MAKØK 3, BLOK 2, 2010/11
WRITTEN EXAM

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This set contains three pages (including this page)

- Auxiliary materials of any kind are not allowed at the exam
- You may answer in English or Danish
- You may use a pencil, ball pen, marker, or any writing appliance that makes your answers readable

All questions must be answered, and weigh equally. Note, however, that the weighting is only indicative when the overall evaluation is made.

QUESTION 1:

Evaluate whether the following statements are true or false. Explain your answers.

(i) In the simple New-Keynesian model with price rigidities only, optimal stabilization of cost-push shocks requires that the central bank can credibly commit to affect private-sector expectations.

(ii) In the New-Keynesian model with Calvo-style wage stickiness, a higher probability of not being able to change the wage (θ_w), leads to a lower welfare loss of nominal wage inflation.

(iii) In the simple New-Keynesian model with price rigidities only, absence of any exogenous fluctuations in firms' desired markup, implies that the central bank can achieve the efficient allocation when an appropriate labor subsidy is in place.

QUESTION 2:

Consider the following log-linear model of a closed economy:

$$y_t = \mathrm{E}_t\{y_{t+1}\} - \sigma^{-1}(i_t - \mathrm{E}_t\{\pi_{t+1}\} - \rho), \quad \sigma > 0, \tag{1}$$

$$\pi_t = \beta \mathrm{E}_t\{\pi_{t+1}\} + \kappa(y_t - y_t^n), \quad 0 < \beta < 1, \quad \kappa > 0, \tag{2}$$

$$i_t = \rho + \phi_\pi \pi_t, \qquad \phi_\pi > 1, \tag{3}$$

where y_t is output, i_t is the nominal interest rate, π_t is goods price inflation and y_t^n is the natural rate of output, which is assumed to be a mean-zero, serially uncorrelated shock. $\mathrm{E}_t\{.\}$ is the rational expectations operator conditional upon all information up to and including period t.

(i) Discuss (1) and (2) with focus on the underlying economic mechanisms. What does (3) represent? Explain.

(ii) Derive the solutions for y_t and π_t [Hint: Conjecture that the solutions are linear functions of the period's natural rate, y_t^n, and remember that $\mathrm{E}_t\{y_{t+1}^n\} = 0$.]

(iii) What is the role of the parameter ϕ_π in terms of output and inflation's responses to shocks to the natural rate of output? Can ϕ_π be chosen such that the *output gap*, $\widetilde{y}_t \equiv y_t - y_t^n$, and inflation are stabilized completely? Why/why not?

QUESTION 3:

Assume a model of a closed economy under "small" permanent distortions, where the welfare-relevant loss function can be written as

$$\mathrm{E}_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{1}{2} \left(\pi_t^2 + \alpha_x \widehat{x}_t^2 \right) - \Lambda \widehat{x}_t \right], \quad 0 < \beta < 1, \quad \Lambda > 0, \quad \alpha_x > 0, \tag{1}$$

where π_t is goods price inflation and $\widehat{x}_t$ is the welfare-relevant output gap.

(i) Discuss the economic and model-consistent rationale for such a loss function.

(ii) Derive the optimal sequences of $(\widehat{x}_t, \pi_t)_{t=0}^{\infty}$ under discretionary policymaking when these have to obey

$$\pi_t = \beta \mathrm{E}_t \left\{ \pi_{t+1} \right\} + \kappa \widehat{x}_t + u_t, \quad \kappa > 0, \tag{2}$$

where u_t is a mean-zero, serially uncorrelated shock. For this purpose, treat $\widehat{x}_t$ as the policy instrument, and show that the relevant first-order condition for optimal policy together with (2) yield the difference equation

$$\pi_t = \frac{\alpha_x \beta}{\kappa^2 + \alpha_x} \mathrm{E}_t \left\{ \pi_{t+1} \right\} + \frac{\alpha_x}{\kappa^2 + \alpha_x} u_t + \frac{\kappa}{\kappa^2 + \alpha_x} \Lambda. \tag{3}$$

(iii) Show that optimal inflation therefore is given by

$$\pi_t = \frac{\kappa}{\kappa^2 + \alpha_x (1 - \beta)} \Lambda + \frac{\alpha_x}{\kappa^2 + \alpha_x} u_t.$$

Discuss the average properties and business cycle properties of this solution. Will inflation be fully stabilized under any circumstances?

(iv) Discuss how commitment policies can improve on the solution under discretion.