

## Issues in International Finance

### *Exchange rates in the short run: The asset approach*

UW – Madison // Fall 2018

## Roadmap

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- ▶ 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
- ▶ Currently: 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
- ▶ Coming up: Integrating the short and long run approach

## Recap: UIP

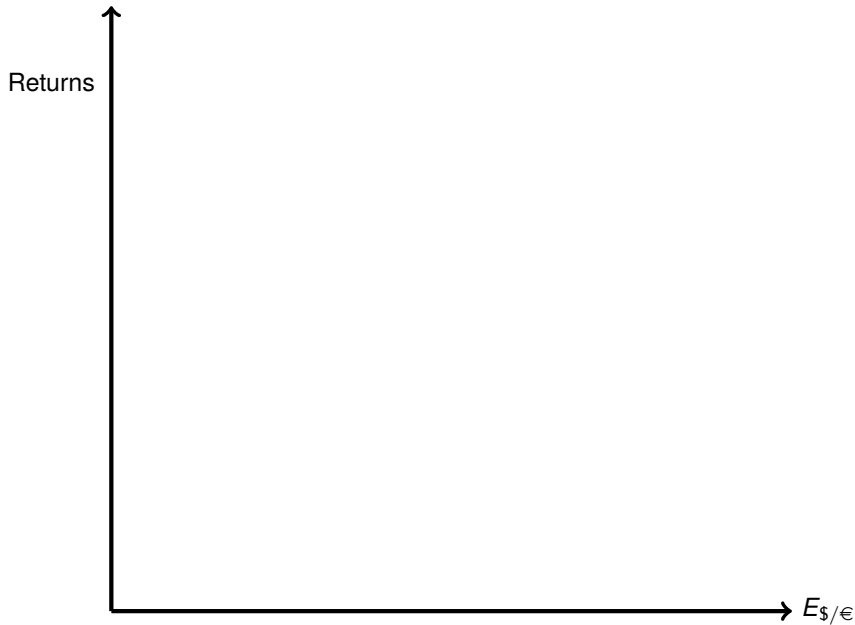
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- ▶ Uncovered interest parity

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

- ▶ Left-hand side: return to investing in dollars
- ▶ Right-hand side: return to investing in euros
- ▶  $\frac{E_{\$/\text{€}}^e}{E_{\$/\text{€}}} - 1 = d_{\$/\text{€}}^e$  is the expected depreciation rate of the dollar
- ▶ Known variables:  $i_{\$}$ ,  $i_{\text{€}}$ ,  $E_{\$/\text{€}}^e$
- ▶ Solve for:  $E_{\$/\text{€}}$
- ▶ Let's plot the left- and right-hand sides of (1)

# Foreign and domestic returns



## Recap: UIP

- ▶ The foreign return curve (FR)

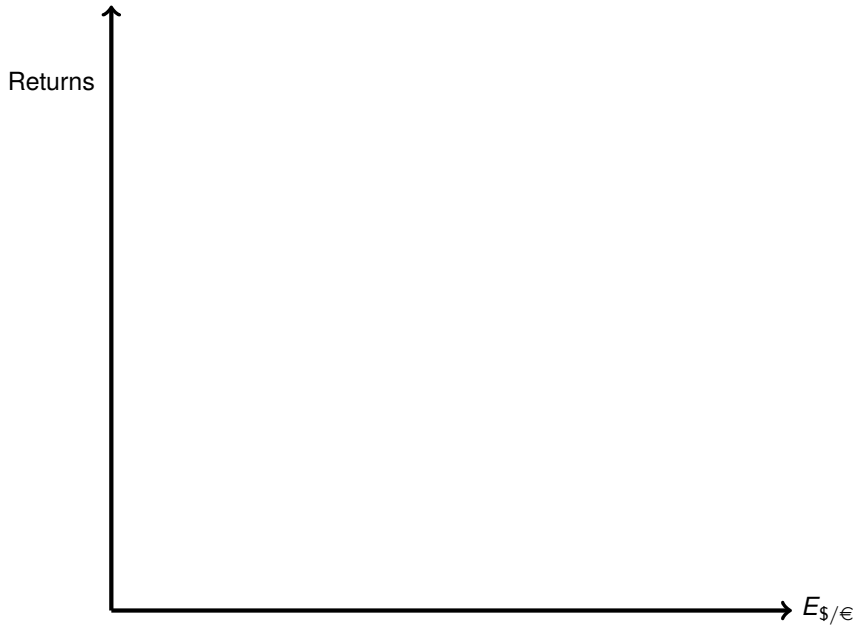
$$FR = i_{\epsilon} + \left( \frac{E_{\$/\epsilon}^e}{E_{\$/\epsilon}} - 1 \right)$$

