ECON 434
Fall 2015
HOMEWORK #3

This homework is due on Thursday November 12 at the end of class

When you are asked to make a graph please carefully label all variables, axis, and the slope of each line you draw.

The homework consists of 4 questions

Question 1: (20 points)

Consider a consumer with a period utility u(C).

Define what is the marginal utility of consumption. What does it mean for the marginal utility to be decreasing?

From now on suppose that the period utility of the consumer is such that the marginal utility of consumption is decreasing (risk averse consumar). Further suppose that the consumer receives income Q1 in period 1 and income Q2H in the second period if there is a boom and Q2L if there is a recession. Suppose that the country is in a recession with probability 1/2 and it is in a boom with complementary probability 1/2. The preferences for the consumers are then:

U(C1,C2B,C2R) = u(C0)+ .5*u(C1B) + .5*u(C1R)

Suppose that the consumer can save using one of the following assets:

a) Asset A: pays 1 unit in boom and one unit in a recession

b) Asset B: pays 1.5 unit in boom and .5 unit in a recession

c) Asset C: pays .5 unit in boom and 1.5 unit in a recession

If the price of each asset in period 1 is 1, which assets does the consumer prefer to invest in? To answer this question please explain and discuss when does the consumer wants to receive payments. What should be the correlation between assets payout and consumption?

Now suppose that all three assets are held by the consumer in equilibrium. What can you say about the price of asset A, B and C? Which asset has the highest price? Which asset has the lowest price? Explain carefully why.

Define what is the correlation between two time series variables; Define what the variance and standard deviation of a time series are.

Question 2: (20 points)

Consider a world composed by two countries: A and B. Households in each county have the same preferences. The period utility is given by u(c) with decreasing marginal utility. Output in country A and B is equal to Q1 in period 1. In period 2, it can be either rainy or sunny with probability .5. If it is sunny the output in country A is Q2+D and in country B is Q2-D. If it is rainy the output in country A is Q2-D and the output in country B is Q2+D.

In period 1 all output is paid as wages to the country residents. In period 2 in each state of the world (rainy or sunny) half of the output is paid as wages to domestic households and the other half is paid as dividends by the local firms.

Suppose that in period 1 all the shares of country A firm are owned by country A households and all the shares of country B firm are owned by country B households. The shares in the firm give right to receive the dividends in the next period.

Should households in country A sell they share in country A firm to buy shares in country B firm and households in country B sell they share in country B firm to buy shares in country A firm? Please explain as carefully as you can. (Think about the answer you gave to question 1 to answer this question)

Question 3: (40 points)

Go to the Fred database: http://research.stlouisfed.org/fred2/categories

Think of this exercise as a report you have to write for your company, be as precise as you can. Use as many observation as they are available. Make sure that the frequency of the data you are using matches. (to make sure: define what the frequency of a time series is)

Start comparing US and Germany. Find data for the nominal exchange rate between US dollar and German Marks/Euro (use the appropriate currency for each period).

Find data for US and Germany interest rates on treasury securities. For each country consider two measures of interest rates:

a) Interest Rates, Government Securities, Treasury Bills (for instance, look at http://research.stlouisfed.org/fred2/series/INTGSTDEM193N)

b) Interest Rates, Government Securities, Government Bonds (for instance, look at http://research.stlouisfed.org/fred2/categories/32273)

Please define the difference between bills and bonds. Please define expected return, and realized return. Please define what is the risk premium.

i) Calculate the percentage change in the nominal exchange rates. Calculate the realized return for a US investors of investing in German Government Bills and Bonds (write down the formulas you are using)

ii) Plot the following time series: a) interest rates differential (for both Bills and Bonds), b) change in the nominal exchange rates, c) realized returns for a US investor investing in German bonds and bills.

iii) If the risk premium is constant over time what should be the relation between interest rate differential between US and Germany and the change in the nominal exchange rates? Please explain using equations if you can. Are the plots in part ii) consistent with this behavior?

Redo parts i-iii using data for US and UK.

Redo parts i-iii using data for US and Italy (as for Germany mind the switch from Liras to Euro).

Bonus question *(we will talk about this at the end of the course, but give it a try)*: Do you notice a difference in the behavior of German and Italian interest rates during the euro period? What can explain the differential behavior? What are we implicitly assuming in our analysis?

Question 4: (20 points)

Please do Exercise 8.3 at the end of Chapter 8 in the lecture notes.