

# ECON4310 Fall 2010 Seminar 5

Week 46

## 1 Saving and risk

Consider an economy with constant population,  $N_t = N$ . The utility function of an agent who is young in period  $t$  is

$$u_t = \ln(c_{y,t}) + \ln(c_{o,t+1}) \quad (1)$$

where  $c_{y,t}$  and  $c_{o,t+1}$  are his consumption when young and old. There is no real capital in the economy. One unit of labor produces one unit of goods. Young agents are always endowed with  $\omega_{y,t} = 1$  unit of labor. The endowments of old agents,  $\omega_{o,t+1}$  are uncertain. Half of them get  $\omega_{o,t+1} = 1 + \Delta$ , the other half  $\omega_{o,t+1} = 1 - \Delta$ . Individuals learn which group they belong to at the start of the period when they are old. They have no indication before that. Thus, ex ante all agents are identical.

There is only one asset, private lending with an interest rate  $r_{t+1}$  from period  $t$  to  $t + 1$ . No insurance against endowment risk is sold. Note that there is no aggregate risk.

1. Write down the period by period budget constraints for an agent that is young in period  $t$ . Let the assets that a representative young consumer carries over from period  $t$  to period  $t + 1$  be represented by  $a_{t+1}$ .
2. Derive the first order conditions for maximum utility.
3. What is the equilibrium level of  $a_{t+1}$ ? (No algebra needed).
4. Use the answers to the two preceding questions to determine the interest rate  $r_{t+1}$ ?
5. How does the interest rate and the equilibrium amount of saving depend on the degree of income risk? How do you explain what goes on here in relation to common theories about saving?
6. Would you get the same result if the utility function were quadratic?

## 2 Investment

Explain what is meant by Tobin's  $q$ , how it has been measured and how it is related to investment.

## 3 Government deficits

A government spends 25 per cent of GDP on government consumption and collects net taxes equal to 20 per cent of GDP. The real GDP of the country grows by 2.0 per cent per year. Inflation is 2,5 per cent, the nominal interest rate 5.5 per cent. The initial government debt is 60 per cent of GDP.

1. By how much does the budget need to be tightened in order to prevent the ratio of debt to GDP to increase further?
2. Suppose the necessary cuts have been made. What will then be the size of the nominal government deficit relative to GDP.
3. Suppose we look at another economy with the same figures except that the growth rate of real GDP is 4 per cent. What will happen to this country's debt level if it does not make cuts in the budget?
4. Comment briefly on the realism of assuming a fixed interest rate in 3.