Assignment 8

Problem 1:
Use the datafile CSI which contains the Consumer Sentiment Index and do the following tasks:

1. Plot the data. Looking at this graph would you expect this time series to be stationary? Look at the autocorrelation and partial autocorrelation of this time series. What do you think which order this process has?

2. Perform three specifications of the Dickey Fuller Test and compare the results: DF Test including neither a constant nor a trend, DF Test including a constant and DF Test including a constant and a trend. Which of these DF Tests would you use to draw conclusions regarding the stationarity of your time series? (For Stata users: with the option *regress* after *dfuller* Stata shows you the regression equation fitted in the test).

Problem 2:
Use the file CONSUMP where y is the real per capita disposable income. Do the following tasks:

1. Plot the time series and check for stationarity. If the time series is not stationary try to detrend it. Is the detrended time series stationary?

2. According to your conclusions in point 1 transform the data and estimate two models using *arima*: one where you include one lag and a second where you include two lags of the independent variable. Use for the regression the data until the year 1989 (inclusive 1989).

3. Forecast the disposable income for the next 6 years using the two estimated models.

4. Compute the forecast error using the MAE. Which model would you choose according to this?

5. Now use the additional data on c which is the consumption. Are the

two variables y and c cointegrated?

Problem 3:
The data in file DIST follows an Erlang distribution with probability density function $f(x) = \frac{(x/b)^{c-1} exp(-x/b)}{b(c-1)!}$. The mean of this distribution is bc and the variance b^2c. Use the method of moments estimator to estimate b and c out of the data.