- ▶ The domestic return curve (DR)

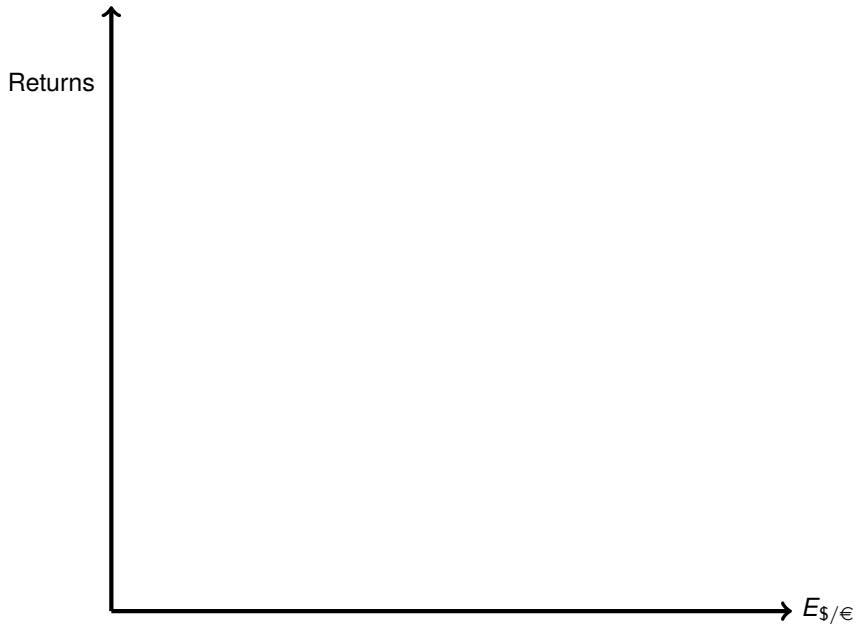
$$DR = i_{\$}$$

- ▶ How do the curves shift and what happens to  $E_{\$/\epsilon}$  when
  - ▶  $i_{\$}$  increases?
  - ▶  $i_{\epsilon}$  decreases?
  - ▶  $E_{\$/\epsilon}^e$  decreases?

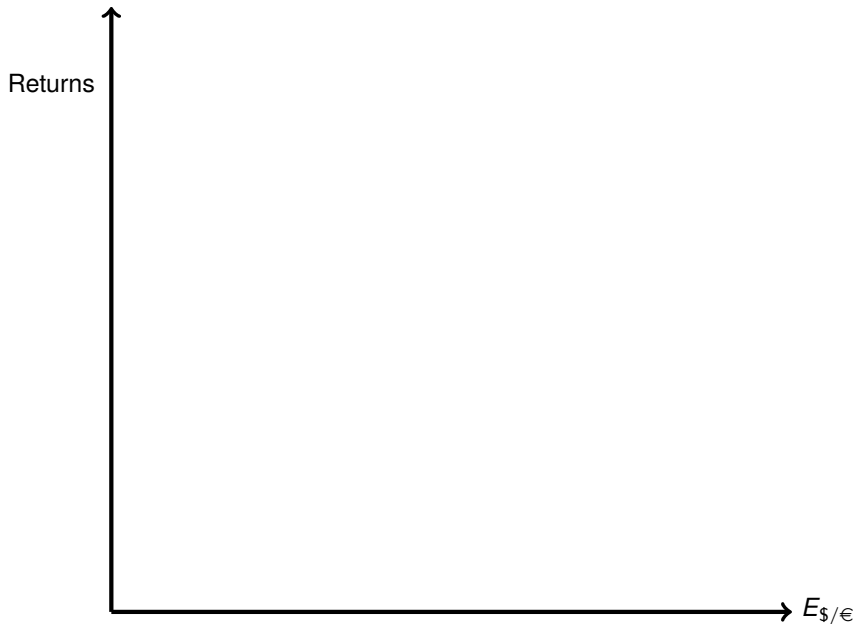
Foreign and domestic returns (increase  $i_{\$}$ )



