

Written Exam for the B.Sc. in Economics winter 2013

Macro B

Final Exam

February 18 2013
(3 hours closed-book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by “eksamen på dansk” in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students’ self-service system.

All questions of both problems should be answered

Problem A

This exercise asks you to develop a model for private consumption and use this model to analyse factors that may be relevant for understanding consumption in the current macroeconomic environment.

In the textbook the Keynesian consumption function is represented by

$$C = a + bY^d, \quad a, b > 0$$

This function is found to have the following properties:

- Current consumption (C) depends only on current income Y^d
- The marginal propensity to consume dC/dY^d is positive, but less than 1,
- The average propensity to consume, $C/Y^d = b + a/Y^d$ is declining in income

1. Describe and illustrate the theoretical and empirical shortcomings of the Keynesian consumption function.

In order to set up a satisfactory theory for consumption in the textbook we have considered the following model where consumers live for two periods; period 1 which is the current period and period 2 which is the future. The consumer maximizes total lifetime utility by choosing the consumption level in the two periods, *i.e.* C_1 and C_2 while taking the intertemporal budget constraint into consideration. In short, the consumer solves the problem

$$\begin{aligned} \max_{C_1, C_2} U &= u(C_1) + \frac{u(C_2)}{1 + \phi} \\ \text{st.} & \\ C_1 + \frac{C_2}{1 + r} &= Y_1 - T_1 + \frac{Y_2 - T_2}{1 + r} + V_1 \end{aligned} \tag{M.1}$$

where $u' > 0, u'' < 0$. The parameter $\phi > 0$ reflects impatience in consumption. Y_t and T_t , $t = 1, 2$ denotes income and net taxes in the two periods, V_1 is initial wealth and r is the real interest rate.

2. Describe the characteristics of the utility function and the intertemporal budget constraint. Comment on the underlying assumptions.

3. Show that the first-order condition for solving the consumers' maximization problem is

$$-\frac{dC_2}{dC_1} = \frac{u'(C_1)}{u'(C_2)/(1+\phi)} = 1+r. \quad (\text{A.1})$$

Illustrate the solution in a diagram where you have C_1 at the first axis and C_2 at the second axis. In the particular case where $\phi = r$ describe and illustrate why the existence of capital markets in general makes it possible for the consumers to enjoy welfare gains compared to a situation without capital markets.

4. Assume the economy has been hit by a negative shock that may result in the following three scenarios:
- Stock markets and house prices are driven down so that consumers' initial wealth V_1 is reduced,
 - Current income Y_1 is reduced,
 - Both current income Y_1 and future income Y_2 is reduced (each by an amount equal to the reduction in Y_1 in scenario b).

How is current consumption affected in each of the three scenarios. In relation to scenario b, explain why the change in current income, Y_1 , leads to only a less than proportional reduction in C_1 so that $0 < \partial C_1 / \partial Y_1 < 1$. Also compare the effect on current consumption in scenario b scenario c.

Now assume that consumers differ with respect to their income stream and that they may be divided into two segments. The one group currently earns a relatively high income Y_1^H whereas the other group has an income that is relatively low in the current period, $Y_1^L < Y_1^H$. Otherwise consumers are identical. In particular, both groups have the same amount of human capital, H (that is the present value of the consumers income stream over the entire life span is identical so that $H^H = H^L$) and initial wealth V_1 is the same across the two groups.

5. Explain the implicit assumption on Y_2 for the two groups and explain why both groups face the same intertemporal budget constraint. Which income group has the largest average propensity to consume in period 1? Is this

in accordance with the empirical observations cited in the textbook? Is the marginal propensity to consume positive but less than 1 for both the high income group and the low income group?

Now assume that as a consequence of the negative shock mentioned in question 4 banks etc. becomes more restrictive in supplying credit so that some consumer's possibility for current consumption is constrained by the current income. Specifically, assume that consumers belonging to the low income group are constrained. For these consumers we reformulate the model (M.1) as

$$\begin{aligned} \max_{C_1, C_2} U &= u(C_1) + \frac{u(C_2)}{1 + \phi} \\ \text{st.} & \\ C_1^L &= Y_1^L - T_1 \\ C_1^L + \frac{C_2^L}{1 + r} &= Y_1^L - T_1 + \frac{Y_2^L - T_2}{1 + r} + V_1 \end{aligned} \tag{M.2}$$

If the consumer is not constrained the model is still given by the maximization problem (M.1).

6. Illustrate the solution to the consumers problem in case the credit constraint is binding. In particular explain what happens to the marginal propensity to consume ($\partial C_1 / \partial Y_1$) if the restriction is binding. What happens to current consumption if current income Y_1^L changes? Compare your answer to your answer in question 5. Explain. Also compare to the Keynesian macroeconomic consumption function.
7. Discuss why credit restrictions like the above mentioned (question 5) may amplify the business cycle.

Problem B

1. When deriving the AS curve two different models for wage formation are used; the union wage model and the efficiency wage model. Explain the main features of the two models, including why both models imply structural unemployment.
2. In the textbook the social loss function takes the form

$$SL = \sigma_y^2 + \kappa \sigma_\pi^2, \quad \kappa > 0$$

Explain why the policy maker is concerned with the variability of output and inflation.

3. Explain the so-called “Impossible Trinity” which states that a macroeconomic policy regime simultaneously can include at most two of the following three policy goals:
 - a. Free cross-border capital flows
 - b. A fixed exchange rate
 - c. Independent monetary policy