

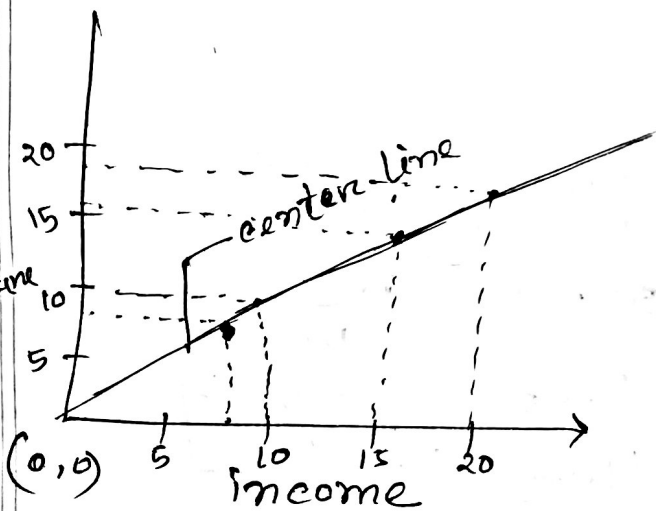
# Regression Analysis

25/07/17

## Standard Error

Income	Expenditure
20	18
10	10
15	16
8	7

→ center line (સરેરાશ)  
 ૬- નિમ્ન સરેરાશ ૭૫-  
 ૨૦.૮- ૧૦- સરેરાશ  
 Standard Error  
 ૬૦- સરેરાશ



સરેરાશ ૧૦ નિમ્ન સરેરાશ  
 ૨૦.૮- ૧૦- સરેરાશ  
 (Standard Error Average)

Standard error → સરેરાશ સરેરાશ સરેરાશ/સરેરાશ

સરેરાશ સરેરાશ સરેરાશ સરેરાશ  
 absolute error

S.E. of

$$S_{(x,y)} = \sqrt{\frac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{n-2}}$$

$\downarrow$   
 total pairs of var.

here,  
 $n = 4$   
 $\hookrightarrow$  total value  
 $2 \times 2 = 4$

$$\hat{y}_i = \hat{\beta}_0 + \hat{\beta}_1 x_i$$

$x_i$	$y_i$		
Income	Expenditure	$\hat{y}_i = 0.43 + 0.93 x_i$	$(y_i - \hat{y}_i)^2$
20	18	<del>27.2</del> 19.03	$(18 - 19.03)^2$ = 1.06
10	10	9.73	$(10 - 9.73)^2$ = 0.74
15	16	14.38	$(16 - 14.38)^2$ = 2.62
8	2	7.87	$(2 - 7.87)^2$ = 35.36

$$\therefore S_{(x,y)} = \sqrt{\frac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{n-2}}$$

$$= \sqrt{\frac{4.51}{4-2}} = 1.5$$

$\rightarrow$  just standard error of  $\hat{\beta}_1$

#  $X | Y \rightarrow$  જે કિસ્સામાં જુસ્ત (just) પ્રશ્ન

અન S.E. જો  $20.6$  થી  $\text{than Regression}$   
 - model  $20.6$  થી  $20.6$ ,  $\text{than Standard Error}$   
 $20.6$   $20.6$   $20.6$

# જો  $X, Y$  અન  $\text{Regression Model Equation}$   
 જો અન  $0.10$  Previous page see.



Supply	Demand
5	7
8	12
40	6
15	10
7	2

Find standard  
 Error?

