

### 15.3: Multiple coefficient of determination

Def:

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

$$SSR = \sum (\hat{y}_i - \bar{y})^2$$

$$SSE = \sum (y_i - \hat{y}_i)^2$$

Notation:

$n$ : # of observations

$p$ : # of independent variables

Proposition:

$$SST = SSR + SSE$$

Def: Multiple coefficient of determination:

$$R^2 = \frac{SSR}{SST}$$

Def: Adjusted Multiple coefficient of determination:

$$adj R^2 = 1 - (1 - R^2) \left( \frac{n-1}{n-p-1} \right)$$

exp from excel:

Model 1

Model 3

$$R^2 = 0.66$$

$$R^2 = 0.90$$

$$adj R^2 = 0.62$$

$$adj R^2 = 0.88$$

↳ variable 1

↳ Multiple variable

الرجوع المتأخر  $adj R^2$

↳ زيادة variable يعني  $adj R^2$

لأنه قادر على تفسير  $adj R^2 = 0.88$

$adj \uparrow \rightarrow$   $R^2$  أكثر

لهما نفس المعنى في  $R^2$  و  $adj R^2$

أو  $adj R^2$  و  $R^2$

لهما نفس المعنى في simple, multiple regression