PROBLEM SET THREE **DUE 5 MARCH**

You will legibly write both your full name and section on your completed assignment.

From Chapter 4 (These questions should follow from the material presented in lectures on 22-24 February)

1. Applied Econometrics

Acquire the data file pset2dat.txt from the web site. This file contains data series in this order: time (t), output (Y), capital (K), and labor (N). You job is to estimate the production function which generated this data. Report **coefficent estimates and t-ratios** using Ordinary Least Squares (OLS) on each of the following models:

a. $Y_t = \beta_0+\beta_1K_t+\beta_2N_t$
b. $Y_t = \beta_0+\beta_1K_t+\beta_2N_t+\beta_3t$
c. $\ln(Y_t) = \beta_0+\beta_1\ln(K_t)+\beta_2\ln(N_t)$
d. $\ln(Y_t) = \beta_0+\beta_1\ln(K_t)+\beta_2\ln(N_t)+\beta_3t$

Program code and instructions for use with the statistics application **SAS** (found on Athena) will be distributed on the web site early next week. This question can also be done using the Data Anlaysis – Regression function found on recent versions of Microsoft Excel. After running these

Why are the coefficient estimates so different between the two models a and b? or c and d?
Which model seems to best describe the data and why?
What could the time trend be capturing in each of models b and d?
Remove the logs from model d and use your estimates to write down the production function.

Now estimate the following models using OLS, reporting estimates and t-ratios as before.

e. $\ln(N_t) = \beta_0+\beta_1t$
f. $K_{t+1} = \beta_0+\beta_1K_t+\beta_2Y_t$

Why might you be interested in these equations? What do β_1 and β_2 represent in each one? Note that steady-state capital and output per effective worker in a Solow model with labor-augmenting technological progress is as follows (don't worry about the derivations, this is very close to what you did in the problem set last week).

$(K/AN)^{ss} = [s/(\delta+n+g_A)]^{1/(1-\alpha)}$
$(Y/AN)^{ss} = [(K/AN)^{ss}]^{\alpha}$

Use your estimates above to construct estimates of these two objects. Hints: use estimates from d for α and g_A and estimates from e and f for n, s, and δ. Look at output per effective worker in the last time period (t=100), and calculate how close this economy is to the steady-state. Strictly speaking, your estimated coefficients on the production function probably won't add up to one, but ignore this and use the coefficient on capital for α.

From Chapter 5 ((These questions should follow from the material presented in lectures on 29 February)

2. Suppose that the typical person in the economy has the following money demand function: $M^d = PY(0.5-i)$ where M^d is money demand, Y is real income, P is the price of one unit of output, and i is the interest rate expressed so a five percent interest rate implies i = 0.05. Finally, the aggregate level of wealth is denoted by W.

a. Assume P = $5, Y = 10,000, and i = 0.05. What is money demanded? If W = $500,000, what is bond demand?

b. Assume B^s = $475,000, P = $5, W = $500,000 and Y = 10,000. What is the equilibrium interest rate? Calculate this in two ways: equilibrium in the bond market and equilibrium in the money market.

c. Starting from the equilibrium in part b, assume the central bank carries out an open-market operation that reduces the money supply by 10 percent. What happens to the interest rate? Again calculate this in two ways. Describe in words the adjustment process from one equilibrium to the other.

d. Starting from the equilibrium in part b, assume a recession reduces output by 10 percent. What happens to the interest rate? Again calculate this two ways. Describe in words the adjustment process from one equilibrium to the other.