Supply	Demand	$\hat{y}_i$	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$
5	7	5.87	-4	-0.4	1.6	16
8	12	7.04	-1	4.6	-4.6	1
10	6	7.76	1	-1.4	-1.4	1
15	10	9.65	6	2.6	15.6	36
7	2	6.26	-2	-5.4	10.8	4
$\bar{x} = 9$	$\bar{y} = 7.4$				22	58

$$\hat{y}_i = B_0 + B_1 x_i$$

$$= 3.98 + 0.328 x_i$$

$$y_i =$$

$$B_1 = \frac{\sum_{i=1}^n [(x_i - \bar{x})(y_i - \bar{y})]}{\sum_{i=1}^n (x_i - \bar{x})^2}$$

$$= \frac{22}{58}$$

$$= 0.378$$

$$B_1 = \bar{y} - B_1 \bar{x}$$

$$= 7.4 - 0.328 \times 9$$

$$= 3.98$$

$$\sum (y_i - \bar{y})^2$$

$$1.27$$

$$24.96$$

$$3.09$$

$$6.12$$

$$18.14$$

$$47.58$$

$$S(n, y)^2 = \sqrt{\frac{47.58}{3}}$$

$$= 3.98$$

## Coefficient of determination :

$$r^2 = 20\%$$

→ 20% ~~variation~~ variation of  
explain ~~20%~~ dependent  
var. explained by  
the independent var.

⇒ What are difference between  
correlation & Regression Analysis



→ Linear  
relation  
among 2 var

→ No dependent  
& Independent  
var.

→ dependent  
& Independent  
var change 20%  
dependent var  
change 20%

→ Dependent &  
Independent  
var ~~not~~ consider  
200%

# Probability

$$P(A) = \frac{m}{n}$$

## Imp: Terms

Experiment?

→ any kind a work + experiment

Outcome?

result of Experiment is called outcome.

Mutually exclusive outcome:

→ outcome not with another  
Example, like coin change loss and  
winning head and tail.

## Probability

$n$  = total num of outcome [coin 20 221-  
outcome head & tail]  
 $m$  = favorable num of outcome.



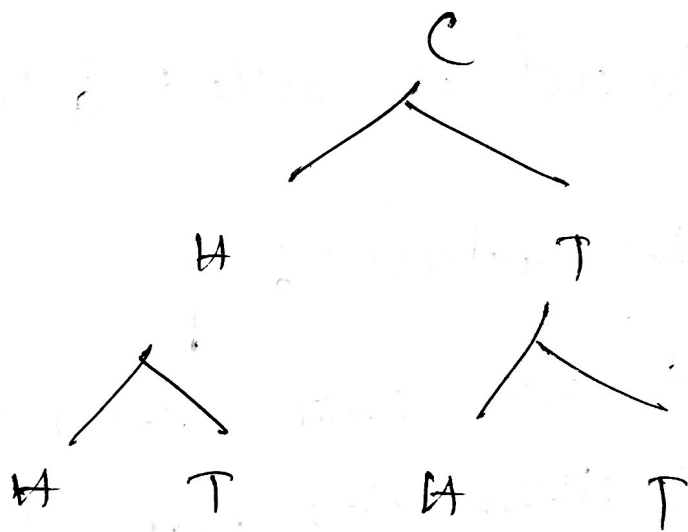
Head 3 and tail 3. Probability  $\frac{1}{2}$ .

total num of outcome :

~~HHH~~  $(2)^n \rightarrow$  experiment no.  $n=3$

~~$(2)^4$~~   $(2)^4 = 2 \rightarrow$  probability

$$(2)^2 = 4$$



$n = \{ \underline{HHH}, \underline{HHT}, \underline{HTH}, \underline{HTT}, \underline{THH}, \underline{THT}, \underline{TTH}, \underline{TTT} \}$

$\rightarrow$   $P(HHH) = \frac{1}{8}$  (2 or 3 or 4)  $P(H) = \frac{2}{4}$   $P(HH) = \frac{1}{4}$   $\rightarrow$  zero probability.

zero coin toss zero probability  $H$  zero  $\frac{1}{2}$   
 $\frac{1}{2}$  " " " "  $HH$   $\frac{1}{4}$



## Topics of 2nd Quiz:

⇒ Skewness & Kurtosis

⇒ Correlation

⇒ Regression Analysis