# Math Notes

Cobb-Douglas $u = c^{0,5} d^{0,5}$ $\quad \sigma_{cd} = 1 \quad \mathcal{E}_{cp_d} = 0$

CES gross compl $\quad u = \left(c^{-1/3} + d^{-1/3}\right)^{-3}$

$$\sigma_{cd} = 0{,}75 \qquad \mathcal{E}_{cp_d} \begin{cases} = -0{,}125 & \text{initial} \\ = -0{,}115 & \text{post} \end{cases}$$

CES gross subs $\quad u = \left(b^{0,5} + w^{0,5}\right)^2$

$$\sigma_{bw} = 2 \qquad \mathcal{E}_{bp_w} \begin{cases} = 0{,}5 & \text{initial} \\ = 0{,}667 & \text{post} \end{cases}$$

gross own price elasticity

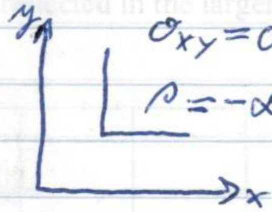
$$\mathcal{E}_{xp} = e_{xp} - k_x \eta_x = k_x(\sigma_{xx} - \eta_x)$$

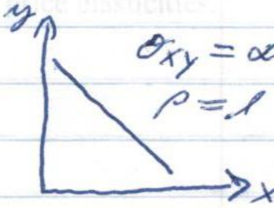
gross cross price elasticity

$$\mathcal{E}_{xq} = e_{xq} - k_y \eta_x = k_y(\sigma_{xy} - \eta_x)$$

$$k_x \sigma_{xx} + k_y \sigma_{xy} = 0$$

$$\sigma_{xx} = \frac{-k_y}{k_x} \sigma_{xy}$$




Cobb-Douglas yields constant shares

CES (or any other homothetic utility fn) yields unit income elasticity

$$u = k(ax^\rho + by^\rho)^{1/\rho} \qquad \sigma_{xy} = \frac{1}{1-\rho}$$

where $-\infty \leq \rho \leq 1$ $\quad$ so that: $0 \leq \sigma_{xy} < \infty$