

# **Econometrics**

## **Introduction to Estimation**

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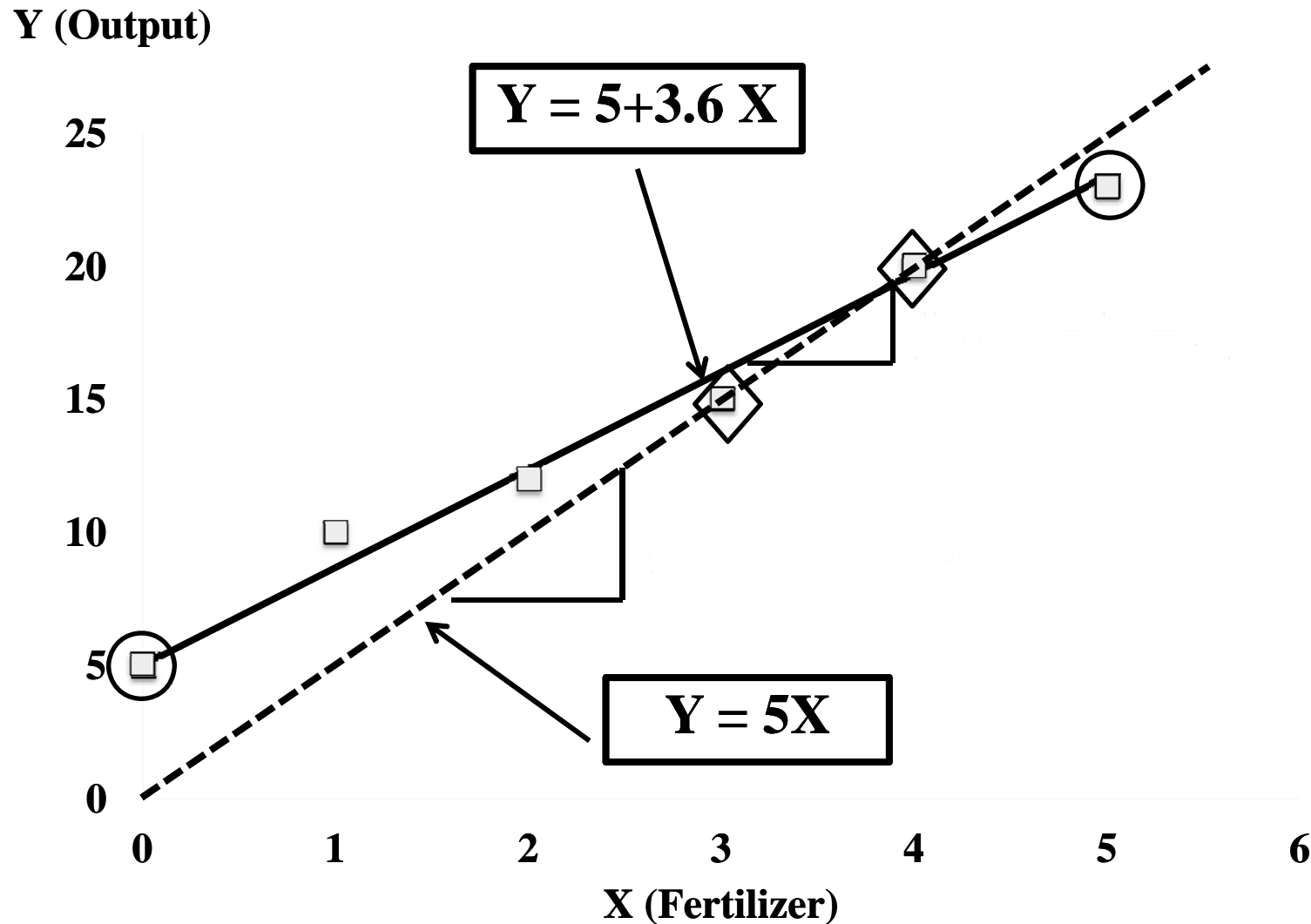
**Model:  $Y = a + bX$**

