Monetary policy and theory

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Agenda

- **Forex market**
  - **Institutional features**
  - **Exchange rate determination**

Reading: Chapter 18. This chapter outlines how the foreign exchange market functions and how the value of different currencies is determined.

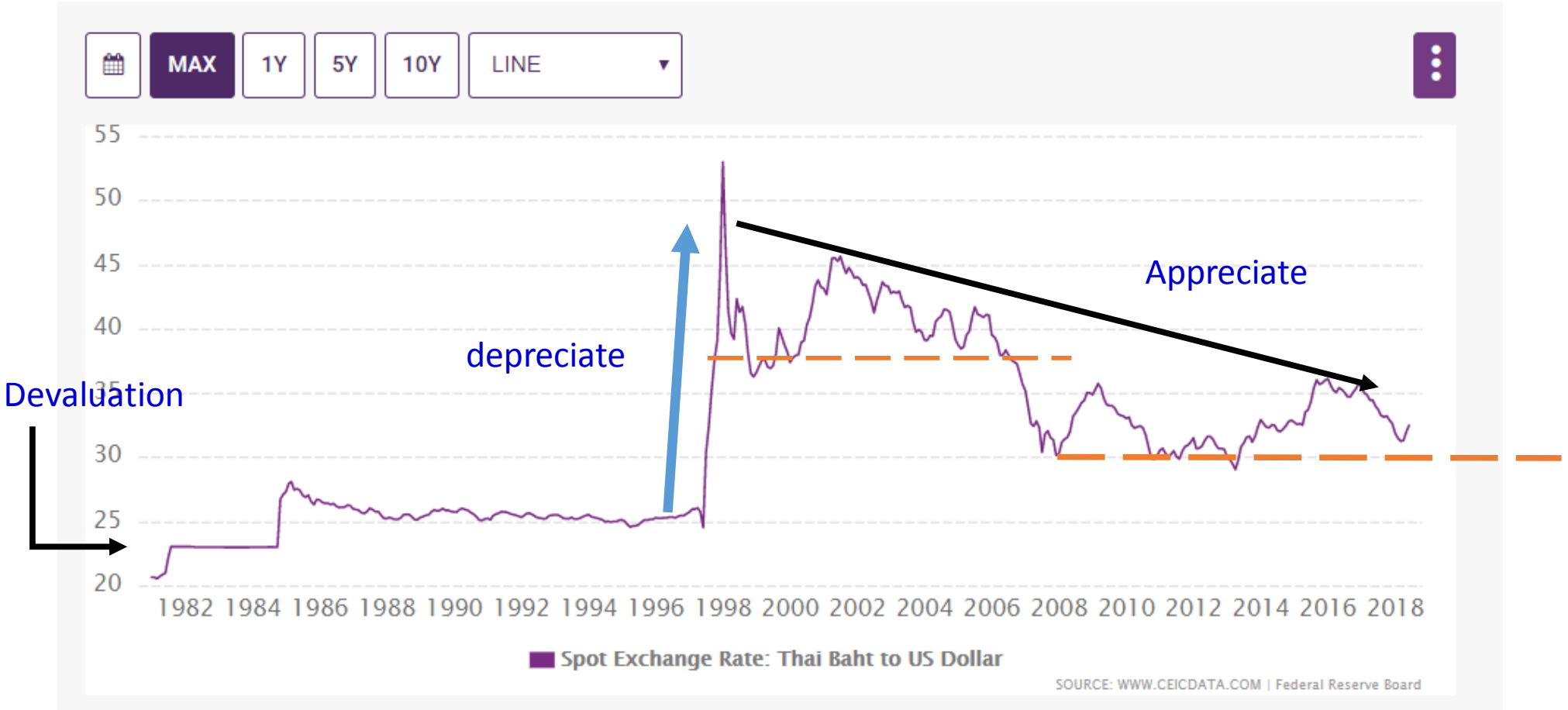
Foreign Exchange Market

- **Exchange rate**: price of one currency in terms of another
- **Foreign exchange market**: the financial market where exchange rates are determined
  - **Spot transaction**: immediate (two-day) exchange of bank deposits
    - Spot exchange rate
  - **Forward transaction**: the exchange of bank deposits at some specified future date
    - Forward exchange rate

Foreign Exchange Market

- **Appreciation**: a currency rises in value relative to another currency
- **Depreciation**: a currency falls in value relative to another currency

Nominal exchange rate: THB v.s. USD



The Effect of exchange rate.

- When a country's currency appreciates, the country's goods become more expensive to foreigners and foreign goods in that country become less expensive to domestic economic agents.

- Not always! Better look at the **real exchange rate**.

Foreign Exchange rate: Nominal v.s. Real

- **The nominal exchange rate (e):** the price of one unit of foreign currency in terms of domestic currency; rising 'e' means depreciation in local currency.
  - P = the price of domestic goods in the unit of domestic currency.
  - P*= the price of foreign goods in the unit of foreign currency.
  - eP* = the price of foreign goods in the unit of domestic currency.

