

Course in Macroeconomics and Global Economics
University of Rome 'Tor Vergata'
Academic year 2016/2017

Instructor: Prof. Barbara Annicchiarico
Teaching Assistants: Francesca Diluiso, Matilde Giaccherini

12/15/2015

Practice 10 - Solutions

Exercise 1

1 $Y_1 + \frac{Y_2}{1+r} = C_1 + \frac{C_2}{1+r}$, where r is the price of today's consumption in terms of future consumption.

2 The optimal condition is:

$$MRS_{C_1, C_2} = (1 - r)$$

In our case:

$$\frac{1}{C_1}(1 + \rho)C_2 = 1 + r$$

$$C_1 = \frac{C_2(1+\rho)}{1+r}$$

Substituting into the inter-temporal budget constraint:

$$Y_1 + \frac{Y_2}{1+r} - \frac{C_2(1+\rho)}{1+r} - \frac{C_2}{1+r} = 0$$

*(PROOF)

a) For $r = 0.1$ and $\rho = 0$ we have:

$$100 + \frac{100}{1.1} - \frac{C_2}{1.1} - \frac{C_2}{1.1} = 0$$

$$100 + \frac{100}{1.1} = 2\frac{C_2}{1.1}$$

$$110 + 100 = 2C_2$$

$$C_2 = 105$$

$$C_1 = \frac{105}{1.1} = 95.45.$$

b) For $r = 0.1$ and $\rho = 0.1$ we have:

$$100 + \frac{100}{1.1} - C_2 - \frac{C_2}{1.1} = 0$$

$$110 + 100 = C_2(1.1) + C_2$$

$$210 = C_2(2.1)$$

$$C_2 = 100$$

$$C_1 = 100.$$

3 a) with $\rho = 0$:

$$110 + 120 = 2C_2$$

$$C_2 = \frac{230}{2} = 115$$

$$C_1 = \frac{115}{1.1} = 104.55.$$

b) with $\rho = 0.1$:

$$230 = C_2(2.1)$$

$$C_2 = \frac{230}{2.1} = 109.52$$

$$C_1 = 109.52.$$

* The following equations are intended to provide you a proof for previous results. We can find the optimal condition by solving our constrained optimization problem through the Lagrangian method:

$$\mathcal{L} = \log C_1 + \frac{1}{1+\rho} \log C_2 + \lambda(Y_1 + \frac{Y_2}{1+r} - C_1 - \frac{C_2}{1+r}) \quad (1)$$

$$\frac{\partial \mathcal{L}}{\partial C_1} = \frac{1}{C_1} - \lambda = 0 \Rightarrow \frac{1}{C_1} = \lambda \quad (2)$$

$$\frac{\partial \mathcal{L}}{\partial C_2} = \frac{1}{C_2} \frac{1}{1+\rho} - \lambda \frac{1}{1+r} = 0 \Rightarrow \frac{1}{C_2} \frac{1}{1+\rho} = \lambda \frac{1}{1+r} \quad (3)$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = Y_1 + \frac{Y_2}{1+r} - C_1 - \frac{C_2}{1+r} = 0 \quad (4)$$

In order to find the values of C_1 and C_2 that maximize utility, we substitute eq. 2 in eq. 3:

$$\frac{1}{C_2} \frac{1}{1+\rho} = \frac{1}{C_1} \frac{1}{1+r} \Rightarrow C_1 = \frac{C_2(1+\rho)}{1+r}$$

Substituting in eq. 4 we obtain:

$$Y_1 + \frac{Y_2}{1+r} - \frac{C_2(1+\rho)}{1+r} - \frac{C_2}{1+r} = 0$$

Exercise 2

- 1 If r'^e goes down, IS curve shifts to the right.
- 2 If M goes up, LM curve shifts down. IS curve does not move. If we assume that a monetary expansion leads financial investors, firms and consumers to revise their expectations of future interest rate and output, THEN also the IS curve shifts.
- 3 If T'^e goes up, IS curve shifts to the left.
- 4 If Y'^e goes down, IS curve shifts to the left.

Exercise 3

The statement is FALSE since the Rational Expectations assumption does not claim that everyone in the economy has perfect knowledge and can predict the future without committing any error. Rational Expectation is the assumption that people, firms and participants in financial markets, form expectations on the future by assessing the course of future expected policy and then working out the implications for future output, future interest rate and so on. Put in another way: agents use the information they have in the best possible way!