UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Exam: **ECON4330 – International Macroeconomics, spring 2012**

Date of exam: Tuesday, May 29, 2012 **Grades are given: June 13, 2012**

Time for exam: 2:30 p.m. – 5:30 p.m.

The problem set covers 5 pages (incl. cover sheet)

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.

Exam in: ECON 4330: International Macroeconomics

Day of exam: 29 May, 2012

Time of day: 14:30-17:30

This is a 3 hour school exam.

Guidelines:
In the grading, the answers to the three problems will be given 1/3 weight each.

Problem 1 (weight 1/3)

Consider a two-period representative agent model for a small open economy. The representative agent has utility function

$$U = \log(C_1) + \beta \log(C_2)$$

The output levels in the two periods, Y_1 and Y_2, are exogenously given, and there is a fixed interest rate r. There are no foreign assets initially. The country can borrow unlimited amounts from the outside world. This gives a lifetime budget constraint:

$$C_1 + \frac{C_2}{1+r} = Y_1 + \frac{Y_2}{1+r}$$

1. Find the optimal levels of consumption in the two periods.

2. Explain what the autarky real interest rate, r^A, is. Use the first-order condition for optimal consumption to find an expression for $1 + r^A$ as a function of the domestic growth rate $g = Y_2/Y_1 - 1$ and the discount rate $\delta = 1/\beta - 1$.

3. Define the current account in period 1, CA_1, as $CA_1 = Y_1 - C_1$. Show that CA_1/Y_1 can be written as:

$$\frac{CA_1}{Y_1} = \frac{1}{2+\delta}\left[1 - \frac{1+r^A}{1+r}\right]$$

   Interpret how the relative size r^A/r affects the sign of CA_1/Y_1.

4. Assume that the rest of the world can be described as an agent with the same utility function, but with a different growth rate (denoted g^*)

and a different discount rate (δ^*). Assume that both countries have the same levels of output in period 1, $Y_1 = Y_1^*$. Impose the correct market clearing condition for general equilibrium and show that the equilibrium interest rate is a weighted average of the two autarky rates r^A and r^{A*}. Give a short interpretation.

5. Assume that you are working as an advisor for the finance ministry in Germany. Use the concept of *debt overhang* to provide a short and non-technical explanation for why a heavily indebted country's economic performance may be affected by the risk of sovereign default.

Problem 2 (weight 1/3)

With reference to the Mean-Variance model in *Open Economy Macroeconomics*, we have the equilibrium condition for the foreign exchange market:

$$F_g = -f(\frac{B_{p0}}{E} + F_{p0}) - (1-b)(\frac{B_{*0}}{E} + F_{*0}) \tag{1}$$

where f and b denote optimal portfolio shares for the domestic (f) and the foreign investor (b). They are given by

$$f = \frac{\sigma_{ep}}{\sigma_{ee}} - \frac{r}{R\sigma_{ee}}$$
$$b = \frac{-\sigma_{ep*}}{\sigma_{ee}} + \frac{r}{R\sigma_{ee}}$$

σ_{ee} and σ_{pp} denote the variances of the rate of depreciation (e) and the rate of domestic inflation (p). σ_{ep} and σ_{ep*} are the covariances between e and p, and between e and foreign inflation (p_*). R is the coefficient of relative risk-aversion ($R > 0$) and r is the risk-premium

$$r = i - i_* - \mu_e$$

μ_e is the expectation of the rate of depreciation, i and i_* are the domestic and foreign interest rates. Assume that μ_e is a constant parameter. The remaining symbols in (1) are taken from the balance sheet of the simple portfolio model in *Open Economy Macroeconomics*.

1. Explain what we mean by the term "supply of foreign currency to the central bank".

2. State a set of sufficient conditions for an upward-sloping supply curve in this model, and give a short economic interpretation of these conditions.

3. Give a brief explanation of how the supply of foreign currency is influenced by the investors' perception of depreciation risk and the degree of correlation between depreciation and inflation.

4. Consider the case of a downward sloping supply curve. What kind of investor behaviour may give rise to this case? Is a downward sloping supply curve consistent with stability in the market for foreign exchange?

5. Give an expression for $\frac{\partial F_g}{\partial r}$ and discuss how this derivative is related to the degree of capital mobility. What are the determinants of the degree of capital mobility in this model?

6. Assume a floating exchange rate regime and explain how the market equilibrium is affected by an increase in i.

Problem 3 (weight 1/3)

1. In this section we consider the Price specie-flow model given by the equations at the end of the exam set. Assume a fixed exchange rate regime with an exogenous domestic interest rate. Define $W'_* = \frac{EF_*}{P}$ as the real value of foreign debt measured in terms of the home good, and define the real exchange rate by $R = EP_*/P$. Show that in a long-run steady state, the equilibrium solutions for W'_* and R are determined by

$$C(\bar{Y} - i_* W'_* - G, -W'_* - W_g, i, i_*) + G = \bar{Y} - i_* W'_* \quad (2)$$

$$i_* W'_* = X(R, \bar{Y}, Y_*) \quad (3)$$

   and comment on the interpretation of this result.

2. Assume that the economy is initially in equilibrium. Make use of a phase-diagram to analyze the dynamic effects of a permanent reduction in Y_*.

3. Use the model to discuss one or more economic policies that can be invoked in order to stabilize the economy after the negative shock to Y_*.

4. Discuss, in a non-technical manner, whether the policy options after the shock to Y_* would have been more limited if the country was part of a monetary union.

Reference: Equations from Chapter 6.6 in OEM

Price specie-flow model

$$Y = C\left(Y - i_* \frac{EF_*}{P} - G, W_p, i, i_*\right) + G + X\left(\frac{EP_*}{P}, Y, Y_*\right) \tag{4}$$

$$W_p = -\frac{EF_*}{P} - W_g \tag{5}$$

$$\dot{P} = P\gamma(Y - \bar{Y}) \tag{6}$$

$$\dot{F}_* = i_* F_* - \frac{P}{E} X\left(\frac{EP_*}{P}, Y, Y_*\right) \tag{7}$$

Endogenous variables: Y, P, F_* and W_p

Initial conditions in the case of a fixed exchange rate regime: $P(0) = P_0$, $F_*(0) = F_{*0}$ and $W_g(0) = (-M_0 - B_0 + E(0)F_{g0})/P_0$.