

# Dottorato di Ricerca in Economia Politica, XVIII ciclo

## Microeconomics: production and cost functions

March 21st, 2019

Consider the cost function

$$\ln C(y, w, r) = (\alpha \ln y + \beta \ln w + \gamma \ln r)^\theta,$$

where  $y$  is the production (output), while  $w$  and  $r$  are the costs of inputs, namely the salary and the cost of capital.

1. Is it possible to assign specific values to all parameters in order to obtain a translogarithmic cost function?

YES, the parameters should be

$$\alpha > \text{_____}, \quad \beta > \text{_____}, \quad \gamma > \text{_____}, \quad \theta = \text{_____}.$$

NO, because \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Set  $\theta = 1$  and prove that the above function exhibits constant return to scale when  $\alpha = 1$

3. Set  $\theta = 1$  and tick the cases where the  $[\ln C(y, w, r)]$  **cannot be** a cost function:

$\alpha > 1$ ,      $\beta + \gamma > 1$ ,      $\gamma = 1.5$       $\beta + \gamma < 0.5$       $\alpha = 0.01$

4. Set  $\theta = 1$  and tick the conditions that must be respected **for being**  $[\ln C(y, w, r)]$  a cost function

$\beta = 1$ ,      $\gamma + \beta = 1$       $\alpha = 1$

5. Set  $\theta = 1$ . Given  $[\ln C(y, w, r)]$ , compute  $C(y, w, r)$ .

Assume perfect competition, with  $p$  the price of the output. Write the profit function.

$$\pi(p, y, w, r) =$$

6. Which restriction on parameters must be set in order to have a profit maximising plan?

Restriction: = \_\_\_\_\_

7. Write the maximum profit function,  $\pi(p, w, r)$ .

$\pi(p, w, r) =$

8. Compute the elasticity of profits to price.

$\varepsilon_{\pi,p} =$  \_\_\_\_\_.