

**ECON 222**  
**Macroeconomic Theory I**  
Winter Term 2009/10

*Midterm Exam - ANSWER KEY*

**PART A:** Long Questions.

**Question A.1: Equilibrium in the Labor Market (30 Marks)**

a) First the students have to realize that they are given the inverse demand and supply functions. That it, in order to study the equilibrium in the labor market, first they have to solve them for  $N^D$  and  $N^S$  :  $N^D(\omega) = 50 - \omega$  and  $N^S(\omega) = \omega$ . Only now they can impose the equilibrium condition  $N^D(\omega) = N^S(\omega)$ , which leads to  $\omega_a^* = 25$  and  $N_a^* = N^S(\omega^*) = N^D(\omega^*) = 25$ . The graph is trivial.

b) In both cases the equilibrium in the labor market is unaltered:  $\omega_b^* = 25$  and  $N_b^* = N^S(\omega^*) = N^D(\omega^*) = 25$ . However:

i) labor demand is represented by a flat line, which means that is perfectly elastic. In this case supply is going to determine the level of employment, while the demand side is giving us the value of the wage.

ii) now labor demand is represented by a vertical line, which means that is perfectly inelastic. In this case supply is going to determine the level of the wage, while the demand side is giving us the employment level.

c) Again the students have to realize that they are given the inverse demand and supply functions. But they also have to compute the aggregate labor demand, by simply adding up  $N_A^D$  and  $N_M^D$ . Aggregate labor demand would be  $N^D(\omega) = 35 - \frac{3\omega}{2}$ . By imposing the equilibrium condition, we get  $\omega_c^* = 14$  and  $N^* = N^S(\omega^*) = N_A^D(\omega^*) + N_M^D(\omega^*) = 14$ .  $N_A^D(\omega^*) = 11$ ,  $N_M^D(\omega^*) = 3$ . Again, the graph is trivial: they have just to add up the labor demands horizontally.

d) We know aggregate labor demand already  $N^D(\omega) = 35 - \frac{3\omega}{2}$ . By imposing the equilibrium condition, we get  $\omega_c^* = 17.5$  and  $N^* = N^S(\omega^*) = N_A^D(\omega^*) + N_M^D(\omega^*) = 8.75$ . Households have become more reluctant to work: this induces an increase in wages, but at the same time less people are going to be employed overall.

**Question A.2: Savings, Investment, and Current Account (30 Marks)**

a) First, we have to obtain the desired savings.

$$\begin{aligned} S^d &= Y - C^d - G \\ &= 100 - [10 + 0.5 * 100 - 200r] - 20 \\ &= 20 + 200r \end{aligned}$$

Then, we impose the equilibrium condition:

$$\begin{aligned} S^d(r) &= I^d(r) \\ 20 + 200r &= 60 - 600r \\ r^* &= 0.05 \\ S^{d*} &= 30 = I^{d*} \\ C^{d*} &= 60 - 200 * 0.05 = 50 \end{aligned}$$

An interest rate equal to 5% clears the goods market:  $r^*$  is such that the savings and investments are exactly identical (and equal to  $S(r^*) = I(r^*) = 30$ ).

b) Since Bulgaria is now small and open, the interest rate is given for this economy. This means that we just need to substitute the value we have to get all the variables we are asked for.

$$\begin{aligned}
 r^w &= 0.1 \\
 S^{d'} &= 20 + 200r^w = 40 \\
 I^{d'} &= 60 - 600r^w = 0 \\
 C^{d'} &= 60 - 200 * 0.1 = 40 \\
 CA &= S^{d'} - I^{d'} = 40 - 0 = 40 \\
 Absorption &= C^{d'} + I^{d'} + G = 40 + 0 + 20 = 60
 \end{aligned}$$

c) To answer this question we just have to remember that (by definition)  $CA + KA = 0$ . Since  $KA = -10$ , it follows that the current account has to be  $CA = 10$ . So we have to look for the world interest rate  $r^w$  that, if it were to happen, would make the excess investment in the domestic economy equal to:

$$\begin{aligned}
 S^d - I^d &= CA = 10 \\
 20 + 200r^w - (60 - 600r) &= 10 \\
 r^w &= \frac{50}{800} = 6.25\%
 \end{aligned}$$

## **PART B: Short Questions.**

Question B.1:

- a) Book: pag. 22-26.
- b) Book: pag. 30-32.