Homework 6- Business Cycle Fluctuations

1. Draw the time paths for the capital-labor ratio (k), output per person (y), investment (i) and the wage rate (w) in an economy that is hit with a temporary increase in the technology level. The temporary increase in the technology is assumed to last exactly one period before it returns to its previous level.

Hint: Assume that the economy was at a steady state before the improvement in the technology occurred. Describe first what happens to the capital-labor ratio and then work out the behavior of the other variables.

2. Using the data from Tables 1 and 2 in the paper "Business Cycles: Real Facts and a Monetary Myth," state whether each of the following variables are pro-cyclical or counter-cyclical:

(i) investment

(ii) consumption

(iii) wage rate (i.e. average hourly real compensation)

Hint: A series is pro-cyclical if its correlation with GDP is positive and is counter-cyclical if its correlation with GDP is negative. A series is acyclical if its correlation with GDP is zero or near zero.

Does the model from question 1 seem capable of generating these features of the data? In this question don't worry about whether the magnitues are likely to be correct. Just concentrate on whether theory suggests that a particular variable is likely to be pro or counter-cyclical.

3. Using the data from the Tables in the paper "Business Cycles: Real Facts and a Monetary Myth," state whether each of the following variables are pro-cyclical or counter-cyclical:

(i) labor hours

(ii) capital input

Does the model from question 1 seem to be capable of generating these features of the data? Explain.

4. [Bonus Question]

Calculate whether or not hours worked $L$, capital input $K$ and average wages $w$ are procyclical or countercyclical. Use the data on (i) total output $Y$, (ii) hours worked $L$ and (iii) capital $K$ from Homework 3. To answer the question calculate the correlation of the growth rates of these three series with output growth. To carry out this exercise follow steps 1-3.

Step 1: You have data on all of these variables except average wages. Calculate average wages $w_t$ using $w_t = (1-\alpha)Y_t/L_t$, where $\alpha = .36$.

Step 2: Calculate annual growth rates for (i) output, (ii) hours, (iii) capital and (iv) wages.

Step 3: Calculate the correlation of each of these three series with output growth. Look in a beginning statistics book to find how to calculate a sample correlation. This amounts to calculating the covariance and dividing by the standard deviation of each series.