

## 15.2: Least squares Method

$$\sum_{i=1}^n (y_i - \hat{y}_i)^2$$

where  $y_i$ : observed value of  $Y$  at observation  $i$ .

$\hat{y}_i$ : estimated value of  $Y$  at observation  $i$ .

$b_0, \dots, b_p$ : LS estimated of  $\beta_0, \dots, \beta_p$ .

exp:

table 2

$y$ : Travel times (hours).

$X_1$ : Distance travelled (km).

$X_2$ : Number of deliveries.

مقدار  
بجمل البيانات

Excel  
output

Model 1  $Y = \beta_0 + \beta_1 X_1 + \epsilon$

Model 2  $Y = \beta_0 + \beta_1 X_2 + \epsilon$

Model 3  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$

Model 1

$$\hat{y} = b_0 + b_1 X_1$$

$$\hat{y} = 1.27 + 0.07 X_1$$

• goodness of fit:

• significance

• validity of Assumptions

SLR (ch14)

Model 2

$$\hat{y} = b_0 + b_1 X_1$$

=

opt?

SLR (ch14)

Model 3:

$$\hat{y} = b_0 + b_1 X_1 + b_2 X_2$$

$$\hat{y} = -0.87 + 0.06 X_1 + 0.92 X_2$$

• Goodness of fit:

• significance:

• validity of Assumption:

Multiple Linear Regression