

# Issues in International Finance

## *Exchange rates review*

UW – Madison // Fall 2018

## Administrative things

- ▶ PS #2 solutions posted this afternoon
- ▶ Last set of marked up slides posted this afternoon
- ▶ Practice exam and solutions posted
- ▶ Office hours (7444 Soc Sci):
  - ▶ Today (10/2) 2:30PM–3:30PM
  - ▶ Tomorrow (10/3) 5:30PM–6:30PM
  - ▶ Thursday (10/4) 9:00AM–10:00AM
- ▶ Next week: Start Ch. 16 “National and International Accounts”

## Exam I: Thursday 10/4

- ▶ Exam duration is 75 minutes
- ▶ We will start on time; arrive early
- ▶ Bring
  - ▶ Calculator
  - ▶ One page of notes (8.5"x11")
  - ▶ No wireless devices or other materials
- ▶ Show your work!

## Big picture

- ▶ Exam information
- ▶ Introduction to exchange rates
  - ▶ Definitions: appreciate, depreciate, multilateral fx rates
  - ▶ Exchange rate regimes: fixed, floating, somewhere in between
  - ▶ Types of fx contracts
  - ▶ Triangle arbitrage *2 fx rates → 3rd is implied*
  - ▶ Covered interest parity
  - ▶ Uncovered interest parity



## Big picture

- ▶ Exchange rates in the long run: Monetary approach
  - ▶ Key assumption: Flexible prices
  - ▶ Law of one price
  - ▶ Purchasing power parity: Absolute and relative
  - ▶ Quantity theory of money: Prices depend on money supply
  - ▶ Hyperinflations
  - ▶ Real and nominal interest rates (the Fisher effect)
  - ▶ Real interest rate parity ←  $r_{US}^e = r_{UK}^e = r_{JP}^e = \dots = r^*$
  - ▶ Nominal anchors
- ▶ Big idea: long-run exchange rates determined by money supply
- ▶ Big idea: nominal interest rates determined by expected inflation

$$i = r^* + \pi^e$$

— PPP

## Big picture

- ▶ Exchange rates in the short run: Asset approach
  - ▶ Key assumption: Sticky prices
  - ▶ Long-run model (PPP) pins down expected exchange rate
  - ▶ UIP pins down short-run exchange rate
  - ▶ Sticky prices: Change in money change  $M/P, i$
  - ▶ Temporary shocks vs. permanent shocks
  - ▶ Overshooting
  
- ▶ Big idea: short-run exchange rates determined by UIP
- ▶ Big idea: nominal interest rates determined in money market

*asset*

## Introduction to fx rates: Key equations

- ▶ Triangle no-arbitrage

$$E_{\$/\text{€}} = E_{\$/\text{£}} \times E_{\text{£}/\text{€}}$$

- ▶ Covered interest parity *→ Removes fx risk*

$$F_{\$/\text{€}} = \frac{1 + i_{\$}}{1 + i_{\text{€}}} E_{\$/\text{€}}$$

- ▶ Uncovered interest parity

$$E_{\$/\text{€},t} = \frac{1 + i_{\text{€}}}{1 + i_{\$}} E_{\$/\text{€},t+1}^e$$

$$d_{\$/\text{€}}^e + i_{\text{€}} = i_{\$}$$

*depreciation is related to differences in interest rates.*

- ▶ Where the expected depreciation rate of the dollar is

$$d_{\$/\text{€}}^e = \frac{E_{\$/\text{€},t+1}^e}{E_{\$/\text{€},t}} - 1$$

## Long-run monetary approach: Key equations

---

- ▶ Purchasing power parity

$$P_{us} = P_{eu} \times E_{\$/\text{€}}$$

$$\pi_{us} - \pi_{eu} = d_{\$/\text{€}}$$

- ▶ Money market equilibrium → price level

$$P = \frac{M}{L(i)Y}$$

- ▶ Expressed in changes → inflation rate

$$\pi_{us} = \mu_{us} - g_{us} - \lambda_{us}$$



## Long-run monetary approach: Relationships

---

- ▶ Assumptions: flexible prices, no-arbitrage

---

	Levels	Expected change
Fx rate	$E_{H/F} = \frac{P_H}{P_F}$	$d_{H/F}^e = \pi_H^e - \pi_F^e$
Price	$P_H = \frac{M_H}{L(i_H)Y_H}$	$\pi_{H/F}^e = \mu_H^e - g_H^e - \lambda_H$
Nominal interest rate	$i_H = r^* + \pi_H^e$	

---

- ▶ Similar equations hold for foreign country
- ▶ Shocks: changes in  $M_H, M_F, Y_H, Y_F, \mu_H, \mu_F, g_H, g_F$

## Long-run monetary approach: Expectations

- ▶ Flexible prices: real variables are unaffected by changes in money
- ▶ Unstable expectations create unstable exchange rates and interest rates
- ▶ **Expectation management** is important for policy makers
- ▶ Nominal anchors help to coordinate expectations
  - ▶ Exchange rate target:  $\pi_H = d_{H/F} + \pi_F$
  - ▶ Money supply target:  $\pi_H = \mu_H - g_H - \lambda_H$
  - ▶ Inflation target:  $\pi_H^e = i_H - r^*$

## Short-run asset approach: Key equations

---

- ▶ Bring together long-run and short-run models
- ▶ Long run: Purchasing power parity

$$E_{H/F}^e = \frac{P_H^e}{P_F^e}$$

- ▶ Long run: Quantity theory with flexible prices (in expected value)

$$P_F^e = \frac{M_F^e}{L_F(i_F^e) Y_F^e}$$

$$P_F^e = \frac{M_F^e}{L_F(i_F^e) Y_F^e}$$

## Short-run asset approach: Key equations

---

- ▶ Bring together long-run and short-run models
- ▶ Short run: UIP

$$i_H = i_F + \frac{E_{H/F}^e}{E_{H/F}} - 1$$

- ▶ Short run: Quantity theory with fixed prices

$$\bar{P}_F = \frac{M_F}{L_F(i_F)Y_F}$$

$$\bar{P}_F = \frac{M_F}{L_F(i_F)Y_F}$$

## Short-run approach: Relationships

---

- ▶ Assumption: Long run = monetary approach in levels
- ▶ Assumption: Prices are sticky, but expectations adjust instantly
- ▶ Assumption: Over time, prices gradually adjust to long-run level

---

	Short run	Long run
Fx rate	$E_{H/F} = \frac{E_{H/F}^e}{1+i_H-i_F}$	$E_{H/F} = \frac{P_H}{P_F}$
Price	fixed	$P_H = \frac{M_H}{Y_{HL}(i_H)}$
Nominal interest rate	$\frac{M_H}{P_H} = Y_{HL}(i_H)$	

---

- ▶ Similar equations hold for foreign country
- ▶ Shocks: changes in  $M_H, M_F, Y_H, Y_F$  both temporary and permanent

## Short-run approach

- ▶ Sticky prices: fx rates more volatile than prices
- ▶ Permanent shocks create fx rate overshooting

↳  $\Delta$  in expectations.  
⋮  
nominal anchors.