Foreign and domestic returns (decrease  $i_{\epsilon}$ )



Foreign and domestic returns (decrease  $E_{\$/\epsilon}^e$ )





## Determining the spot exchange rate

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- ▶ UIP tells us that  $i_{\$}$ ,  $i_{\text{€}}$ ,  $E_{\$/\text{€}}^e$  determine  $E_{\$/\text{€}}$
- ▶ Where do  $i_{\$}$ ,  $i_{\text{€}}$ ,  $E_{\$/\text{€}}^e$  come from?
  1. Quantity theory in the short run:  $i_{\$}$ ,  $i_{\text{€}}$
  2. Quantity theory + PPP in the long run:  $E_{\$/\text{€}}^e$

## Short run nominal interest rates

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▶ Short-run assumptions

1. Price level is fixed (sticky) at  $\bar{P}_{us}, \bar{P}_{eu}$
2. Nominal interest rate adjusts to clear money market

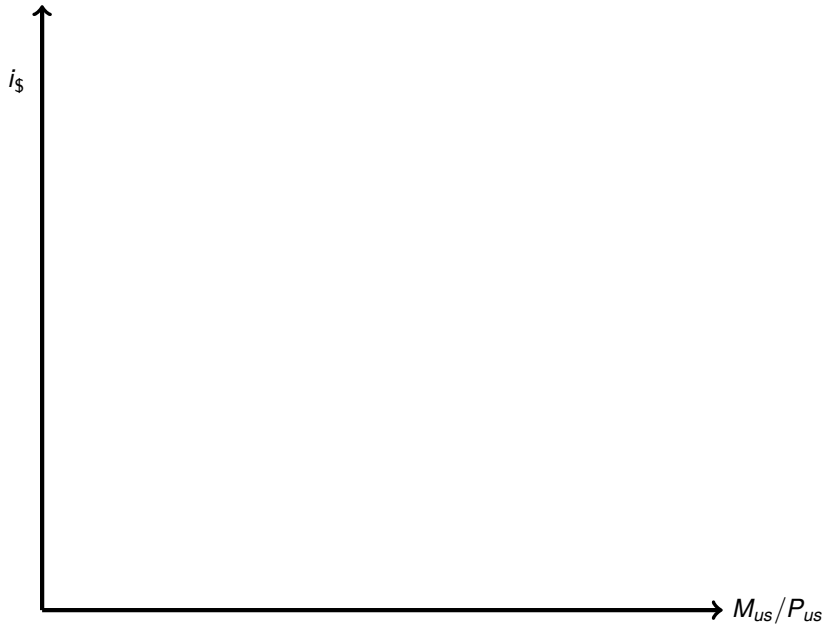
▶ Quantity theory with fixed prices

$$\frac{M_{us}}{\bar{P}_{us}} = L(i)Y_{us}$$

$$\frac{M_{eu}}{\bar{P}_{eu}} = L(i)Y_{eu}$$

- ▶ We will focus on the US, but the analogous relationships are true in EU

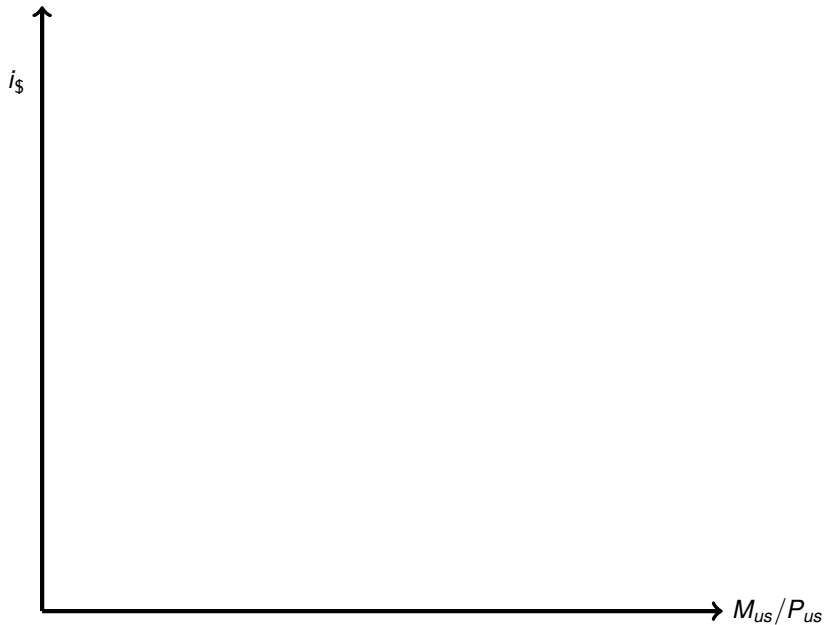
# Home money market



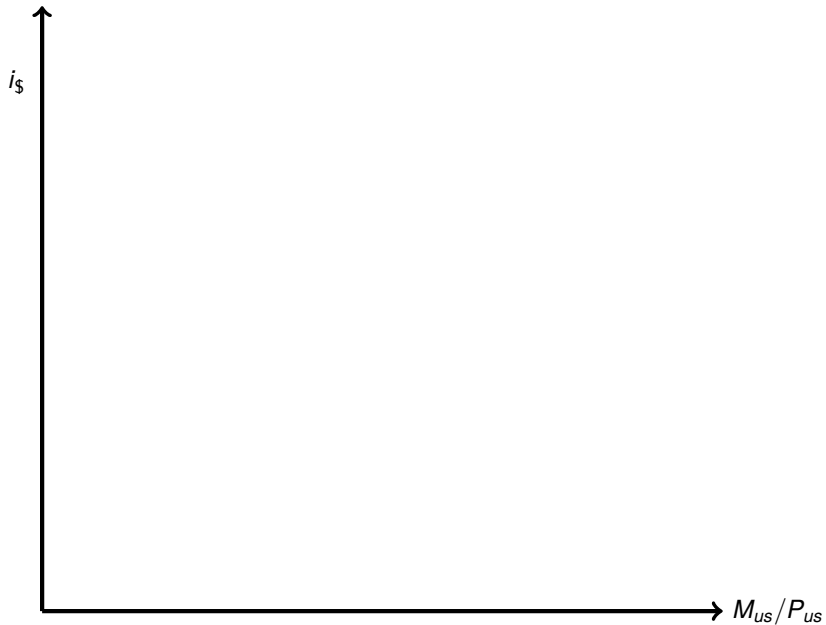
## Home money market

- ▶ How do the curves shift and what happens to  $i_{\$}$  when
  - ▶  $M_{US}$  increases?
  - ▶  $Y_{US}$  decreases?

Home money market (increase  $M_{US}$ )



Home money market (decrease  $Y_{us}$ )