- **The real exchange rate** (***RER: the terms of trade***) is the price of foreign goods in terms of domestic goods:

$$real\ exchange\ rate = \frac{eP^*}{P}$$

Effective Exchange rate: weighted average of exchange rate indices

- **Nominal effective exchange rate (NEER):** an index constructed to measure the relative (nominal) value of a national currency against other trading partners.

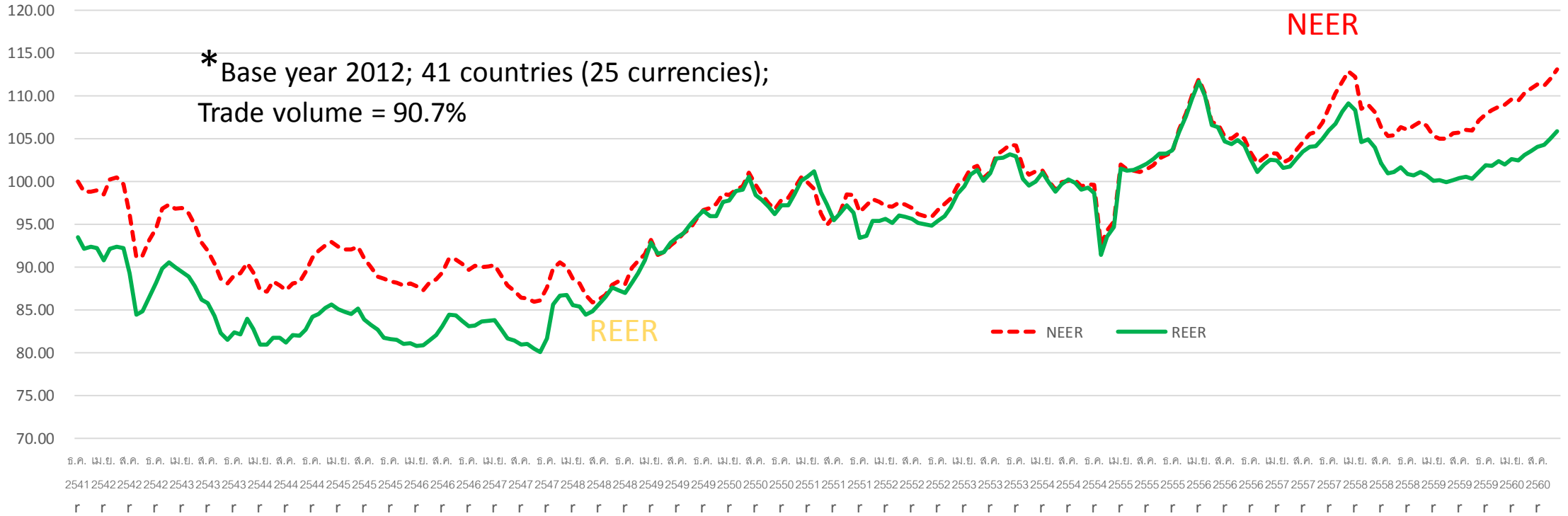
$$NEER_t = \frac{\sum_{i=1}^{N} w_{i,0}\, e_{i,t}}{\sum_{i=1}^{N} w_{i,0}\, e_{i,t=0}} * 100$$

  - $w_{i,0}$: $trading\ basket\ (bilateral\ trade\ share\ with\ country\ \ i)$

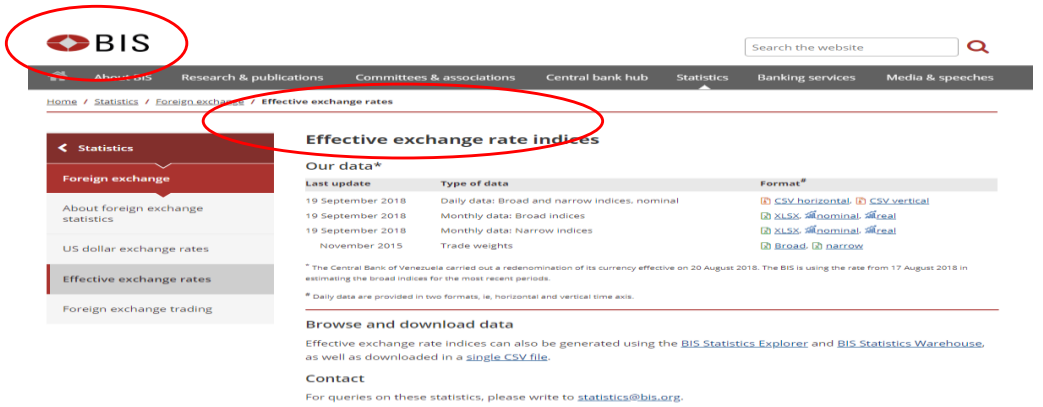
- **The real exchange rate (REER):** an index constructed to measure the relative (real) value of a national currency against other trading partners.

$$REER_t = \frac{\sum_{i=1}^{N} w_{i,0}\, rer_{i,t}}{\sum_{i=1}^{N} w_{i,0}\, rer_{i,t=0}} * 100$$

NEER v.S. REER in Thailand



By the way official series are constructed*, an increase in NEER refers to the *baht appreciation* against Thailand's major trading partners and competitors. This reflects a relatively overall *disadvantage* of the baht in (relative) price competitiveness.



