

1 office 5 ימים | 1720

$$a = \bar{y} - b\bar{x} = 68 - (-0.2) \cdot 10 = 70$$

$$\hat{y} = 70 - 0.2x$$

... 70 הוא נקודת המפגש בין הישרים. נקודת האמצע של הישרים.

$$P(-0.239 \leq \beta \leq -0.16) = 0.95$$

$$H_0: \beta = 0$$

$$H_1: \beta \neq 0$$

$$t = \frac{-0.2 - 0}{0.02} = -10$$

$$t_{10, 0.025, 0.025} = 1.96$$

הוא אומר?

$$E(\hat{y} | x=20) = 70 - 0.2 \cdot 20 = 66$$

$$E(\hat{y} | x=0) = 70$$

$$70 - 0.2 \cdot 20 \pm 1.96 \cdot \sqrt{3.96 \left[\frac{1}{10000} + \frac{(20-10)^2}{5500} \right]}$$

$$70 - 0.2 \cdot 0 \pm 1.96 \cdot \sqrt{3.96 \left[\frac{1}{10000} + \frac{(0-10)^2}{5500} \right]}$$

$$\hat{y} | x=20 = 70 - 0.2 \cdot 20 = 66$$

$$\hat{y} | x=0 = 70$$

$$70 - 0.2 \cdot 20 \pm 1.96 \cdot \sqrt{3.96 \left[\frac{1}{10000} + \frac{(20-10)^2}{5500} \right]}$$

$$70 - 0.2 \cdot 0 \pm 1.96 \cdot \sqrt{3.96 \left[\frac{1}{10000} + \frac{(0-10)^2}{5500} \right]}$$

5. Box plot of y (10x)

פתרון תרגיל 5 שלב 2

$$r_{ax+b, cy+d}^2 = \left(\frac{\text{cov}(ax+b, cy+d)}{S_{ax+b} \cdot S_{cy+d}} \right)^2 =$$

$$= \left(\frac{ac \text{cov}(x, y)}{|a| S_x \cdot |c| S_y} \right)^2 = \left(\frac{\text{cov}(x, y)}{S_x \cdot S_y} \right)^2$$

$$r_{Y, \hat{Y}}^2 = r_{Y, a+bx}^2 = r_{Y, X}^2$$

$$R^2 = 1 - \frac{\sum e^2}{\sum y^2} = \frac{\sum \hat{y}^2}{\sum y^2} = \frac{\sum (bx)^2}{\sum y^2} = b^2 \frac{\sum x^2}{\sum y^2} =$$

$$= \frac{\left(\frac{\sum xy}{\sum x^2} \right)^2 \sum x^2}{\sum y^2} = \left(\frac{\sum xy}{\sqrt{\sum x^2} \cdot \sum y^2} \right)^2 = r_{xy}^2$$

$$\sum (Y_i - \bar{Y})^2 = \sum (Y_i - \hat{Y}_i + \hat{Y}_i - \bar{Y})^2$$

$$= \sum (Y_i - \hat{Y}_i)^2 + 2 \sum (Y_i - \hat{Y}_i)(\hat{Y}_i - \bar{Y}) + \sum (\hat{Y}_i - \bar{Y})^2$$

$$= \sum e^2 + 2 \sum e_i (a + bx_i - (a + b\bar{x})) + \sum (\hat{Y}_i - \bar{Y})^2 =$$

$$= \sum e^2 + 2b(\sum e_i x_i - \sum e_i \bar{x}) + \sum \hat{y}^2$$

$$\sum y^2 = \sum \hat{y}^2 + \sum e^2$$

$$\frac{\sum y^2}{n} = \frac{\sum \hat{y}^2}{n} + \frac{\sum e^2}{n}$$

הנהגות נוספות

3 value 5 value 1200

$$\hat{Y} = 210.4444 - 1.57778 X$$

$$r_{\hat{Y}} = \frac{\frac{d\hat{Y}}{dX}}{\frac{Y}{X}} = \frac{-1.57778}{\frac{100}{70}} = -1.1$$

$$\hat{X} = 126.34 - 0.5634 Y$$

$$\hat{Y} = 210.4444 - 0.0157778 X$$

$$r_{\hat{Y}} = \frac{\frac{d\hat{Y}}{dX}}{\frac{Y}{X}} = \frac{-0.0157778}{\frac{100}{70.100}} = -1.1$$

$$\hat{Y} = 467.05 - 3.506 X$$

$$r_{\hat{Y}} = \frac{-3.506}{\frac{100/0.45}{70}} = -1.1$$

$$S_a^2 = 12.57^2$$

$$S_b^2 = 0.1762^2$$

$$S^2 = 8.359^2$$

$$H_0: \beta = 0$$

$$H_1: \beta \neq 0$$

$$t = \frac{-1.57778 - 0}{0.1762} = -8.95$$

$$t_{(2-1), 0.025}$$

Ho not

$$H_0: \beta = -1$$

$$H_1: \beta \neq -1$$

$$t = \frac{-1.57778 - (-1)}{0.1762} = -3.28$$

Ho not

$$P(-1.57778 - t_{(2-1), 0.025} \leq \beta \leq -1.57778 + t_{(2-1), 0.025}) = 0.95$$

