Econometrics

Introduction to Estimation

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Model: Y = a + bX

Observation	X	Y
	Fertilizer	Output
1	0	5
2	1	10
3	2	12
4	3	15
5	4	20
6	5	23

Using Observation 1 and 6,

1st Estimated Model: $Y = \hat{a} + \hat{b}\,X$

$5 = \hat{a} + \hat{b}\,(0)$ ------ (1; Obs.1)

$23 = \hat{a} + \hat{b}\,(5)$ ------ (2; Obs.6)

Solving both equations;

$\hat{a} = 5$

$\hat{b} = (23-5)/5 = 18/5 = 3.6$

Thus, the 1st Estimated Model is $Y = 5 + 3.6X$

Using Observation 4 and 5,

2nd Estimated Model: $Y = \hat{a} + \hat{b}\,X$

$15 = \hat{a} + \hat{b}\,(3)$ ------ (3;Obs.4)

$20 = \hat{a} + \hat{b}\,(4)$ ------ (4;Obs.5)

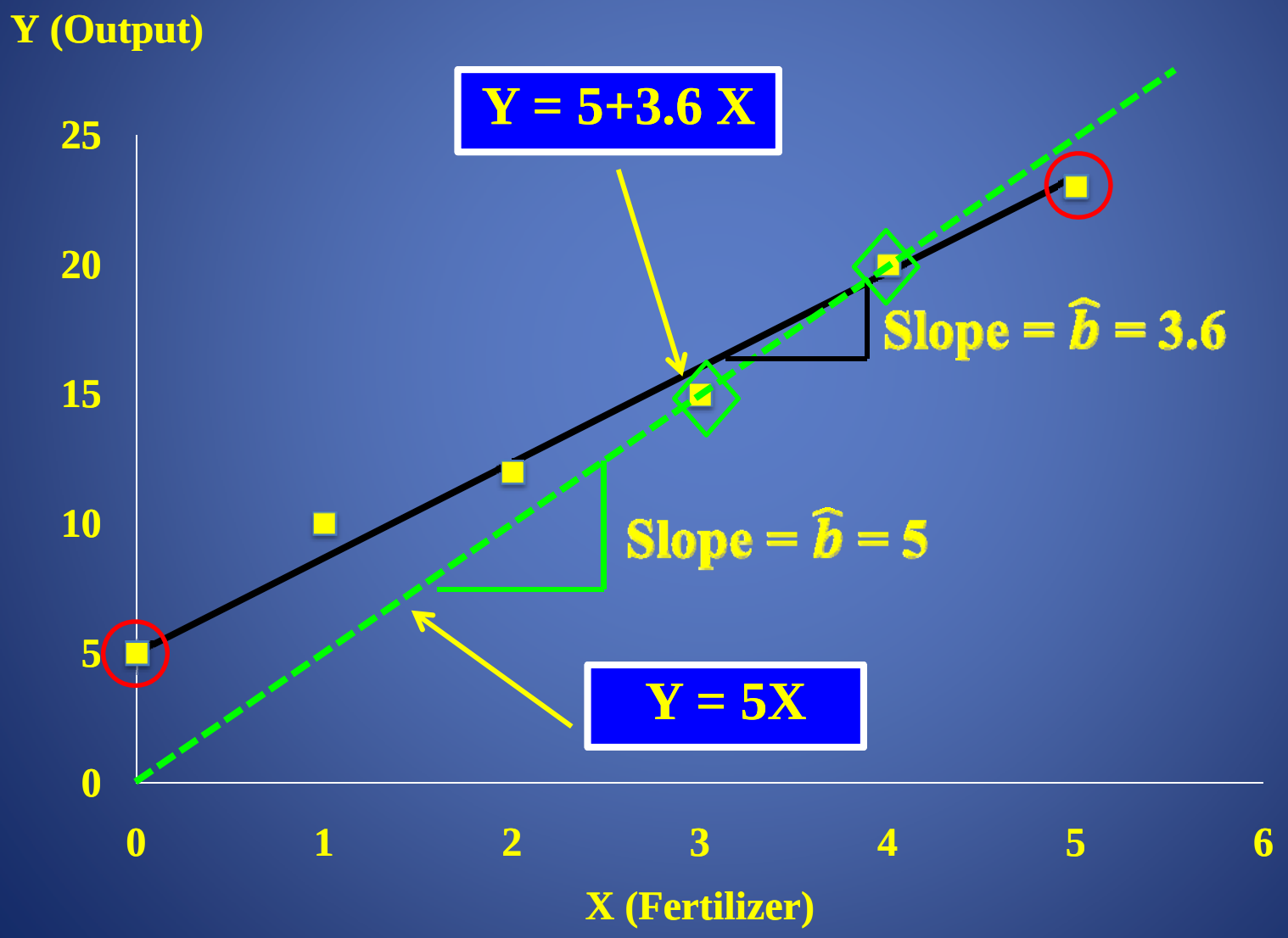
Solving both equations;

$\hat{a} = 15 - 3(5) = 0$

$\hat{b} = 20 - 15 = 5$

Thus, the 2nd Estimated Model is $Y = 5X$

Scatter Diagram between Y (Output) and X (Fertilizer)



Model: Y = a + bX

Group of Data	X (Fertilizer)	Y (Output)
1	0	5
1	1	10
1	2	12
Mean	(0+1+2)/3 = 1	(5+10+12)/3 = 9
2	3	15
2	4	20
2	5	23
Mean	(3+4+5)/3 = 4	(15+20+23)/3 = 19.33

Using mean values of group 1 and 2;

The Estimated Model: $Y = \hat{a} + \hat{b}\,X$

$$9 = \hat{a} + \hat{b}\,(1) \text{ ------ } (5)$$

$$19.33 = \hat{a} + \hat{b}\,(4) \text{ ------ } (6)$$

Solving both equations;

$$\hat{a} = 9\text{-}3.4433 = 5.5567$$

$$\hat{b} = (19.33\text{-}9)/3 = 10.33/3 = 3.4433$$

Thus, the Estimated Model is

$$Y = 5.5567 + 3.4433X$$

Scatter Diagram between Y (Output) and X (Fertilizer)