Topics for Today

1. The Road Ahead
   - How chpts. 13-16 fit together
2. The Foreign Exchange Market
3. Covered Interest Parity and the determination of Forward exchange rates
4. The Demand for Foreign Currency Denominated Assets
5. Uncovered Interest Rate Parity

Ultimately, our goal is to explain the behavior of 3 key variables:

1.) E = Exchange Rate

2.) R = Interest Rate

3.) Y = Output

These are jointly determined, endogenous variables.

We study these variables by examining 3 key markets:

1.) The foreign exchange market

2.) The domestic money market

3.) The market for goods & services

These markets are interdependent.

We are studying a general equilibrium system.

The exogenous (determining) variables are:

1.) M, M^* = Domestic & Foreign Money Supplies
2.) R^* : Foreign Interest Rate
3.) Y^* : Foreign Output

A Warning About Notation

Exchange Rate: The price of one currency in terms of another currency.

Since exchange rates are relative prices, we can define them in 2 ways:

1.) Value of domestic Currency = $\frac{\text{Foreign Currency}}{\text{Domestic Currency}}$

2.) Price of foreign Currency = $\frac{\text{Domestic Currency}}{\text{Foreign Currency}}$

We will use (2)

$E\uparrow \Rightarrow$ domestic currency depreciates

foreign currency appreciates

Our strategy will be to take a step-by-step approach

Analyze equilibrium in each market in isolation, taking the outcomes in other markets as given, and then fit all the pieces together at the end.

Chpt. 13: **The FX Market**

"Uncovered Interest Parity"

Derive an equilibrium relationship between (E, R, R^*, E^e)

E^e: expected future ex. rate

Chpt. 14: **The Money Market**

Determinants of R

(holding, Y and P fixed)

Chpt. 15: **Expectations** / Long-Run Equil.

"Purchasing Power Parity"

Determination of E^e (and P).

Chpt. 16: Simultaneous determination of Y and E (with R in the background) in goods + asset markets

DD-AA Model

The Foreign Exchange Market

The FX market is by far the world's largest financial market

On a typical day, roughly $1.5-2.0 trillion changes hands

⟹ in less than a week fx transactions exceed the annual value of world trade.

The FX market is a decentralized multiple-dealer market. It never closes!

Most trading is between dealers (about 60-70%)

About ½ of inter-dealer trades go through fx brokers.

Major Participants

1.) Commercial Banks

2.) other financial institutions

3.) Corporations

4.) Central Banks

Leading Trading Centers

1.) London

2.) New York

3.) Tokyo

4.) Frankfurt, Hong Kong, Singapore

Major Instruments

1.) Spot (2 day settlement lag)

2.) Forwards } "over-the-counter" markets

3.) Swaps }

Futures + options also exist, but they are less important

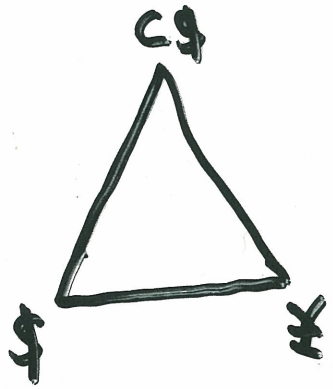
Most volume is in forwards + swaps (~60%) with swaps being more important than forwards

Most fx trading takes place in and through the U.S. dollar.

Cross rates are determined by "triangular arbitrage"

$$\frac{C\$}{¥} = \frac{C\$}{\$} \cdot \frac{\$}{¥}$$

i.e.



The Demand for FX Assets

Like all assets, the demand for foreign currency-denominated assets depends on 3 factors:

1.) Expected (real) returns

2.) Risk

3.) Liquidity

In turn, the expected dollar return on foreign currency assets depends itself on 2 factors:

1.) Their interest rate (or cash flows).

2.) Expected exchange rate changes

Note: When comparing real $ returns on domestic and foreign assets, we can ignore inflation, since it is the same for both.