5 nice 5 years pass @

$$\hat{Y} = 30 + \frac{1}{3}X$$

$$\hat{X} = 15 + \frac{2}{3}Y$$

$$\sum Y^2 = 40000$$

$$n = 16$$

$$\begin{aligned} \hat{Y} &= 30 + \frac{1}{3}\bar{X} \\ \bar{X} &= 15 + \frac{2}{3}\bar{Y} \end{aligned}$$

$$\bar{X} = 45$$

$$\bar{Y} = 45$$

$$b \cdot b' = r^2$$

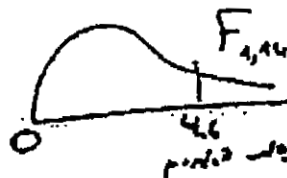
$$\frac{1}{3} \cdot \frac{2}{3} = \frac{1}{9} \Rightarrow r < \frac{1}{2}$$

$$b_{01} = r \cdot \frac{S_Y}{S_X}$$

$$\frac{1}{3} = \sqrt{\frac{1}{9}} \cdot \frac{S_Y}{S_X} \Rightarrow \frac{S_Y}{S_X} < 1$$

$$\begin{aligned} H_0: \beta_{01} &= 0 & H_0: \rho^2 &= 0 \\ H_1: \beta_{01} &\neq 0 & H_1: \rho^2 &> 0 \end{aligned}$$

$$F = \frac{\frac{1/9}{1}}{(1-1/9)/(16-1-1)} = 4$$



$$\sum y^2 = \sum Y^2 - n\bar{Y}^2 = 7600$$

$$S_{b_2}^2 = \frac{S^2}{\sum y^2} = \frac{\frac{\sum e^2}{n-2}}{\sum y^2} = \frac{(1-R^2)\sum x^2}{\sum y^2} = \frac{(1-1/9)15200}{7600} = 0.1111$$

$$S_{b_2} = \frac{1}{3}$$

$$S_{e_2}^2 = S^2 \left[\frac{1}{n} + \frac{\bar{Y}^2}{\sum y^2} \right] = \frac{(1-R^2)\sum x^2}{n-2} \left[\frac{1}{n} + \frac{\bar{Y}^2}{\sum y^2} \right] = \frac{(1-1/9)15200}{16-2} \left[\frac{1}{16} + \frac{45^2}{7600} \right] = 2$$

$$S_{e_2} = 1.66$$

$$H_0: \beta_2 = 1 \quad t = \frac{1/3 - 0}{1.66} = 2$$

$$H_0: \alpha = 0 \quad t = 0.9 \text{ not } H_0$$

צורה 5 - 5 שאלה

1) $\hat{Y}_i = a + bX_i$ $\hat{Y}_i = 1.37X_i + 1.11$

2) $\hat{Y}_i = X_i$ $\hat{Y}_i = X_i$

3) $\hat{Y}_i = 0.5X_i + 1.5$

4) $\hat{Y} | Y=52 \pm t_{n-2, \alpha} \cdot S' \sqrt{\frac{1}{n} + \frac{(52-9)^2}{\sum y_i^2}}$

(33.34, 65.99)

5) $\hat{X} | Y=52 \pm t_{n-2, \alpha} S' \sqrt{1 + \frac{1}{n} + \frac{(52-9)^2}{\sum y_i^2}}$

(-14.61, 99.33)

6) $\hat{Y} = 0.25X + 0.3$

(45, 41.5)

7) $\hat{Y} - t \cdot S \sqrt{\frac{1}{n} + \frac{(45-45)^2}{\sum x_i^2}}$

$\hat{X} - t \cdot S' \sqrt{\frac{1}{n} + \frac{(45-45)^2}{\sum y_i^2}}$

$S^2 = \frac{(1-R^2) \sum y_i^2}{n-2}$
 $S'^2 = \frac{(1-R^2) \sum x_i^2}{n-2}$ } $S^2 < S'^2$

$43 \pm \frac{7.6}{2}$

(39.2, 46.8)

$\hat{Y} = 30 + \frac{1}{3}X$
 $\hat{Y} | X=39 = 43$

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בתורת 5 תרגילים - 6-9 אלף

$E(Y|x_0) - \hat{y}$ הקטן ביותר $Y|x_0 - \hat{y}$ הקטן ביותר $Y|x_0 - \hat{y}$ הקטן ביותר

$\hat{y} \pm t_{n-2} S \sqrt{1 + \frac{1}{n}}$: $Y|x_0 - \hat{y}$ הקטן ביותר, $x_0 = \bar{x}$ הקטן ביותר
 $\hat{y} \pm t_{n-2} S \sqrt{\frac{1}{n}}$: $E(Y|x_0) - \hat{y}$ הקטן ביותר
 $\hat{u} = \hat{\alpha}c - \frac{\hat{\beta}cb}{a} + \frac{\hat{\beta}c}{a} V$

$\bar{y}, \bar{x}, \sum xy, \sum y^2, \sum x^2$: נתונים
 נתון R^2 נתון R^2 נתון R^2 נתון R^2

$\sum e_i x_i = 0$ $\sum e_i = 0$ נתון a, b נתון a, b
 נתון $(70, 66)$ נתון $(70, 66)$ נתון $(70, 66)$
 $\sum e_i x_i = 0$ $\sum e_i = 0$ נתון a, b

$R^2 = 1 - \frac{\sum e_i^2}{\sum y_i^2}$
 $R^2 = 0.40625$ $R^2 = 0.38625$

$k=10$ $\beta=0.5$

$x = 9$

$R^2 = 0.40625$

$R^2 = 0.38625$

F	MS	df	SS	התוצאה
20.52	1300	1	1300	X
63/3	63/3	30	1900	e
		31		Y

$25 - 1.96 \cdot \sqrt{63/3} \sqrt{1 + \frac{1}{32} + \frac{(30-20)^2}{5200}} \leq Y|x=30 \leq \dots$

$\hat{\beta}' = \hat{\gamma} = 0.632$ $\hat{\alpha}' = 0$