

Written Exam for the B.Sc. in Economics summer 2012

Macro C

Final Exam

August 7

(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.

Problem A: A structural reform in the Blanchard model

Consider the following version of the Blanchard model describing a small open economy with a fixed exchange rate. In the following we will consider the consequences of a labour market reform which permanently increases \bar{y} .

$$y_t = z + \eta \cdot Q_t - \beta \cdot p_t \quad (\text{A.1})$$

$$\frac{D_t + \dot{Q}_t}{Q_t} = r^f \quad (\text{A.2})$$

$$D_t = \alpha \cdot y_t \quad (\text{A.3})$$

$$\dot{p}_t = \gamma \cdot (y_t - \bar{y}) \quad (\text{A.4})$$

We assume: $\eta > 0$, $\beta > 0$, $r^f > 0$, $0 < \alpha < 1$, $r^f > \alpha \cdot \eta$ and $\gamma > 0$.

At each point in time p_t is predetermined while Q_t is free to jump.

In addition we assume that the relevant transversality condition is satisfied such that Q_t is given by the fundamental stock price:

$$Q_t = \int_{s=t}^{\infty} D_s \cdot e^{-(s-t) \cdot r^f} ds \quad (\text{A.5})$$

- 1) Interpret each of the equations. Show that the dynamic evolution of the economy can be described by the two differential equations:

$$\dot{p}_t = \gamma \cdot (z + \eta \cdot Q_t - \beta \cdot p_t - \bar{y})$$

$$\dot{Q}_t = (r^f - \alpha \cdot \eta) \cdot Q_t + \alpha \cdot \beta \cdot p_t - \alpha \cdot z$$

- 2) Construct the phase diagram. Comment.
- 3) Use the phase diagram to analyze the consequences of an unanticipated increase in \bar{y}

Now assume instead that the increase in \bar{y} is announced at time t_0 and implemented at time $t_1 > t_0$.

- 4) Use the phase diagram to analyze the effects from time t_0 and onwards. Explain the effects.

Problem B: A fiscal expansion in the Dornbusch model

Consider the Dornbusch model describing a small open economy with a flexible exchange rate. The model is given by the following equations:

$$y_t - \bar{y} = z + \beta \cdot (e_t^n - p_t) - \epsilon \cdot (r_t - r^f) \quad (\text{B.1})$$

$$m - p_t = y_t - \bar{y} - \epsilon \cdot (r_t - r^f) \quad (\text{B.2})$$

$$r_t = r^f + \dot{e}_t^n \quad (\text{B.3})$$

$$\dot{p}_t = \gamma \cdot (y_t - \bar{y}) \quad (\text{B.4})$$

At each point in time p_t is predetermined while e_t^n is free to jump.

We will assume that: $0 < \beta < 1$, $\epsilon > 0$, $\varepsilon > 0$ and $\gamma > 0$.

- 1) Interpret each of the equations.
- 2) Show that if we take e_t^n and p_t as given the equilibrium is characterized by:

$$r_t - r^f = \frac{z - m + \beta \cdot e_t^n + (1 - \beta) \cdot p_t}{\epsilon + \varepsilon} \quad (\text{B.5})$$

$$y_t - \bar{y} = \frac{\varepsilon \cdot z + \epsilon \cdot m + \varepsilon \cdot \beta \cdot e_t^n - (\epsilon + \varepsilon \cdot \beta) \cdot p_t}{\epsilon + \varepsilon} \quad (\text{B.6})$$

Illustrate this equilibrium graphically. Explain the effects of changes in z and m (still treating e_t^n and p_t as constants). How will an increase in p_t affect the domestic interest rate (taking e_t^n as constant)?

- 3) Construct the phase diagram. Comment. *Hint:* Show that that lines along with $\dot{p}_t = 0$ and $\dot{e}_t^n = 0$ are given by:

$$\dot{p}_t = 0 \Rightarrow e_t^n = \frac{(\epsilon + \varepsilon \cdot \beta) \cdot p_t - (\epsilon \cdot m + \varepsilon \cdot z)}{\varepsilon \cdot \beta}$$

$$\dot{e}_t^n = 0 \Rightarrow e_t^n = \frac{m - z - (1 - \beta) \cdot p_t}{\beta}$$

- 4) Define the steady state and show that the steady state values of p_t and e_t^n (marked with a star) is given by:

$$p^* = m$$
$$(e^n)^* = m - \frac{z}{\beta}$$

How will a fiscal expansion (an increase in z) affect the steady state?

Now we will consider a fiscal expansion. At first we assume that the fiscal expansion is not announced in advance of implementation. The economy is in steady state before the fiscal expansion.

- 5) Use the phase diagram to analyze the effects. Explain the economic intuition carefully.

Now we will consider the case where the fiscal expansion is announced at t_0 and implemented at t_1 where $t_1 > t_0$. The economy is in steady state up until time t_0 .

- 6) Use the diagram to analyze the effects from t_0 and onwards. Explain the economic intuition carefully. Is the economy in a boom or recession (i.e. is y_t above or below \bar{y}) between time t_0 and t_1 ? What about after t_1 ?