ECON4330 Seminar 5

Equilibrium in the foreign exchange market

Consider a world with two currencies, kroner and dollars. The table below shows the balance sheets. The last line is equal to the line immediately above. Government is the consolidated government and central bank sector. Taken together the two governments are net borrowers. Implicitly this equality defines the net assets (or wealth) of the four sectors measured in their respective currencies. (If this helps, you may think of the initial price levels as being equal to one).

Consider a period which is too short for new savings to add significantly to the stock of wealth. The only thing the agents can do then is to change one currency for another within the constraint that

$$B_j + EF_j = B_j^0 + EF_j^0 \tag{1}$$

for all sectors j.

The demands for dollars by the domestic and foreign private sectors are given as:

$$F_p = [\phi + \xi(i_* + \mu_e - i)]W_p/E = fW_p/E \tag{2}$$

$$F_{p*} = [\phi_* + \xi(i_* + \mu_e - i)]W_{p*} = f_*W_{p*} \tag{3}$$

Here, $0 \leq \phi < \phi_* \leq 1$ and $\xi > 0$ are constants.

1. Discuss how the total private demand for dollar denominated assets depends on the level of the exchange rate.
2. Assume that the exchange rate is floating freely.
   (a) Write down the equilibrium condition for the foreign exchange market.

Assets	Home		Foreign		Total
	Govern.	Private	Govern.	Private	
Kroner	B_g	B_p	B_{g*}	B_{p*}	0
Dollars	F_g	F_p	F_{g*}	F_{p*}	0
Sum	$B_g + EF_g$	$B_p + EF_p$	$B_* + EF_*$	$B_{p*} + EF_{p*}$	0
Sum	W_g	W_p	EW_{g*}	EW_{p*}	0

(b) Explain how you can use this to solve for the exchange rate as a function of exogenous and predetermined variables only (you are free to do the calculations, but this is not asked for).

3. Suppose the domestic central bank sells dollars.

   (a) What effect does this have on the exchange rate?

   (b) Which of the entries in the balance sheet would change and in what direction?

4. Imagine that the private holdings of foreign currency instead of F_p^0 and F_{p*}^0 had been $F_p^0 + \Delta$ and $F_{p*}^0 - \Delta$ in the initial balance sheet. What would this have meant for the exchange rate now?

5. Suppose both governments have balanced budgets. The home country has a current account surplus equal to S per period. The foreign country has a corresponding deficit. You may assume that all payments on the current account are made in dollars. How many dollars does the home central bank have to buy per period if it is to avoid a gradual appreciation? Would the figure be the same if the surpluses and deficits were in the government sectors, while the private sectors were in balance?

Mean-variance model of portfolio choice

An investor with financial wealth W is considering how to divide her investments between assets denominated in domestic and in foreign currency. Her preferences between risk and return are described by:

$$\mathcal{E}(\pi) - \frac{1}{2} R var(\pi) \tag{4}$$

where π is the real rate of return and R is the degree of relative risk aversion and $\mathcal{E}$ is for expectation. Let

$f = EF/PW$ = share of foreign currency in portfolio

i, i_* = domestic and foreign interests 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}

1. a) Calculate the expectation and variance of the return on a portfolio with share of foreign currency f. b) Use the result to show that the optimal share is
$$f = \frac{\sigma_{ep}}{\sigma_{ee}} - \frac{i - i_* - \mu_e}{R\sigma_{ee}} \tag{5}$$
c) Interpret this equation.

2. Suppose you are advising an investor who knows no maths or stats. How would you explain to him that, everything else equal, he should invest more in foreign currency the higher is the covariance, σ_{ep}?

3. Actual portfolios seem to have a "home bias". Explain what is meant by this expression. How can home bias be explained?

