

# Coefficients of Partial Determination - Example

Variables in Model	R-Square	SST	SSR	SSE
x4	0.5274	21.063	11.109	9.955
x3	0.4424	21.063	9.318	11.746
x2	0.3515	21.063	7.404	13.659
x1	0.12	21.063	2.528	18.535
x2 x3	0.8129	21.063	17.122	3.940
x3 x4	0.6865	21.063	14.460	6.603
x2 x4	0.6496	21.063	13.683	7.381
x1 x3	0.6458	21.063	13.602	7.461
x1 x4	0.5278	21.063	11.117	9.946
x1 x2	0.4381	21.063	9.228	11.836
x1 x2 x3	0.9723	21.063	20.480	0.583
x2 x3 x4	0.8829	21.063	18.597	2.467
x1 x3 x4	0.7192	21.063	15.149	5.915
x1 x2 x4	0.65	21.063	13.691	7.372
x1 x2 x3 x4	0.9724	21.063	20.482	0.582

$$r^2_{Y \cdot X^* \cdot X^1}$$

regressor of interest      regressors already in the model

$$= \frac{SSR(X^* | X^1 \text{ in model})}{SSE(X^1 \text{ in model})}$$

Coefficient of Partial Determination

$$r^2_{Y4.123} = \frac{SSR(X_4 | X_1, X_2, X_3)}{SSE(X_1, X_2, X_3)} = \frac{SSR(X_1, X_2, X_3, X_4) - SSR(X_1, X_2, X_3)}{SSE(X_1, X_2, X_3)}$$

$$= \frac{20.482 - 20.480}{0.583} = \frac{.002}{.583} = \boxed{0.003}$$

$$r^2_{Y2.1} = \frac{SSR(X_2 | X_1)}{SSE(X_1)} = \frac{SSR(X_1, X_2) - SSR(X_1)}{SSE(X_1, X_2) - SSE(X_1)}$$

$$= \frac{9.228 - 2.528}{18.535 - 18.535} = \boxed{0.361}$$

$$r^2_{Y3.12} = \frac{SSR(X_3 | X_1, X_2)}{SSE(X_1, X_2)} = \frac{SSR(X_1, X_2, X_3) - SSR(X_1, X_2)}{SSE(X_1, X_2, X_3) - SSE(X_1, X_2)}$$

$$= \frac{20.480 - 9.228}{11.836 - 11.836} = \frac{11.252}{11.836} = \boxed{0.951}$$