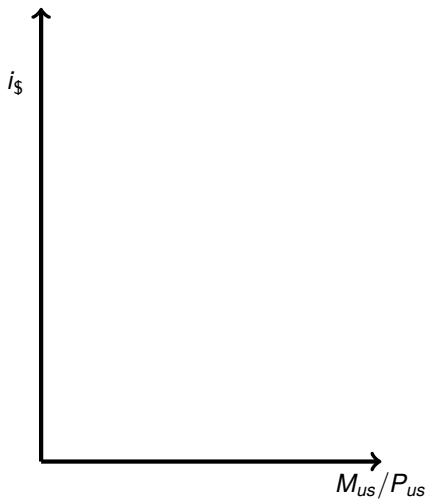


## Determining the spot exchange rate

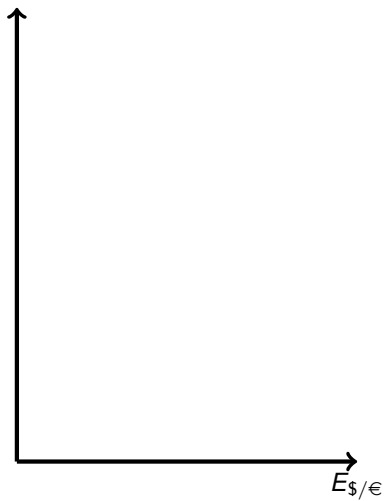
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- ▶ UIP tell us that  $i_{\$}$ ,  $i_{\text{€}}$ ,  $E_{\$/\text{€}}^e$  determine  $E_{\$/\text{€}}$
- ▶ Where do  $i_{\$}$ ,  $i_{\text{€}}$ ,  $E_{\$/\text{€}}^e$  come from?
  1. Quantity theory in the short run:  $i_{\$}$ ,  $i_{\text{€}}$
  2. Quantity theory + PPP in the long run:  $E_{\$/\text{€}}^e$
- ▶ We can now put together quantity theory and UIP in the short run.
- ▶ We still take  $E_{\$/\text{€}}^e$  as exogenous for now.

Home money market



FX market

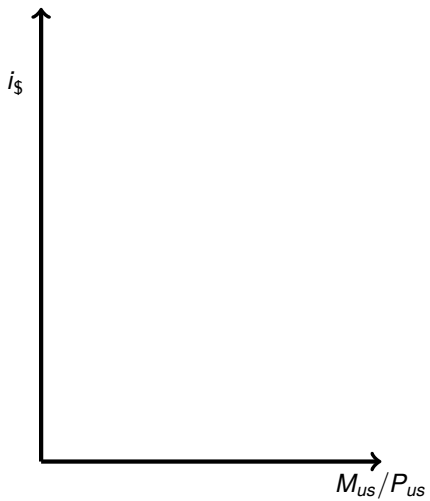




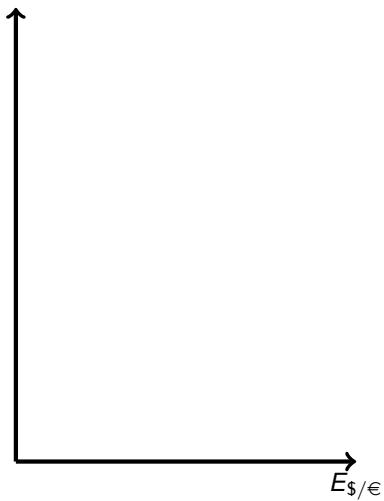
## Determining the spot exchange rate

- ▶ The central bank in each country determines  $M$
- ▶  $M/\bar{P} = L(i)Y$  in each country determines  $i_{\$}$  and  $i_{\text{€}}$
- ▶  $i_{\$}$  and  $i_{\text{€}}$  (and  $E_{\$/\text{€}}^e$ ) determine  $E_{\$/\text{€}}$
  
- ▶ What happens when  $M_{US}$  **temporarily** increases?
- ▶ Temporary is important: a permanent change would lead to changes in the long run and changes in  $E_{\$/\text{€}}^e$  (through PPP)

Home money market



FX market



## Determining the spot exchange rate

- ▶ The central bank in each country determines  $M$
- ▶  $M/\bar{P} = L(i)Y$  in each country determines  $i_{\$}$  and  $i_{\text{€}}$
- ▶  $i_{\$}$  and  $i_{\text{€}}$  (and  $E_{\$/\text{€}}^e$ ) determine  $E_{\$/\text{€}}$
  
- ▶ What happens when  $M_{US}$  temporarily increases?
- ▶ Temporary is important: a permanent change would lead to changes in the long run and changes in  $E_{\$/\text{€}}^e$  (through PPP)
  1. Real money supply shifts (prices are fixed)
  2. Lowers  $i_{\$}$  to new equilibrium rate
  3. Shifts DR curve down
  4. Dollar depreciates

## Summary: Short run fx rates

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- ▶ Quantity theory + UIP
- ▶ Price level is fixed, expected deflation is known
  - ▶ Money supply determines real money supply ( $M/P$ )
  - ▶ Quantity theory determines the interest rate
  - ▶ Interest rates determine spot exchange rate through UIP
- ▶ A **temporary** increase in the US money supply
  - ▶ Does nothing in the long run
  - ▶ Decreases nominal interest rates in US
  - ▶ Depreciates the dollar