Written Exam for the B.Sc. in Economics
Winter 2011-2012

Macro B

February 20, 2012

(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 both problems should be answered

Problem A

Consider the equation

$$\left(1 + i_t^l\right)^n = (1 + i_t) \times \left(1 + i_{t+1}^e\right) \times \left(1 + i_{t+2}^e\right) \times ... \times \left(1 + i_{t+n-1}^e\right) + \varepsilon_t, \quad \text{(A.1)}$$

where i_t^l is the long-term interest rate in period t, i_t is the short-term interest rate at period t and i_{t+j}^e is the expected short-term interest rate in period $t + j$.

1. Explain why (A.1) is expected to hold with equality and explain the role of ε_t.

Under certain assumptions, (A.1) can be recasted as

$$i_t^l = \frac{1}{n}\left(i + i_{t+1}^e + i_{t+1}^e + ... + i_{t+n-1}^e\right) \quad \text{(A.2)}$$

2. State the assumptions necessary to derive (A.2), derive it and interpret.

Let each period denote one year and assume that investors expect the central bank to raise the leading interest rate thereby affecting the short-run interest rate by 1 percentage point next year and then in two years' time lower it by 1 percentage point and keep it constant forever hereafter.

3. How much will this expected one-year increase affect the current 10-year interest rate? How much will it affect the 30-year interest rate?

4. Explain the concept "yield curve" and draw an illustration. What is the expected sign of the slope of the yield curve in a situation where

   a. the economy is in a recession and the central bank has set current interest rates below the expected long-run level?

   b. the economy and monetary policy is in long-run equilibrium and the market expects it to stay there for eternity?

5. Explain why credibility is important for the central bank to be able to affect total demand through monetary policy.

Problem B

Consider the following description of an economy (in usual notation).

$$y - \bar{y} = \beta_1 e^r - \beta_2 (r - \bar{r}) + \beta_3 (g - \bar{g}) + v, \quad \beta_1, \beta_2, \beta_3 > 0, \qquad \text{(B.1)}$$

$$e^r = e^r_{-1} + \triangle e + \pi^f - \pi \qquad \text{(B.2)}$$

$$r = i - \pi^e_{+1} \qquad \text{(B.3)}$$

$$r^f = i^f - \pi^f \qquad \text{(B.4)}$$

$$i = i^f + h\left(\pi - \pi^f\right), \qquad \text{(B.5)}$$

$$g = \bar{g} - k(y - \bar{y}), \quad k \geq 0 \qquad \text{(B.6)}$$

$$\pi^e_{+1} = \pi^e = \pi^f \qquad \text{(B.7)}$$

$$i = i^f + e^e_{+1} - e \qquad \text{(B.8)}$$

$$e^e_{+1} - e = -\theta(e - e_{-1}), \quad \theta > 0 \qquad \text{(B.9)}$$

$$\bar{r} = \bar{r}^f \qquad \text{(B.10)}$$

$$\pi = \pi^e + \gamma(y - \bar{y}) + s, \quad \gamma > 0, \qquad \text{(B.11)}$$

$$v \equiv \beta_4 \left(y^f - \bar{y}^f\right) + \beta_5 (\ln \varepsilon - \ln \bar{\varepsilon}), \quad \beta_4, \beta_5 > 0.$$

1. Explain thoroughly (B.1) − (B.11) and explain what kind of economy the model describes.

From now on assume $h = \theta = 0$. In this case the AD and SRAS curves are given by

$$\text{AD} \quad : \quad \pi = \pi^f + e^r_{-1} - \frac{1 + \beta_3 k}{\beta_1}(y - \bar{y}) + \frac{1}{\beta_1}v \qquad \text{(B.12)}$$

$$\text{SRAS} \quad : \quad \pi = \pi^f + \gamma(y - \bar{y}) + s, \qquad \text{(B.13)}$$

2. Explain in economic terms what a) $h = 0$ and b) $\theta = 0$ means. Would you say these assumptions appear reasonable if the model should be used to analyze the Danish economy? Are they reasonable if the model aims at describing the German economy?

Now consider two different regimes. One is a regime where fiscal policy is passive ($k = 0$) and the other one is a regime where fiscal policy is active ($k > 0$).

3. How do the AD and SRAS curves differ under these two regimes? Provide the economic intuition behind this.

Now assume the economy is hit by a one-period negative supply shock.

4. Illustrate the supply shock and the convergence back to the long-run equilibrium under both regimes. Compare the short-run responses in inflation and output under the two regimes. Explain.

Finally, assume the economy is hit by a one-period negative demand shock.

5. Illustrate the demand shock and the convergence back to the long-run equilibrium under both regimes. Compare the short-run responses in inflation and output under the two regimes. Explain. Does the government face a trade-off between inflation and output when stabilizing demand shocks?

Assuming $s_{t+1} = s_t = v_{t+1} = v_t = 0$, the convergence towards long-run equilibrium can be solved to the two equations

$$\hat{y}_{t+1} = \alpha \hat{y}_t, \quad \hat{y}_t \equiv y_t - \bar{y} \tag{B.14}$$

$$\hat{\pi}_{t+1} = \alpha \hat{\pi}_t, \quad \hat{\pi}_t \equiv \pi_t - \pi^f, \tag{B.15}$$

where

$$\alpha \equiv \frac{1 + \beta_3 k}{1 + \beta_3 k + \beta_1 \gamma}. \tag{B.16}$$

6. Explain how the speed of convergence towards long-run equilibrium is affected by the use of active fiscal policy.