In case you need it: If x and y are two stochastic variables, then

$$Var(ax + by) = a^2 Var(x) + b^2 Var(y) + 2abCov(xy)$$

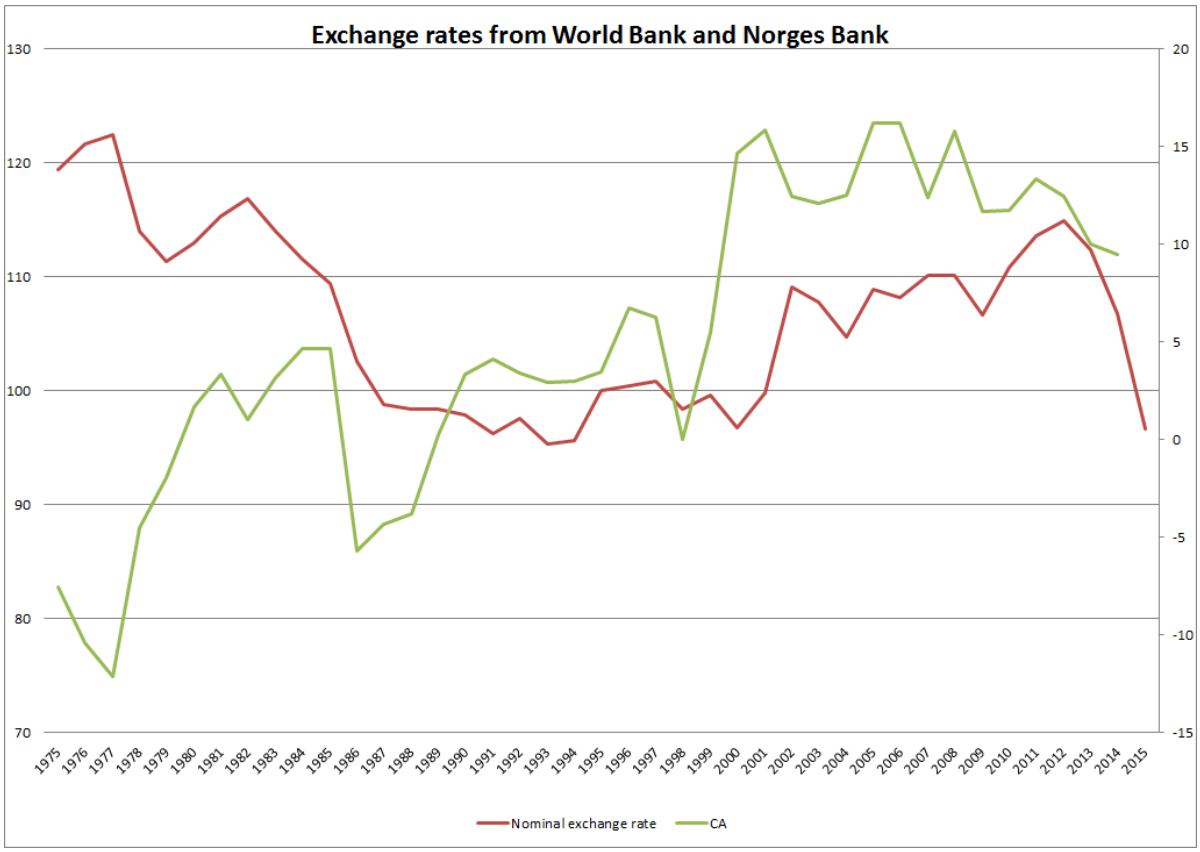
Discussion

This discussion is similar to what we did in seminar 3, only now we focus on the nominal exchange rate.
Discuss the movements of the Norwegian NOMINAL exchange rate since 1975

(See graph on next page, note: The exchange rates are inverse, graph = $\frac{1}{E}$). I have also added the Norwegian Current Account as percentage of GDP. Pay particular attention to these factors:

- What are the main trends since 1975?
- How do you explain the relatively calm period throughout the 90s?
- How do you think the period 2015-2020 will look?
- What is the relationship with the Current account?
- What else is interesting?

Try to connect your answers to todays exercises, but discuss also what we can not explain. I encourage you to look for data or theories on line.


Exchange rates from World Bank and Norges Bank
130
120
110
100
90
80
70
20
15
10
5
0
-5
-10
-15
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Nominal exchange rate
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