

Issues in International Finance

Exchange rates in the short and the long run

UW – Madison // Fall 2018

Roadmap

- ▶ Where we have been: Exchange rates in the **long run**
 - ▶ Perfectly flexible prices
 - ▶ PPP & UIP hold
 - ▶ Quantity theory of money
 - ▶ $i_F = r^* + \mu_F$
 - ▶ Exchange rate determined by prices/inflation

- ▶ Where we have been: Exchange rates in the **short run**
 - ▶ Price level is fixed
 - ▶ Long-run depreciation of fx rate is given
 - ▶ UIP holds
 - ▶ Quantity theory of money
 - ▶ i determined by M/\bar{P} and $L(i)Y$
 - ▶ Exchange rate determined by interest rates

Roadmap

- ▶ Currently: Integrate the long- and short-run models
 - ▶ Long-run model (PPP) pins down expectations
 - ▶ Short-run model takes expectations from long-run model and (UIP) pins down current exchange rates
- ▶ Allows us to think about permanent and temporary changes
 - ▶ In the short-run model, we could only consider temporary changes, because we held $E_{H/F}^e$ fixed.

- ▶ Let's review the two models first. . .

Recap: Short-run model

- ▶ Uncovered interest parity

$$i_{\$} = i_{\text{€}} + \left(\frac{E_{\$/\text{€}}^e}{E_{\$/\text{€}}} - 1 \right)$$

- ▶ Quantity theory with sticky prices (bars on P)

$$\bar{P}_{us} = \frac{M_{us}}{L_{us}(i_{\$})Y_{us}}$$

$$\bar{P}_{eu} = \frac{M_{eu}}{L_{eu}(i_{\text{€}})Y_{eu}}$$

- ▶ $E_{\$/\text{€}}^e$ is given
- ▶ i comes from money market, $E_{\$/\text{€}}$ comes from fx market

Recap: Long-run model

- ▶ Purchasing power parity

$$E_{\$/\epsilon}^e = \frac{P_{us}^e}{P_{eu}^e}$$

- ▶ Quantity theory with flexible prices

$$P_{us}^e = \frac{M_{us}^e}{L_{us}(i_{\$}^e) Y_{us}^e}$$

$$P_{eu}^e = \frac{M_{eu}^e}{L_{eu}(i_{\epsilon}^e) Y_{eu}^e}$$

- ▶ Notice everything is in expectation. The idea is that people today believe that the long-run model is true in the future, so all our long-run results are expected to hold today.
- ▶ This model determines $E_{\$/\epsilon}^e$

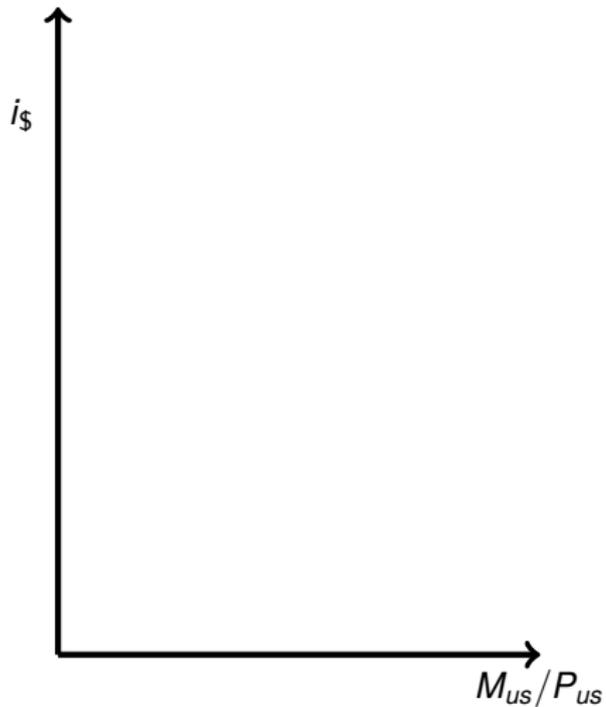
Permanent change in M

- ▶ In the short-run model we had to keep E^e fixed, so we could only study temporary policy shocks. A permanent shock would change E^e . Now, we can handle a permanent shock.
- ▶ Suppose we have a permanent shock to the level of money in the U.S.
- ▶ We approach the problem backwards
 1. Solve the long run. This gives us E^e .
 2. Solve the short run with the new value of E^e and constant prices.
- ▶ We can then work out the adjustment from the short run to the long run

The long run (increase M_{US})

