

(a) 設 X_i 數量 (千輛), Y_i 稅額 (百萬).

$$\hat{\beta}_1 = \frac{S_{XY}}{S_{XX}} = \frac{\sum_{i=1}^n X_i Y_i - \frac{(\sum_{i=1}^n X_i)(\sum_{i=1}^n Y_i)}{n}}{\sum_{i=1}^n X_i^2 - \frac{(\sum_{i=1}^n X_i)^2}{n}}$$

$$= \frac{217.8 - \frac{(111)(13.2)}{7}}{1825 - \frac{(111)^2}{7}} = 0.131$$

| X_i | Y_i | X_i^2 | $X_i Y_i$ |
|-------|-------|-----------------|-----------|
| 11 | 1.1 | 121 | 11 × 1.1 |
| 13 | 1.5 | 169 | 13 × 1.5 |
| 16 | 2 | 16 ² | 16 × 2 |
| 17 | 2.1 | 17 ² | 17 × 2.1 |
| 15 | 1.9 | 15 ² | 15 × 1.9 |
| 18 | 2.2 | 18 ² | 18 × 2.2 |
| 21 | 2.4 | 21 ² | 21 × 2.4 |

Total: 111 13.2 1825 217.8

$$\hat{\beta}_0 = \bar{Y}_i - \hat{\beta}_1 \bar{X}_i = \frac{13.2}{7} - 0.131 \times \frac{111}{7} = 1.89 - 0.131 \times 15.86 = -0.188$$

⇒ 方程式 = $\hat{Y}_i = \hat{\beta}_0 + \hat{\beta}_1 X_i = -0.188 + 0.131 X_i$ #

(b). 代入 24 (千輛) → X_i

$$\hat{Y}_i = -0.188 + 0.131 \times 24 = 2.956 \text{ (百萬)}$$

⇒ 表示新車掛牌數 24 千輛, 營業額 2.956 百萬 #

| | | |
|---------|-------|------|
| logo | 1313 | 111 |
| title 2 | 0 720 | 610 |
| 3 | 1331 | 640 |
| 27 A | -120 | 0 |
| | 1560 | 0 |
| | 0 | 1080 |
| | 1440 | 1080 |