Middle East Technical University **Spring 2014**
Department of Economics
ECON 301

Instructor: Dr. Ozan Eruygur

PROBLEM SET 3

PROBLEM 1

You are given the following estimated demand functions for money:

(1) $\ln M_t^n = 3.9995 + 1.7106 \ln Y_t^n - 0.6079 \ln r_t - 0.7587 \ln P_t \quad R^2 = 0.9418$
(1.8013) (0.4155) (0.4687) (0.6505)

(2) $\ln M_t^n = -1.3227 - 1.1571 \ln r_t + 1.6555 \ln P_t \quad R^2 = 0.8658$
(1.8345) (0.2767) (0.4399)

where M_t^n is aggregate nominal money demand, Y_t^n is aggregate nominal national income, r_t is the long term interest rate and P_t is the implicit price deflator. The figures in the parenthesis are standard errors and the sample size is 17. You are also given the coefficients of determination of the regressions of each explanatory variable on the remaining explanatory variables:

$P_1^2 = 0.9625$ from $\ln Y_t^n$ on $\ln r_t$ and $\ln P_t$,

$P_2^2 = 0.9078$ from $\ln r_t$ on $\ln Y_t^n$ and $\ln P_t$,

$P_3^2 = 0.8789$ from $\ln P_t$ on $\ln Y_t^n$ and $\ln r_t$.

a. Obtain all the information you can as to the seriousness of collinearity in (1) and to the variable which contributes the most to this problem.

b. Assess the advisability of deleting the variable which contributes the most to the problem of collinearity using two different criteria; one statistical, the other economic.

PROBLEM 2

$$Q_t = \beta_0 L_t^{\beta_1} e^{u_t}$$
$$Y_t = \beta_0 \beta_1^{X_t} e^{u_t}$$
$$e^{Y_t} = \beta_0 X_t^{\beta_1} e^{u_t}$$
$$\frac{1}{Y_t} = \beta_0 + \beta_1 \frac{1}{X_t} + u_t$$

Is it possible to transform the models given above to linear regression models and estimate by least squares method? Explain in detail.

PROBLEM 3

In the models

(I) $\ln Y_t = \ln\beta_0 + \beta_1 \ln X_{t1} + u_{t1}$
(II) $Y_t = \alpha_0 + \alpha_1 X_{t1} + u_{t2}$
(III) $\ln Y_t = \gamma_0 + \gamma_1 X_{t1} + u_{t3}$

Y denotes the consumption expenditure and X denotes income. How do you interpret the coefficients and what are the elasticities of consumption with respect to income in each model ? How would you interpret these elasticities?

PROBLEM 4

Consider the following model and informations:

$Y_t = b_0 + b_1 X_{t1} + b_2 X_{t2} + b_3 X_{t3} + u_t$ and $X_{t2} + X_{t3} = 1$.

Show that it is impossible to estimate individual regression coefficients.