Open Economy Macroeconomics

Unit 6

Monetary Approaches to Exchange Rate Determination

We are going to study two models:

- Flexible prices
- Sticky prices (Dornbusch model)

Preliminary questions:

- The price of an asset depends on its expected return
- UIP condition
- Expectation formation mechanisms

The price of an asset depends on its expected return

Two assets (bonds), A y B; Pa = 100, E(Pa) = 120. Pb = 200, E(Pb) = 240. So both assets have an expected return of 20%:

Let's consider know that E(Pa) = 132, so its expected return is 32%:

Consequently, people are going to invest in asset A, so there will be an increase in its demand and, therefore, an increase in its current price. Conclusion: there is a direct relationship between the price of an asset and its expected return (expected price)



When the UIP condition holds, domestic and foreign bonds are **perfect substitutes**

a) Static expectations

$$Es_{t+1,t} = s_t$$

b) Adaptive expectations

$$\mathbf{E}\mathbf{s}_{t+1,t} = \alpha \mathbf{s}_{t} + (1 - \alpha) \cdot \mathbf{E}\mathbf{s}_{t,t-1} \qquad 0 \le \alpha \le 1$$

c) Extrapolative expectations $Es_{t+1,t} = s_{t} + m(s_{t} - s_{t-1})$ d) Regressive expectations $Es_{t+1,t} = \alpha s_{t} + (1 - \alpha) \cdot \overline{s} \qquad 0 \le \alpha \le 1$ e) Rational expectations $Es_{t+1,t} = s_{t+1} + u_{t+1}$

f) Expectations of perfect foresight $Es_{t+1,t} = s_{t+1}$

The flexible-price monetary model

Aim: Explain the determination of the exchange rate. **Assumptions**:

- PPP holds continuously
- UIP holds continuously
- All prices are completely flexible

Demand for money:
$$\frac{M^{D}}{P} = Y^{\eta} \exp(-\sigma r) = Y^{\eta} e^{-\sigma r} \quad \text{and taking logs:}$$
$$m - p = \eta \gamma - \sigma r \qquad m^{\star} - p^{\star} = \eta \gamma^{\star} - \sigma r^{\star}$$
$$PPP \text{ in logs:} \qquad s = p - p^{\star}$$
$$UIP \qquad E\dot{s} = r - r^{\star}$$
$$p = m - \eta \gamma + \sigma r \qquad p^{\star} = m^{\star} - \eta \gamma^{\star} + \sigma r^{\star}$$
$$s = (m - m^{\star}) - \eta (\gamma - \gamma^{\star}) + \sigma (r - r^{\star})$$

Alternative expression (Fisher equation) $\implies s = (m - m^*) - \eta (y - y^*) + \sigma (E\dot{p} - E\dot{p}^*)$

The sticky price monetary model (Dornbusch overshooting model)

Aim: Explain the determination of the exchange rate. In particular explain the large and prolonged departures of S from PPP.

Assumptions:

- PPP holds only in the long-run
- UIP holds continuously
- Goods prices and wages tend to change slowly over time (they are sticky). However, the exchange rate is completely flexible

The dynamics of Dornbusch's overshooting model



Eq. in the money market $m - p = \eta \gamma - \sigma r$

UIP condition
$$E\dot{s} = r - r^*$$

PPP in the long term

$$\overline{s} = \overline{p} - \overline{p}^*$$

Regressive expectations

$$E\dot{s} = \Theta(\overline{s} - s)$$
 where $\Theta > 0$

Goods market
$$\dot{p} = \pi(d - \gamma)$$

Aggregate $d = \beta + \alpha(s - p + p^*) + \varphi \gamma - \lambda r$
 $\dot{p} = \pi[\beta + \alpha(s - p + p^*) + (\varphi - 1)\gamma - \lambda r]$
Solving for r in the money market equilibrium and substituting
 $\dot{p} = \pi[\beta + \alpha(s - p + p^*) + (\varphi - 1)\gamma - \lambda/\sigma(p - m + \eta\gamma)]$

$$\frac{dp}{ds} \mid \dot{p} = 0 = \frac{\alpha}{\alpha + \lambda/\sigma}$$

The goods-market equilibrium schedule



From the money market
equilibrium we have:
$$r = \frac{p - m + \eta \gamma}{\sigma}$$

From the previous equations we have:

$$s = \overline{s} - \frac{1}{\sigma \Theta} \left[p - m + \eta y - \sigma r^* \right]$$

And this equation is representing equilibrium situations in the money market

$$\frac{dp}{ds} = -\sigma\Theta$$

The money-market equilibrium schedule



Long-term equilibrium in the Dornbusch model



If you are not in equilibrium.....



Exchange rate overshooting

