Dottorato di Ricerca in Economia Politica, XVII ciclo
Microeconomics Test: production and cost function
May 31st, 2016

Consider the cost function

$$\ln C(q, w, r) = \beta_0 + \beta_1 \ln q + \beta_2 \ln w + \beta_3 \ln r + \frac{1}{2} \left[\beta_4 \ln q \ln w + \beta_5 \ln q \ln r + \beta_6 \ln w \ln r \right],$$

where q is the production (output), w is the cost of labor and r is the cost of capital.

1. write the conditions under which the above function is a Cobb-Douglas cost function.

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2. by defining with L the labour input, compute the factor share of labour (S_L).

   $S_L =$ _____

3. compute the elasticity of substitution between labor (L) and capital (K).

   $\sigma_{LK} =$ _____

   Assume now that the coefficients associated **to all the cross products are equal to zero**.

4. compute the elasticity of the cost with respect to output.

   $\varepsilon_{C,q} =$ _____

5. write the condition(s) under which the cost function is homogeneous of degree one on the prices of inputs.

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6. write the condition(s) under which the average cost function is decreasing in q.

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7. compute the conditional labour demand function.

(hint: use the Shepard's Lemma).

$$L^*(q, w, r) = \underline{\hspace{7cm}}$$

8. given a market output price $p = 16$, compute the optimal quantity by assuming that $\beta_0 = 0$, $\beta_1 = 1.25$, $w^{\beta_2} = 2$, $r^{\beta_3} = 1.6$.

$$q^* = \underline{\hspace{6cm}}$$