

# Modelos lineales

$$\begin{aligned} \frac{\ln Y - \overline{\ln Y}}{SD(\ln Y)} &= \beta_2^* \left( \frac{\ln X_2 - \ln \bar{X}_2}{SD(\ln X_2)} \right) + \beta_3^* \left( \frac{\ln X_3 - \ln \bar{X}_3}{SD(\ln X_3)} \right) \\ &+ \beta_4^* \left( \frac{\ln X_4 - \ln \bar{X}_4}{SD(\ln X_4)} \right) \\ &+ \beta_{34}^* \left( \frac{\ln X_3 - \ln \bar{X}_3}{SD(\ln X_3)} \right) \left( \frac{\ln X_4 - \ln \bar{X}_4}{SD(\ln X_4)} \right) + \epsilon \end{aligned}$$

$$\begin{aligned} \ln Y &= \overline{\ln Y} + \beta_2 (\ln X_2 - \ln \bar{X}_2) + \beta_3 (\ln X_3 - \ln \bar{X}_3) \\ &+ \beta_4 (\ln X_4 - \ln \bar{X}_4) \\ &+ \beta_{34} (\ln X_3 - \ln \bar{X}_3) (\ln X_4 - \ln \bar{X}_4) + \epsilon \end{aligned}$$

$$SD(\ln Y) \frac{\beta_i^*}{SD(\ln X_i)} = \beta_i', \quad i=1,2,3; \quad \beta_{34}' = \frac{SD(\ln Y)}{SD(\ln X_3) SD(\ln X_4)} \beta_{34}^*$$

$$\begin{aligned} \ln Y &= \overline{\ln Y} - \beta_2' \overline{\ln X_2} - \beta_3' \overline{\ln X_3} - \beta_4' \overline{\ln X_4} + \beta_{34}' \overline{\ln X_3} \overline{\ln X_4} \\ &+ \beta_2' \ln X_2 + (\beta_3' - \beta_{34}' \overline{\ln X_4}) \ln X_3 + (\beta_4' - \beta_{34}' \overline{\ln X_3}) \ln X_4 \\ &+ \beta_{34}' \ln X_3 \ln X_4 + \epsilon \end{aligned}$$

$$\ln Y = \beta_0 + \beta'_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta'_{34} \ln X_3 \ln X_4 + \varepsilon$$

$$\beta_0 = \overline{\ln Y} - \beta'_2 \overline{\ln X_2} - \beta'_3 \overline{\ln X_3} - \beta'_4 \overline{\ln X_4} + \beta'_{34} \overline{\ln X_3 \ln X_4}$$

$$\beta_3 = (\beta'_3 - \beta'_{34} \overline{\ln X_4})$$

$$\beta_4 = (\beta'_4 - \beta'_{34} \overline{\ln X_3})$$

$$Y = e^{\beta_0} X_2^{\beta'_2} X_3^{\beta_3} X_4^{\beta_4} X_4^{\beta'_{34} \ln X_3} e^{\varepsilon}$$

$$Y = e^{\beta_0} X_2^{\beta'_2} X_3^{\beta_3} X_4^{\beta_4 + \beta'_{34} \ln X_3} e^{\varepsilon}$$