UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Exam: **ECON4330 – International Macroeconomics**

Date of exam: Wednesday, May 14, 2014   **Grades will be given: June 4, 2014**

Time for exam: 2.30 p.m. – 5.30 p.m.

The problem set covers 4 pages (incl. cover sheet)

Resources allowed:
- No resources allowed (except if you have been granted use of a dictionary from the Faculty of Social Sciences)

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

A   Demand for foreign currency (40 percent)

Consider the following demand function for foreign currency:

$$F = \left[\frac{\sigma_{ep}}{\sigma_{ee}} - \frac{i - i_* - \mu_e}{R\sigma_{ee}} \right] [F_0 + (B_0/E)] \tag{1}$$

Here B_0 and F_0 are the investor's initial holdings of respectively domestic and foreign currency, while F is his demand for foreign currency now and E the current exchange rate. Other symbols are: i, i_* domestic and foreign interest rate; e rate of depreciation, p inflation rate. The variables e and p are stochastic with:

- Expectations μ_e and μ_p

- Variances σ_{ee}, σ_{pp}

- Covariance σ_{ep}

The demand function belongs to a domestic resident who maximizes a utility function

$$\mathbb{E}(\pi) - \frac{1}{2} Rvar(\pi) \tag{2}$$

where π is the real rate of return on the portfolio.

1. Interpret equation (1). Explain in particular why the covariance σ_{ep} is one of the determinants of the demand for foreign currency.

2. Suppose a foreign resident behaves according to the same principles as the domestic investors. Write down his demand function for his own currency. How does it differ from (1)?

3. Two empirical facts about actual portfolios of financial assets are a) Domestic residents usually have a higher share invested in the domestic currency than foreigners have. b) The share held in the domestic currency varies greatly from country to country. Discuss possible reasons for this.

4. Suppose a world with two countries, home and foreign, populated by investors of the same type as described above. Discuss how the total demand for the currency of the foreign country by private investors depends on the level of the exchange rate. Assume that initially the private investors in sum are net lenders in both currencies, Conversely, the the governments are net borrowers. Does the demand curve always slope downward?

5. Discuss briefly factors not included in the model above that may influence the slope of the demand curve.

B Open Economy OLG-model (50 per cent)

We are looking at a small, open economy where firms and consumers can borrow or lend in an international market at a given real interest rate r.

Consumers live for three periods. The population is constant with N consumers in each generation until at one point there is a wave of immigrants.The utility function of a representative consumer who enters the economy in period t is

$$U_t = \ln(C_t^Y) + \beta \ln(C_{t+1}^M) + \beta^2 \ln(C_{t+2}^O) \tag{1}$$

where C_t^Y, C_{t+1}^M and C_{t+2}^O are consumption levels when young, middle-aged and old respectively. The consumers start life without any financial assets and leave no bequests. They supply one unit of labor when young and middle-aged and retire when old. The wage per unit of labor in period t is w_t. The life-time budget constraint of the representative consumer is

$$C_t^Y + (1+r)^{-1}C_{t+1}^M + (1+r)^{-2}C_{t+2}^O = w_t + (1+r)^{-1}w_{t+1} \tag{2}$$

The production function is Cobb-Douglas with constant returns to scale:

$$Y_t = K_t^\alpha L_t^{1-\alpha} \tag{3}$$

where Y_t is output, K_t is the capital stock and L_t is labor input ($L_t = 2N$ before immigration). Investments made in one period become productive in the next period. Hence,

$$K_{t+1} = K_t + I_t \tag{4}$$

For simplicity we assume that firms are foreign-owned, which means that any windfall profits will be sent abroad.

1. For simplicity we assume throughout that $\beta = 1/(1+r)$.Utility maximization given the budget constraint then yields the optimal consumption path

$$C_t^Y = C_{t+1}^M = C_{t+2}^O = \frac{w_t + (1+r)^{-1}w_{t+1}}{1+(1+r)^{-1}+(1+r)^{-2}} = c_t \tag{5}$$

a) Explain briefly how you would have derived this path if you had time. (You are not expected to carry out the calculations). b) Explain in words what equation (5) says and the economic intuition behind it.

2. When young the consumer saves $w_t - c_t$. How much does he save in middle age and what are his net assets just after retirement.

3. Explain how the time path of the stock of productive capital is determined when firms maximize profits. What are the implications for the time path of wages?

4. Drawing on what you have found in questions 2 and 3, what can you say about the time paths of the current account of the balance of payment and the net foreign debt?

5. At the beginning of period t M young immigrants arrive unexpected. They are identical to the native young in productivity and fertility and stay for the rest of their lives. Hence, the size of each generation changes from N to $N + M$. The migration is a one-time event. What effect will the migration have have on the time paths of the capital stock, investment and wages?

6. What effect will the immigration have on the savings in period t of the young natives, the middle aged and the old (generations t, $t - 1$, and $t - 2$).

7. We are interested in the effect of the immigration on the current account in period t. List the effects we then have to take account of and in which direction they work.

8. When will the transition period be over in the sense that per capita levels are back to where they were before the immigrants arrived?

C   Capital mobility between countries (10 per cent)

1. A) What are the main main welfare gains that can come from international capital mobility? Just list your answers.

2. If you are asked about the degree of capital mobility between countries, what kind of statistics or other information would you look for?