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

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PROBLEM SET 2

PROBLEM 1

Assume that

$D_{t1} = b_0 + b_1 P_{t1} + b_2 P_{t2} + \ldots + b_k P_{tk} + c\ \bar{p}_t + d\ Y_t + u_{t1}$

where,

D_{t1} = Demand for commodity i,
P_{t1} = Price of commodity i,
$\bar{p}_t = \left(\sum_{i=1}^{k} P_{ti} \right) / k$ General price level,
Y_t = Income.

In brief, we believe that the demand for commodity 1, depends on its price, the price of other goods, the general price level, and income.

Are any problems likely to arise in the estimation of model?

PROBLEM 2

Consider the following demand for money equation:

$$MD_t = \beta_0 + \beta_1 i_t + \beta_2 i_{t-1} + \beta_3 (\Delta i_t) + u_t$$

where

MD_t = Demand for money,
i_t = Rate of interest,
$\Delta i_t = i_t - i_{t-1}$.

Are any problems likely to arise in the estimation of model?

PROBLEM 3

Suppose the following model is estimated:

$$\hat{C}_t = -3.42 + 0.63\, Y_t + 0.16\, Y_{t-1} + 0.19\, L_t$$
$$(-0.69)\quad (3.49)\quad (1.02)\quad (1.73)$$

$R^2 = 0.989$; SSR = 226.38; T = 30

where, C = Consumption,
Y = Disposable income,
L = Liquid Assets

The following information is also given:

Dependent Variable	Independent Variables	Coefficient of Determination
Y_t	Y_{t-1} L_t	0.991
Y_{t-1}	Y_t L_t	0.993
L_t	Y_t Y_{t-1}	0.961

a) Is there serious multicollinearity in the model?
b) Which variable contributes most to the multcollinearity (if any)?
c) What do you suggest to solve the problem of multicollinearity (if any)?

PROBLEM 4

Based on the annual data for the US manufacturing sector for 1889-1922, Daugherty obtained the following regression results:

$$\ln Y_t = 2.81 - 0.53 \ln K_t + 0.21 \ln L_t + 0.047\, t \qquad R2 = 0.97$$
$$(1.38)\quad (0.34)\quad (0.14)\quad (0.021)$$

where Y = index of real output, K = index of real capital input, L = index of real labor input, t = trend.

Using the same data, he also obtained the following regression:

$$\ln(Y_t / K_t)) = -0.11 + 0.91 \ln(K_t/L_t) + 0.06\, t \qquad R2 = 0.65$$
$$(0.03)\quad (0.15)\quad (0.006)$$

a) Interpret model (1). Is there a multicollinearity in this regression?
b) What is the logic behind estimating regression (2)?
c) If there was a multicollinearity in regression (1), has that been reduced by regression (2)?