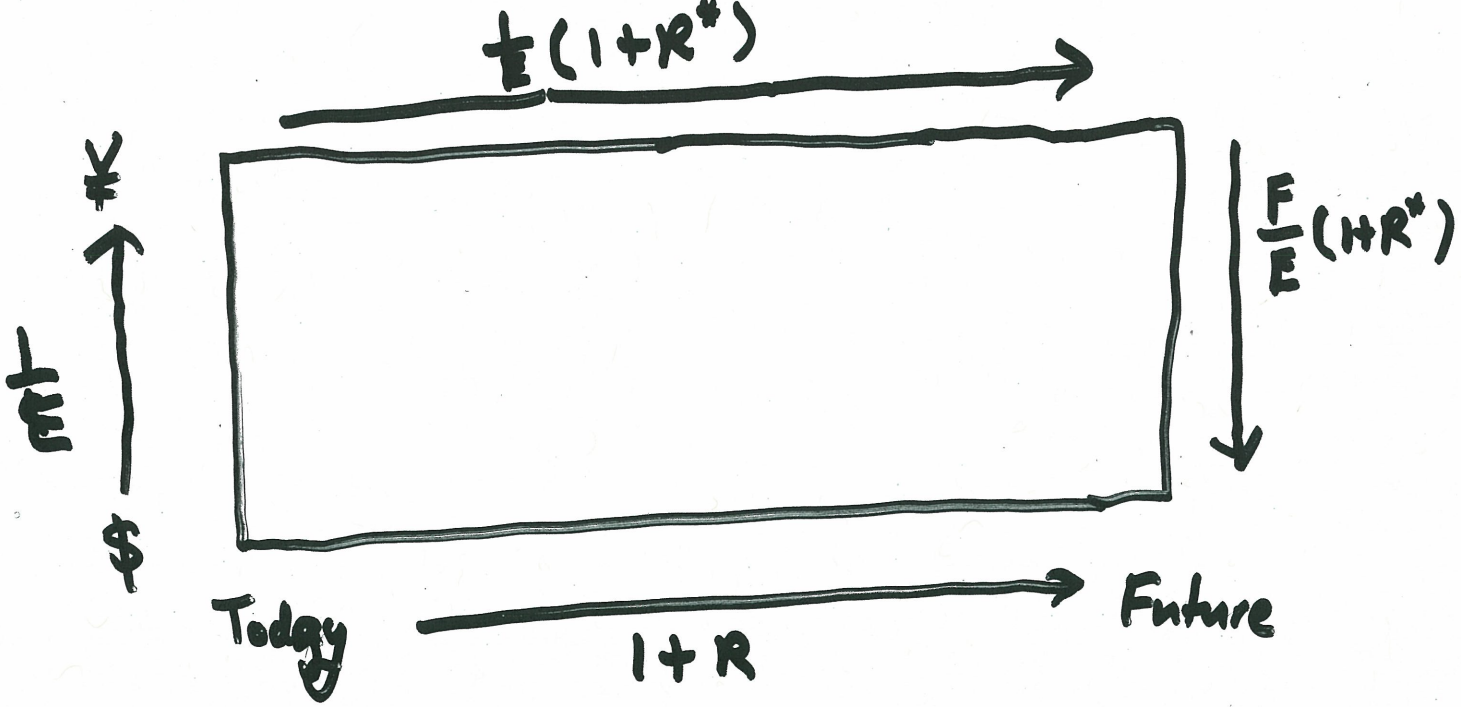
Covered Interest Parity

E_t = spot rate at time t ($/¥)

F_t = forward rate at t ($/¥)

R_t = U.S. (nominal) interest rate

R^*_t = Japanese (nominal) interest rate



There are 2 ways of getting future $

1.) Invest in U.S. $(1+R)$

2.) Buy yen, invest in Japan, sell the ¥ forward

$\frac{F}{E}(1+R^*)$

To prevent arbitrage possibilities, these 2 strategies must be equivalent.

$$\frac{F}{E}(1+R^*) = 1+R$$

→ Covered int rate pari

or, $F = E\left(\frac{1+R}{1+R^*}\right)$ } Determination of forward rate

↘ Divide by $1+R^*$, subtract 1 from both sides

$$\frac{F-E}{E} = \frac{R-R^*}{1+R^*} \approx R-R^*$$

↓

Covered Interest Parity

$\frac{F-E}{E}$ = "forward discount of \$"

Swap: Combo of spot + forward

Buy ¥ now and simultaneously sell ¥ forward.

Uncovered Interest Parity

What if you don't sell forward? Wait and convert fx ~~and~~ at the (unknown) future spot ex. rate.

Expected ($) return on fx deposit:

$$\frac{E^e}{E}(1+R^*)$$

Equilibrium in the fx market:

Expected returns (expressed in common currency units) are the same on domestic and foreign-currency denominated deposits

$$\boxed{R - R^* = \frac{E^e - E}{E}} \quad \} \text{ UIP}$$

$R - R^*$: Interest differential

$\frac{E^e - E}{E}$: Expected rate of domestic currency depreciation

or

$$R = R^* + \frac{E^e - E}{E}$$

Note, combining CIP and UIP we get $F = E^e$, i.e., Forward Rate = Expected Future Spot Rate

Real World Considerations We are abstracting from:

1.) Risk - Future spot rate is <u>unknown</u>

2.) Transactions Costs / Liquidity.