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





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

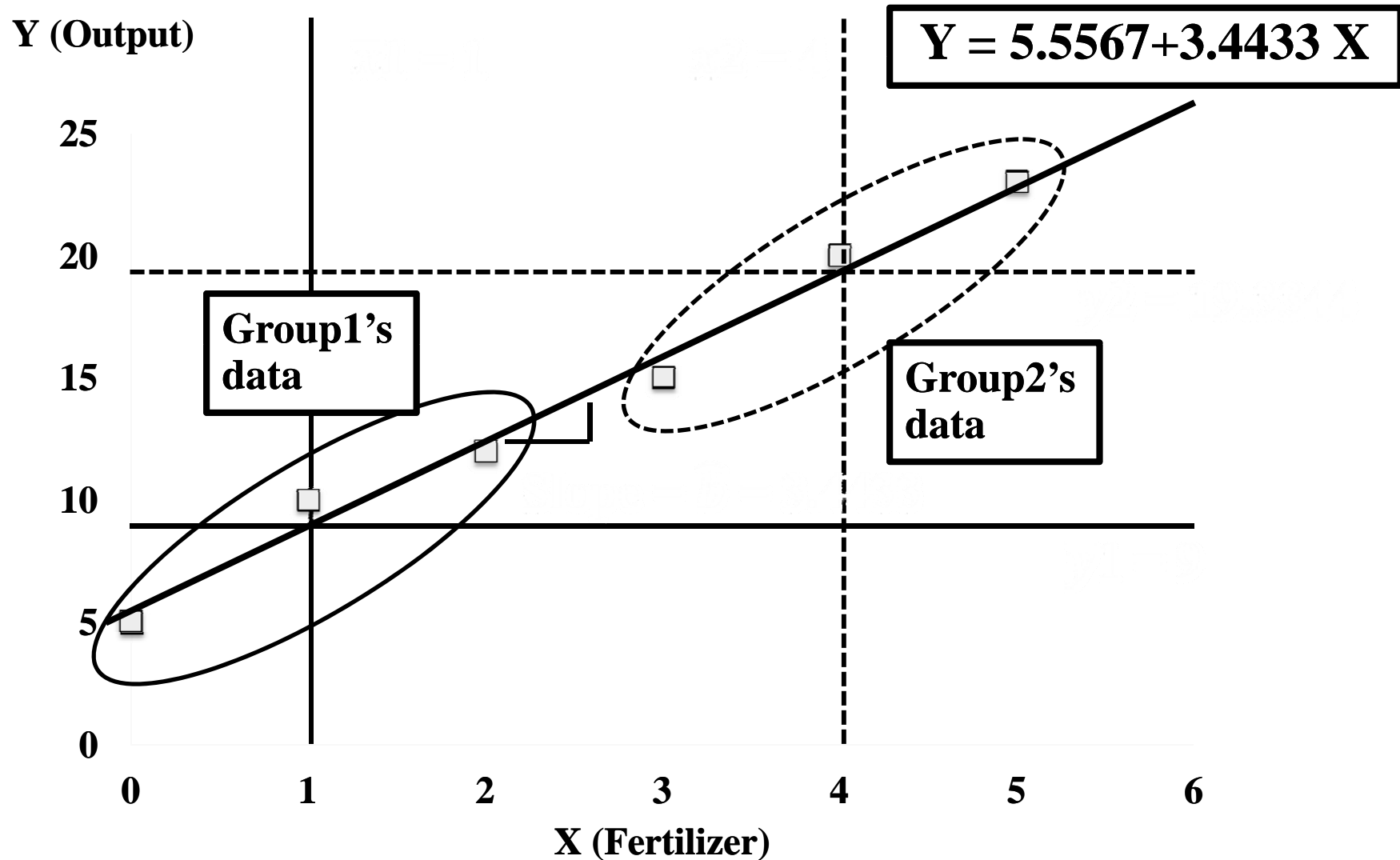


# Model: $Y = a + bX$

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



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



PART ONE: SINGLE-EQUATION REGRESSION MODELS

TABLE 2.1 WEEKLY FAMILY INCOME X, \$

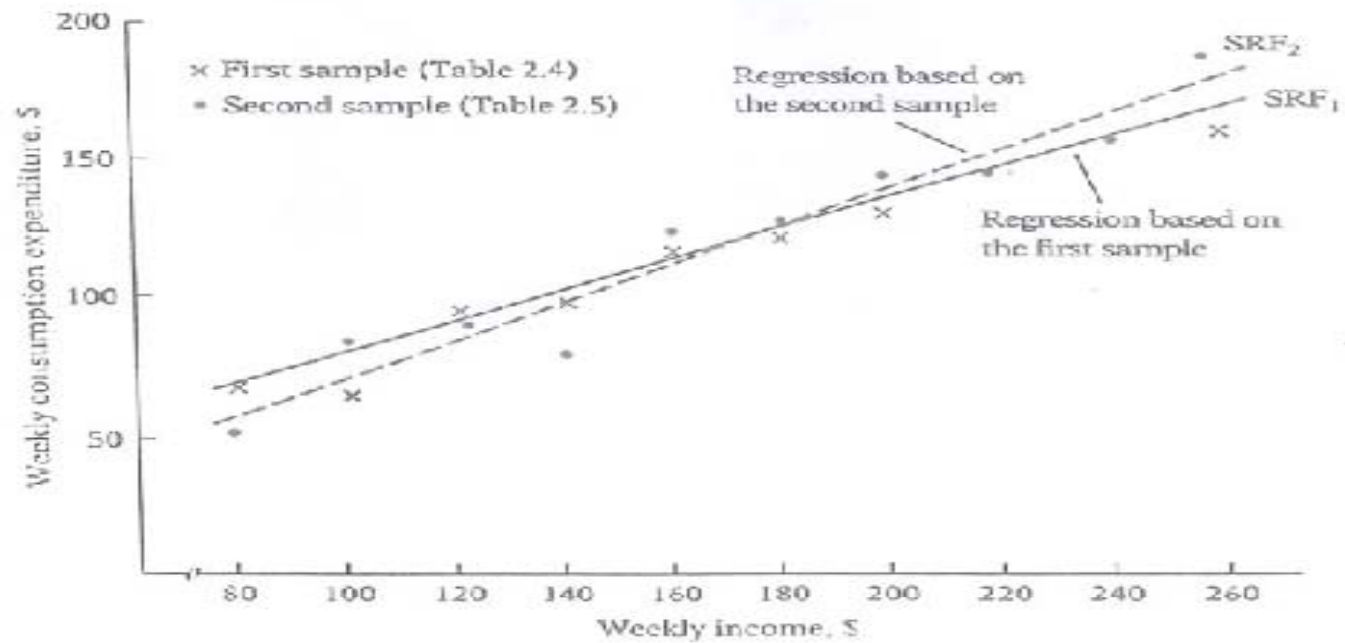
Y ↓ \ X →	80	100	120	140	160	180	200	220	240	260
Weekly family consumption expenditure Y, \$	55	65	79	80	102	110	120	135	137	150
	60	70	84	93	107	115	136	137	145	152
	65	74	90	95	110	120	140	140	155	175
	70	80	94	103	116	130	144	152	165	178
	75	85	98	108	118	135	145	157	175	180
	-	88	-	113	125	140	-	160	189	185
	-	-	-	115	-	-	-	162	-	191
Total	325	462	445	707	678	750	685	1043	966	1211
Conditional means of Y, $E(Y X)$	65	77	89	101	113	125	137	149	161	173

**TABLE 2.4**  
A RANDOM SAMPLE FROM THE  
POPULATION OF TABLE 2.1

Y	X
70	80
65	100
90	120
95	140
110	160
115	180
120	200
140	220
155	240
150	260

**TABLE 2.5**  
ANOTHER RANDOM SAMPLE FROM  
THE POPULATION OF TABLE 2.1

Y	X
55	80
80	100
90	120
80	140
118	160
120	180
145	200
135	220
145	240
175	260



**FIGURE 2.4** Regression lines based on two different samples.

Y

X

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**Dependent variable**

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**Explanatory variable**

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↕

**Explained variable**

**Independent variable**

↕

↕

**Predictand**

**Predictor**

↕

↕

**Regressand**

**Regressor**

↕

↕

**Response**

**Stimulus**

↕

↕

**Endogenous**

**Exogenous**

↕

↕

**Outcome**

**Covariate**

↕

↕

**Controlled variable**

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**Control variable**

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