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

Macro C

Final Exam

31 May

(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.

This exam question consists of 4 pages in total including this page.

The exam consists of the parts: A, B and C. All three parts should be answered.

A) **Short question:** Explain whether or not the following statement is true:

Stabilization policy is ineffective whenever agents in the private sector have rational expectations.

B) An interest rate increase in the Blanchard model

In the following we will consider the Blanchard model, which describes a small open economy with a fixed exchange rate assuming perfect capital mobility. All variables follow usual notation:

$$y(t) = z + \eta \cdot Q(t) - \beta \cdot p(t) \tag{B.1}$$

$$\frac{D(t) + \dot{Q}(t)}{Q(t)} = r(t) \tag{B.2}$$

$$r(t) = r^f \tag{B.3}$$

$$D(t) = \alpha \cdot y(t) \tag{B.4}$$

$$\dot{p}(t) = \gamma \cdot (y(t) - \bar{y}) \tag{B.5}$$

At each point in time $p(t)$ is predetermined while $Q(t)$ is free to jump. You are informed that (B.2) and (B.3) can be combined with the transversality condition (which states that: $\lim_{T\to\infty} Q(T) \cdot e^{-r^f \cdot T} = 0$) to yield:

$$Q(t) = \int_{s=t}^{\infty} D(s) \cdot e^{-r^f \cdot (s-t)} ds \tag{B.6}$$

All parameters are positive, α is less than one and we assume in all the following that:

$$r^f - \alpha \cdot \eta > 0 \tag{B.7}$$

1) Interpret each of equations (B.1) – (B.6). Show also that the dynamic evolution of the economy can be described by the two differential equations (B.8) and (B.9) (in addition to the transversality condition).

$$\dot{p}(t) = \gamma \cdot (z + \eta \cdot Q(t) - \beta \cdot p(t) - \bar{y}) \tag{B.8}$$

$$\dot{Q}(t) = \left(r^f - \alpha \cdot \eta\right) \cdot Q(t) + \alpha \cdot \beta \cdot p(t) - \alpha \cdot z \tag{B.9}$$

2) Construct the phase diagram. Comment.

Now let's consider a *permanent* increase in the international interest rate (r^f). The economy starts out in the initial steady state.

3) Assume at first that the increase in r^f is unanticipated. Use the phase diagram to analyze the consequences and explain the economic mechanisms carefully.
4) Now, assume instead that all agents are informed at time t_0 that r^f will increase at time $t_1 > t_0$. Use the phase diagram to analyze the consequences and explain the economic mechanisms carefully (assuming the economy is in steady state up until t_0).

Now, let's instead consider a temporary monetary contraction in the rest of the world, i.e. a scenario where r^f is increased at time t_0 but it is announced at the same time that r^f will return to its original value at time $t_1 > t_0$. Once again we assume that the economy is in steady state up until t_0.

5) Use the phase diagram to analyze the consequences of the temporary increase in r^f. Explain the economic effects carefully.

C) A simple model of debt crisis

Consider the following model of debt crisis. Notation is as usual: π and R are the endogenous variables denoting the probability of government default and the gross interest rate on public debt. D and $\bar{R}$ are exogenous and denote the amount of public debt (which needs to be paid back in the second period) and the (risk free) gross interest rate on private bonds.

$$(1-\pi)\cdot R = \bar{R} \tag{C.1}$$

$$\pi = F(R\cdot D) \tag{C.2}$$

We assume that the function $F(\cdot)$ is non-decreasing and satisfies the following properties:

$$F(\tau) = 0 \text{ for } \tau \leq \underline{T} \tag{C.3}$$

$$F(\tau) = 1 \text{ for } \tau \geq \overline{T} \tag{C.4}$$

Finally, we assume that:

$$\bar{R}\cdot D > \underline{T} \tag{C.5}$$

$$\bar{R}\cdot D < \overline{T} \tag{C.6}$$

1) Interpret each of equations (C.1) – (C.4). Explain also why we must assume that (C.6) is satisfied.

Assume at first, that there exist three equilibria.

2) Illustrate the three equilibria in an appropriate diagram. Interpret.
3) Explain why multiple equilibria are possible in this model.

Now, let’s consider the consequences of an increase in $\bar{R}$. Initially, there exist three equilibria.

4) Illustrate the consequences in an appropriate diagram, when it is assumed that there only exists one equilibrium after the increase in $\bar{R}$. Comment.