quad \sum (x_i - \bar{x})^2 = 98.16$$

$$\sum (y_i - \bar{y})^2 = 62400 \quad \sum (x_i - \bar{x})(y_i - \bar{y}) = -23088$$

Is the regression equation differ?