Written Exam for the B.Sc. in Economics 2011-II

Macro C

Final Exam

16 June 2011

(3-hour 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 all three problems should be answered

Problem A

For each of the following statements, provide an *economic explanation* of whether the statement is true or false.

1. Introducing a pay-as-you-go pension system in the Diamond OLG Model will not affect the equilibrium.

2. In the model where a monopoly sets the price before knowing the true state of demand, it may be the case that following a contraction in demand the monopoly does not want to reset its price even if it is socially beneficial.

Problem B

Consider the following model, in usual notation, of a closed economy:

$$y_t - \bar{y} = v_t + \alpha_1 (g_t - \bar{g}) - \alpha_2 (r_t - \bar{r}), \quad \alpha_1, \alpha_2 > 0 \tag{B.1}$$

$$g_t = \bar{g} - b (\pi_t - \pi^*) - k (y_t - \bar{y}), \quad b, k > 0 \tag{B.2}$$

$$r_t = \bar{r} \tag{B.3}$$

$$\pi_t = \pi^e_{t,t-1} + \gamma (y_t - \bar{y}) + s_t, \quad \gamma > 0 \tag{B.4}$$

where v_t and s_t are white noise stochastic processes.

The AD curve of the economy is given by

$$y_t - \bar{y} = z_t - \alpha (\pi_t - \pi^*), \quad z_t \equiv \frac{v_t}{1 + \alpha_1 k}, \quad \alpha \equiv \frac{\alpha_1 b}{1 + \alpha_1 k} \tag{B.5}$$

Assume first that expectations are rational, i.e. for any given variabel, X,

$$X^e_{t,t-1} = X_{t-1} \tag{B.6}$$

and that the economy has for some time been in a long run equilibrium without any shocks and thus $y_t = \bar{y}$ and $\pi_t = \pi^*$. However, the inflation is deemed to be too high and consequently it is announced at the beginning of period t_1 that the inflation target is immediately lowered to $\pi' < \pi^*$.

1. Assuming that all shock terms are zero, analyse graphically and in economic terms the effects on the economy from period t_1 and onwards until the economy is again in long-run equilibrium.

From now on it is assumed that expectations are rational, i.e.

$$X^e_{t,t-1} = E\left[X_t \,|\, I_{t-1}\right] \tag{B.7}$$

When the inflation target is expected to be π^*, the equilibrium value of y_t is

$$y_t = \bar{y} + \frac{1}{1 + \alpha_1 k + \gamma \alpha_1 b}\left(v_t - \alpha_1 b s_t\right) \tag{B.8}$$

2. Show that when the inflation target is expected to be π^*, the equilibrium values of π_t is

$$\pi_t = \pi^* + \frac{1}{1 + \alpha_1 k + \gamma \alpha_1 b}\left(\gamma v_t + (1 + \alpha_1 k)\, s_t\right) \tag{B.9}$$

and analyse the effects in the economy following the announcement and implementation of the lower inflation target. Compare with the result in question 1 and comment.

3. Explain in economic terms how and why the value of k influences the effects on real output and inflation following shocks to either demand or supply.

Assume that the fiscal policy rule in equation (B.2) is replaced by

$$g_t = \bar{g} - b\left(\pi_t - \pi^*\right) - k\left(y^e_{t,t-1} - \bar{y}\right), \quad b, k > 0 \tag{B.10}$$

and hence that fiscal policy now depends on the expected value of real output. In this case the equilibrium values of real output and inflation become

$$y_t = \bar{y} + \frac{1}{1 + \gamma \alpha_1 b}\left[v_t - \alpha_1 b s_t\right] \tag{B.11}$$

$$\pi_t = \pi^* + \frac{1}{1 + \gamma \alpha_1 b}\left[\gamma v_t + s_t\right] \tag{B.12}$$

4. Compare the effects of the new fiscal policy rule to those of the original one and explain the difference. Your answer should relate to the Policy Ineffectiveness Proposition.

Problem C

Consider the following version of the Blanchard Model in usual notation. All variables are functions of time but for ease of exposition, reference to time is not made explicit. Expectations are assumed to be rational and there is no uncertainty.

$$\dot{p} = \gamma\left(y - \bar{y}\right), \quad \gamma > 0 \tag{C.1}$$

$$y = \eta Q + \beta\left(e - p\right) + z, \quad \eta, \beta > 0 \tag{C.2}$$

$$r = r^f \tag{C.3}$$

$$\frac{D + \dot{Q}}{Q} = r \Leftrightarrow \dot{Q} = rQ - D, \quad 0 < \tau < 1 \tag{C.4}$$

$$D = \alpha y, \quad \alpha > 0 \tag{C.5}$$

Letting $d \equiv \beta e + z$, the economy may be described by the following two differential equations

$$\dot{p} = \gamma \eta Q - \gamma \beta p + \gamma (d - \bar{y}) \tag{C.6}$$

$$\dot{Q} = \left(r^f - \alpha \eta \right) Q + \alpha \beta p - \alpha d \tag{C.7}$$

and it is assumed that values of parameters and exogenous variables are such that the $\dot{p} = 0$ and $\dot{Q} = 0$ loci intersect in the positive orthant. You may use the fact that the solution to equation (C.4) is

$$Q(t) = \int_t^T D(s) e^{-r(s-t)} ds + e^{-r(T-t)} Q(T) \tag{C.8}$$

The following analysis should be made under the assumption that $r^f > \alpha \eta$.

1. Construct the phase diagram of the economy. Comment.

2. Explain equation (C.8) in economic terms. Also explain how equation (C.8) may be written for an economy that eventually ends up being on the saddle path.

Assume that the economy is in a long-run equilibrium when, at time t_0, a structural policy is implemented which immediately leads to an *unexpected and permanent decrease* in the level of natural output $\bar{y}$.

3. Use the phase diagram to analyse the effects on the economy from time t_0 and onwards. Provide explanations of the relevant economic effects.

Assume instead that the economy is in long-run equilibrium when, at time t_0, it is *announced* that at time $t_1 > t_0$ there will be a *permanent decrease* in $\bar{y}$.

4. Use the phase diagram to analyse the effects on the economy from time t_0 and onwards. Provide explanations of the relevant economic effects.