UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Exam: **ECON4325 – Monetary Policy and Business Fluctuations**

Date of exam: Friday, June 5, 2009 **Grades are given: June 17, 2009**

Time for exam: 09:00 a.m. – 12:00 noon

The problem set covers 3 pages

Resources allowed:
- No resources allowed

The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

The exam consists of three parts: A, B and C. Part A and B have weight 0.3, and part C has weight 0.4. You should answer all parts.

Part A consists of three questions. They should be answered briefly, intuitively and precisely.

Part B and C consist of one question each. Answer in depth and in detail.

PART A

Question 1

What is the Taylor principle? Explain briefly why this principle is important for monetary policy design.

Question 2

There are three types of distortions in the Canonical New Keynesian Model. The first distortion is linked to the presence of monopolistic competition and the fact that prices are set as a mark-up over marginal costs. Discuss briefly the two additional distortions that are due to sticky prices.

Question 3

Explain what a bank run is, and why banks may be subject to bank runs. Discuss what measures could be used to reduce the risk of bank runs.

PART B

Consider the following "New Keynesian" model:

(1) $\pi_t = \beta E_t \pi_{t+1} + \kappa y_t + e_t$

(2) $y_t = E_t y_{t+1} - \sigma(i_t - E_t \pi_{t+1}) + g_t$

where π_t is the rate of inflation, y_t is the output gap, i_t is the nominal interest rate, e_t and g_t are stochastic disturbances, β, κ, σ and λ are parameters, and E_t is the expectations operator. Lower case letters denote logs, measured as deviations from steady state values.

Assume that the central bank minimizes the following (period-by-period) loss function:

$$L_t = \frac{1}{2}[\pi_t^2 + \lambda y_t^2]$$

a. Why is the model called "New Keynesian"?

b. Show that optimal policy under discretion implies the first-order condition $\pi_t = -\frac{\lambda}{\kappa} y_t$

Give a short interpretation.

c. Suppose that the economy is hit by a negative demand shock ($g_t < 0$) . How should the central bank respond? What are the effects on output and inflation of a negative demand shock when the central bank responds optimally?

d. Discuss briefly how the effect of monetary policy could change in this model if a financial accelerator feature was included.

PART C

Government purchases and sticky prices

Consider an economy with the following equilibrium conditions. The household's log-linearized Euler equation takes the form

(3) $c_t = -\frac{1}{\sigma}\left(i_t - E_t\{\pi_{t+1}\} - \rho\right) + E_t\{c_{t+1}\}$

where c_t is consumption, i_t is the nominal interest rate, and $\pi_{t+1} \equiv p_{t+1} - p_t$ is the rate of inflation between t and t+1. Lowercase letters denote logs. The household's log-linearized labour supply is given by

(4) $w_t - p_t = \sigma c_t + \varphi n_t$

where w_t is the nominal wage, p_t the price level, and n_t is employment.
Firms' technology is given by

(5) $Y_t = N_t^{1-\alpha}$

The timing of the price setting is stochastic, and the inflation is given by

(6) $$\pi_t = \beta E_t\{\pi_{t+1}\} + \kappa \tilde{y}_t$$

where $\tilde{y}_t \equiv y_t - y_t^n$ is the output gap, i.e. the difference between the actual and natural level of output. Assume that in the absence of constraints on price setting, firms would set a price equal to a constant markup over marginal costs given by μ (in logs).

Suppose that the government purchases a fraction τ_t of the output in each period, where τ_t varies exogenously. Government purchases are financed through lump-sum taxes.

a) Provide a brief interpretation of the household's optimizing conditions (3) and (4)
b) Show that a log-linear version of the goods market clearing condition takes the form $y_t = c_t + g_t$, where $g_t \equiv -\log(1-\tau_t)$.
c) Derive an expression for the log real marginal cost mc_t as a function of y_t and c_t.
d) Derive the natural level of output y_t^n as a function of g_g and interpret the relationship.
e) Assume that $\{g_t\}$ follows a simple AR(1) process with autoregressive coefficient $\rho_g \in [0,1]$. Derive the DIS equation

$$\tilde{y}_t = E_t\{\tilde{y}_{t+1}\} - \frac{1}{\sigma}\left(i_t - E_t\{\pi_{t+1}\} - r_t^n\right)$$

as well as an expression for the natural rate of interest r_t^n as a function of g_t. Provide a brief interpretation of the DIS equation and the expression for the natural rate of interest.