

# Dottorato di Ricerca in Economia Politica, XIX ciclo

Microeconomics: production and cost functions

May 4th, 2017

Given the production function:

$$q = 100 [0.6L^\rho + 0.4K^\rho]^{\frac{1}{\rho}}$$

Where  $q$  is total production,  $L$  is labor utilisation and  $K$  capital utilisation. Write the general formula for the marginal rate of technical substitution and the elasticity of substitution.

Consider the three cases:

- a  $\rho = 1$
- b  $\rho \rightarrow 0$
- c  $\rho \rightarrow -\infty$

In the three cases:

1. write the production function;
2. compute the marginal rate of technical substitution (MRTS);
3. given  $w$  and  $r$  the unitary cost of labor and capital, compute the conditional demand function for  $L$  and  $K$ ;
4. compute the total cost function, the average cost function and the marginal cost function.