

Answer on Question #51185, Economics - Other

Assignment

From the following data, obtain the two regression equations Y on X and X on Y.

X 2 4 6 8 10

Y 5 7 9 8 11

Solution

We can use the method of least squares to obtain the two regression equations.

1. Y on X

$$\left\{ \begin{array}{l} \sum y = na + b \sum x \\ \sum xy = a \sum x + b \sum x^2 \end{array} \right.$$

$$\left\{ \begin{array}{l} 40 = 5a + 30b \\ 266 = 30a + 220b \end{array} \right.$$

$$\left\{ \begin{array}{l} 240 = 30a + 180b \\ 266 = 30a + 220b \end{array} \right.$$

$$26 = 40b$$

$$b = 0.65$$

$$a = (40 - 30b)/5 = 8 - 6b = 8 - 3.9 = 4.1$$

$$\mathbf{Y = 4.1 + 0.65X}$$

2. X on Y

$$\left\{ \begin{array}{l} 30 = 5a + 40b \\ 266 = 40a + 340b \end{array} \right.$$

$$\left\{ \begin{array}{l} 240 = 40a + 320b \\ 266 = 40a + 340b \end{array} \right.$$

$$26 = 20b$$

$$b = 1.3$$

$$a = (30 - 40b)/5 = 6 - 8b = -4.4$$

$$\mathbf{X = -4.4 + 1.3Y}$$