Home money market

FX market



Permanent change in M

1. Solve the long run. This gives us E^e .

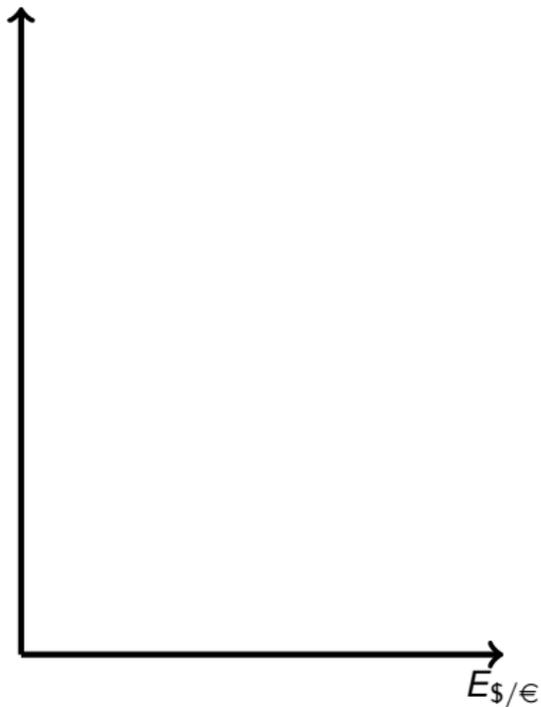
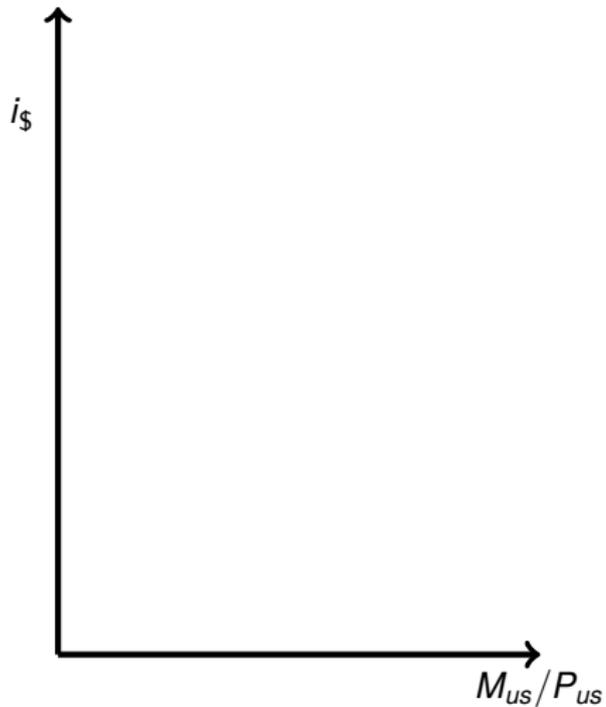
Done! In the long run, the money market will not change. The FR curve permanently shifts up and exchange rate is permanently depreciated.

2. Solve the short run with the new value of E^e and constant prices.

The short run (increase M_{us})

Home money market

FX market



Permanent change in M

1. Solve the long run. This gives us E^e .

Done! In the long run, the money market will not change. The FR curve permanently shifts up and exchange rate is permanently depreciated.

2. Solve the short run with the new value of E^e and constant prices.

Done! In the short run, two things happen: 1) FR shifts up as in the long-run 2) interest rates fall because real money supply increases.

The short-run exchange rate depreciates to $E_{\$/\epsilon}^2$ which is a larger depreciation than will occur in the long run: $E_{\$/\epsilon}^2 > E_{\$/\epsilon}^4$. We say the short run exchange rate “overshoots” the eventual long run exchange rate.

Permanent change in M : Adjustment

- ▶ The economy eventually adjusts from the short run to the long run. How?
 - ▶ As P slowly changes, M/P falls until it returns to its initial and long run level
 - ▶ As M/P decreases, i increases until it is back to its initial and long run level
 - ▶ The FR curve does not return to its original position — there has been a permanent change in expected inflation because the increase in the U.S. money supply is permanent
 - ▶ The exchange rate eventually appreciates to $E_{\$/\epsilon}^4$.
- ▶ Let's look at this as a time series

Permanent increase in M_{US}

Permanent increase in M : Overshooting

- ▶ The key to overshooting is the change in expectations
- ▶ Expectations change because the change in M is permanent
- ▶ With a temporary change, the only change in the FX market is $i_{\$}$. The shift of FR provides the extra depreciation in the short run.
- ▶ The extent to which monetary policy is viewed as temporary or permanent determines how large the short-run change in the exchange rate will be

Summary

- ▶ We could handle permanent changes in the long run model
- ▶ We could handle temporary changes in the short run model
- ▶ Putting the two models together let's us see the effect of a permanent change in the short run
- ▶ The big innovation: The long run model lets people forecast the future exchange rate. In the short run, this causes FR to shift, causing a larger depreciation of the dollar compared to a temporary change in M
- ▶ In the short run, the exchange rate **overshoots** its long run level
- ▶ Monetary policy shocks that are expected to change the long run (permanent shocks) generate more fx volatility than temporary shocks that are not expected to change the long run