PC8: Exchange-rate dynamics

Exercise #1. Uncovered interest-rate parity

On 2 December 2009, the one-year interest rate on US Treasury bonds is 0.3% as compared to 0.75% in France. The bilateral exchange rate is $1.5 per euro.

1) What is the exchange-rate expectation on 2/12/2010 consistent with uncovered interest-rate parity?
2) According to the November 2009 '*Consensus Forecast*' survey, market economists expected inflation to be 2% in the US and 1% in France one-year ahead. Compute real interest rates in both areas and the expected real exchange-rate appreciation/depreciation.
3) On 3 December 2009, the ECB announces that the Euro area overnight interest rate is increased from 0 to 3% immediately and will be brought back to 2% in December 2010 and 1% in December 2011. Meanwhile, the US refinancing rate is raised to 1% and is expected to remain at this level until December 2011. Describe the future path of the euro-dollar exchange rate assuming rational expectations and uncovered interest-rate parity, and assuming that the long-term value of the exchange-rate is unaffected by the ECB decision.

Exercise #2: The Dornbusch model

We consider a small, open economy described by equations (1) to (4). m is the exogenous money supply, p_t the aggregate price index at time t, y the exogenous output level, i_t the nominal interest rate, i^* the exogenous world nominal interest rate, d_t is aggregate demand in volume and e_t is the nominal exchange rate. All variables but interest rates are in logarithms. For convenience, the world price level is normalized at zero. Expectations are perfect.

Money market	$m = p_t + \alpha y - \beta i_t$	$\alpha, \beta > 0$	(1)
UIP	$i_t = i^* - (e_{t+1} - e_t)$		(2)
Prices	$p_{t+1} - p_t = \theta(d_t - y)$	$\theta > 0$	(3)
Aggregate demand	$d_t = \gamma y - \delta(e_t + p_t) - \sigma i_t$	$\delta, \gamma, \sigma > 0, \gamma < 1$	(4)

1) What are the long-run values of the four endogenous variables: p, e, i, d ? These long-run values will be denoted by $\bar{x}$ ($x = p, e, i, d$).
2) Using equations (1) and (2), show that: $e_{t+1} - e_t = \frac{1}{\beta}(\bar{p} - p_t)$ (5)

   Comment the equation.
3) Using equations (2) to (5), show that: $p_{t+1} - p_t = \theta\delta(\bar{e} - e_t) + \theta\left(\delta + \frac{\sigma}{\beta}\right)(\bar{p} - p_t)$ (6)

   Comment the equation.
4) The functioning of the economy can now be fully described as a two-dimensional dynamic equation. Use equations (5) and (6) to draw the phase diagram in the (e,p) space. Show graphically the impact of a permanent rise in money supply from m_0 to m_1.
5) Let $X_t = \begin{pmatrix} e_t \\ p_t \end{pmatrix}$. Show that equations (5) and (6) can be rewritten: $X_{t+1} - X_t = A(X_t - \bar{X})$.

   Find the eigenvalues of A and describe the dynamics.