Models of Exchange Rate Determination

Lecture 1
IME LIUC 2013

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Exchange Rates Movements Show Some Regularities

- Daily and monthly exchange rates are highly unpredictable
- Exchange rates of countries with high inflation depreciate in the long run by about the inflation rate differential
- The high variability of exchange rate in the short run is not systematically related to change in money supply
- Correlation between monthly changes in the exchange rate and the current account position is low

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Do We Have "a" Theory to Explain Exchange Rate Behaviors?

- No, we have several theories that try to explain empirical regularities:
  - The PPP model,
  - Mundell Fleming model,
  - Monetary Model,
  - .....
- They all have limitations

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The Dornbush's model: the "overshooting" model

- Why is the model so famous?
- What is the model about?
- What is the evidence for and against the model?

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Why is the model so famous?

- Quoting from Rogoff
  - The model is "elegant": it is the beauty and clarity of Dornbush's analysis that has made it so flexible and useful.
  - The model is "path breaking": it changed our way of thinking about the exchange rate.

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- Quoting from Krugman

"Rudi was, first of all, the economist who brought international monetary economics into the modern world. The workhorse of pre-Dornbusch open-economy macro, the Mundell-Fleming model, was a fine thing.. But it didn't capture the volatility of a floating-exchange-rate world, the way currencies can soar or plunge not because big things have already happened, but because things are expected to happen.. Rudi's famous "overshooting" paper changed it all…"

(NYT, July 26 2002)

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What is the model about?

- Two relationships lie at the hart of the model:
  - The UIP: $i_{t+1} = i^* + E_t(e_{t+1} - e_t)$
  - The money demand:

$$m_t - p_t = -ni_{t+1} + ly_t$$

- The model also assumes that:
  - P fix in the short-run and flexible in the long-run
  - output *y* is exogenous
  - money is neutral in the long run, so that a permanent rise in *m* leads a proportionate rise in *e* and *p*, in the long run.

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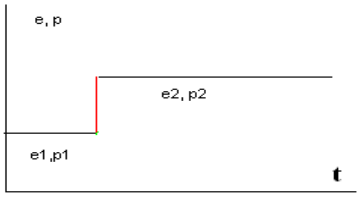
How does the overshooting work?

- **Hp: Unanticipated permanent increase in the money supply m.**
- **Long run:** The increase in m will imply a proportional increase in P and given that the PPP holds also in e



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- **in the short run**:
- If m rises but the price level is temporarily fixed, then the supply of real balances must rise as well.
- To equilibrate the system, the demand for real balances must rise. Since output is assumed fixed in the short run, i on domestic currency bonds falls.
- According to the UIP, it is possible for i to fall if and only if, over the future life of the bond contract, the home currency is expected to **appreciate**.
- But how is this possible if we know that the long run impact of the money supply shock must be a proportionate **depreciation** in the exchange rate?
- Dornbusch's brilliant answer is that the initial depreciation of the exchange rate must, on impact, be larger than the long-run depreciation. The exchange rate must **overshoot**.
- **The volatility of m implies the volatility of e**

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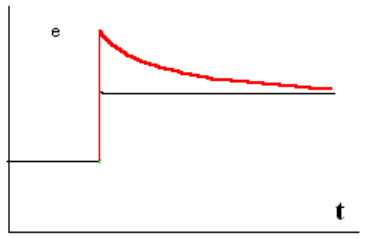
Graphically



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What are prices doing?

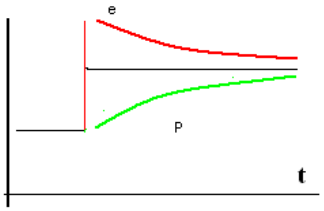
$\bar{y} = equil.outp$

$\bar{q} = equil.RER$

$$y_t^{\,d} = \bar{y} + \vartheta(e_t + p^* - p_t - \bar{q})$$

$$p_{t+1} - p_t = \pi(y^d - \bar{y})$$

e,p



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- **Hp: Announcement in t of a permanent increase in the money supply m a t+3**
- The potential for arbitrage profits rules out the possibility of any discrete jump of e; no jumps in the instant in which the policy is implemented
- e will jump at the announcement
- The depreciation generate an excess demand for goods, therefore p increases
- An increase in p implies a reduction in m/p and an increase in i
- i higher than i* implies further expected depreciation ,,,e and p will continue to increase until t+3 when m increases
- At this point i is below i* therefore expected appreciation, the e must be above its long run level

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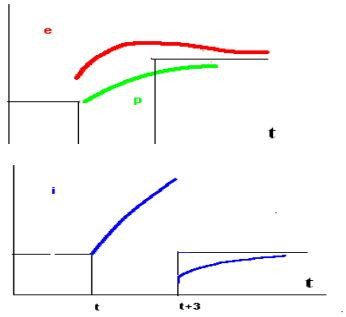
Graphically



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Evidence for and against the model

- Looking at data: the model captures major turning points in monetary policy quite well, however, it does not seem to capture all the other big exchange rate swings that regularly take place.

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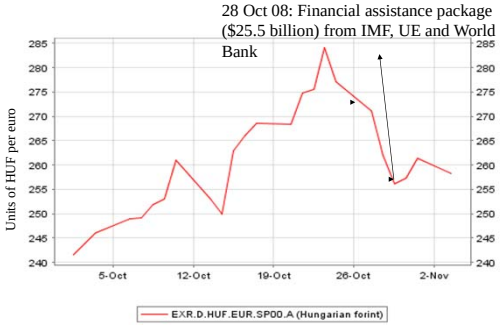
Expectations vs fundamentals: an example



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