

UNIVERSITY OF NORTH CAROLINA
Department of Economics

Economics 275
Homework 7
Due November 29, 2000

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Fall 2000

For the Berndt-Wood nonlinear factor demand system with symmetry imposed

$$q(y, x, \theta) = e$$

$$\text{endogenous: } y = (M_K, M_L, M_E, M_M, \ln P_K, \ln P_L, \ln P_E, \ln P_M)'$$

$$\text{exogenous: } x = (1, z_1, \dots, z_{10})'$$

$$\text{parameters: } \theta = (\theta_1, \theta_2, \dots, \theta_{13})'$$

$$q(y, x, \theta) = \begin{pmatrix} \ln(M_K/M_M) - \ln \frac{\theta_1 + \theta_2 \ln P_K + \theta_3 \ln P_L + \theta_4 \ln P_E + \theta_5 \ln P_M}{1 + \theta_5 \ln P_K + \theta_9 \ln P_L + \theta_{12} \ln P_E + \theta_{13} \ln P_M} \\ \ln(M_L/M_M) - \ln \frac{\theta_6 + \theta_3 \ln P_K + \theta_7 \ln P_L + \theta_8 \ln P_E + \theta_9 \ln P_M}{1 + \theta_5 \ln P_K + \theta_9 \ln P_L + \theta_{12} \ln P_E + \theta_{13} \ln P_M} \\ \ln(M_E/M_M) - \ln \frac{\theta_{10} + \theta_4 \ln P_K + \theta_8 \ln P_L + \theta_{11} \ln P_E + \theta_{12} \ln P_M}{1 + \theta_5 \ln P_K + \theta_9 \ln P_L + \theta_{12} \ln P_E + \theta_{13} \ln P_M} \end{pmatrix}$$

use the data in file klem.dat and documented in file klem.doc which are available either by anonymous ftp from ftp.econ.duke.edu in directory pub/arg/data or by clicking "Browse ftp site" on the course web page, to estimate the elasticity of substitution of capital for energy

$$\hat{\sigma}_{KE} = 1 + \hat{\theta}_4 / (\hat{M}_K \hat{M}_E)$$

$$\hat{M}_K = \hat{\theta}_1 + \hat{\theta}_2 \ln P_K + \hat{\theta}_3 \ln P_L + \hat{\theta}_4 \ln P_E + \hat{\theta}_5 \ln P_M$$

$$\hat{M}_E = \hat{\theta}_{10} + \hat{\theta}_4 \ln P_K + \hat{\theta}_8 \ln P_L + \hat{\theta}_{11} \ln P_E + \hat{\theta}_{12} \ln P_M$$

for the year 1959 using three stage least squares and set a 95% confidence interval on your estimate.