

Homework

Econ 5243

November 22, 2005

Problems

Using the table12.3.csv data available by link from my website to do the following exercises.

1. Estimate a translog model of production (1) using least squares. Estimate the elasticities of labor and capital at the means of the data. Report the corresponding standard errors.

$$\ln(Q_i) = \beta_1 + \beta_2 \ln(L_i) + \beta_3 \ln(K_i) + \beta_4 0.5 \ln^2(L_i) + \beta_5 0.5 \ln^2(K_i) + \beta_6 \ln(K_i) \ln(L_i) + u_i \quad (1)$$

2. Estimate the linear approximation (3) to the CES production function as described in class to estimate γ, ν, δ , and ρ in (2). Estimate the standard errors for the coefficients using the Delta method.

$$\ln(Q_i) = \ln(\gamma) + \nu \delta \ln(K_i) + \nu(1 - \delta) \ln(L_i) + \rho \nu \delta (1 - \delta) \left\{ -\frac{1}{2} [\ln(K_i) - \ln(L_i)]^2 \right\} + u_i \quad (2)$$

$$\ln(Q_i) = \beta_1 + \beta_2 \ln(K_i) + \beta_3 \ln(L_i) + \beta_4 \left\{ -\frac{1}{2} [\ln^2(K_i/L_i)] \right\} + u_i \quad (3)$$

3. Estimate the CES production function (4) using nonlinear least squares and compare results to those obtained using the linear approximation.

$$\ln(Q_i) = \ln(\gamma) - \frac{\nu}{\rho} \ln[\delta K_i^{-\rho} + (1 - \delta) L_i^{-\rho}] + u_i \quad (4)$$