Trading arrangements in the FOREX market

- ***Over-the-counter*** market mainly banks
- **OTC:** Bid-ask spread (cost of matching buyers & sellers)
- **Spot transaction**: immediate (two-day) exchange of bank deposits
  - Spot exchange rate
- **Forward transaction**: the exchange of bank deposits at some specified future date
  - Forward exchange rate

Currency	Description	Bank Notes Buying Rates	Bank Notes Selling Rates	Sight Bill Buying Rates	TT Buying Rates	Bill - DD - TT Selling Rates
USD1	USD: 1-2	31.28	32.58			
USD5	USD: 5-20	31.63	32.63			
USD50	USD: 50-100	32.03	32.63	32.20	32.30	32.60
GBP	United Kingdom	41.77	43.28	42.21750	42.32750	43.18000

U.S. Dollar/Thai Baht (^USDTHB)

32.4524 **-0.0984 (-0.30%)** 04:15 CT [FOREX]

32.4500 x N/A 32.4700 x N/A

FORWARD RATES for Wed, Sep 19th, 2018

Alerts

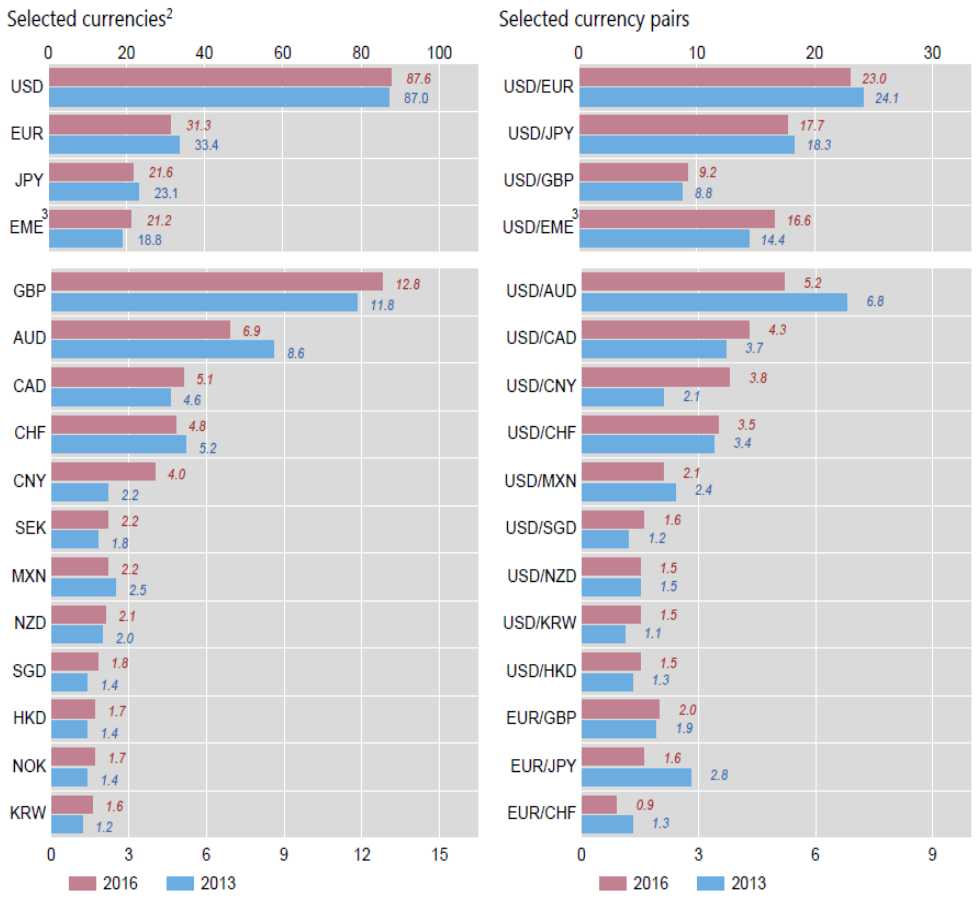
Forward Rates

Name	Bid	Ask	Mid Price
USD/THB Overnight Forward	-2.0000	2.0000	0.0000
USD/THB Tomorrow Forward	-2.0000	1.9900	-0.0050
USD/THB Spot Forward	-2.1500	1.8500	-0.1500
USD/THB 1-Week Forward	-1.7000	-1.0000	-1.3500
USD/THB 2-Week Forward	-4.7000	-0.7700	-2.7350
USD/THB 3-Week Forward	N/A	N/A	N/A
USD/THB 1-Month Forward	-4.4800	-3.7200	-4.1000
USD/THB 2-Month Forward	-8.5000	-7.5000	-8.0000
USD/THB 3-Month Forward	-11.6700	-10.5300	-11.1000

Some Facts about foreign exchange market

Foreign exchange market turnover by currency and currency pairs

Net-net basis,[1] daily averages in April, in per cent — Graph 1



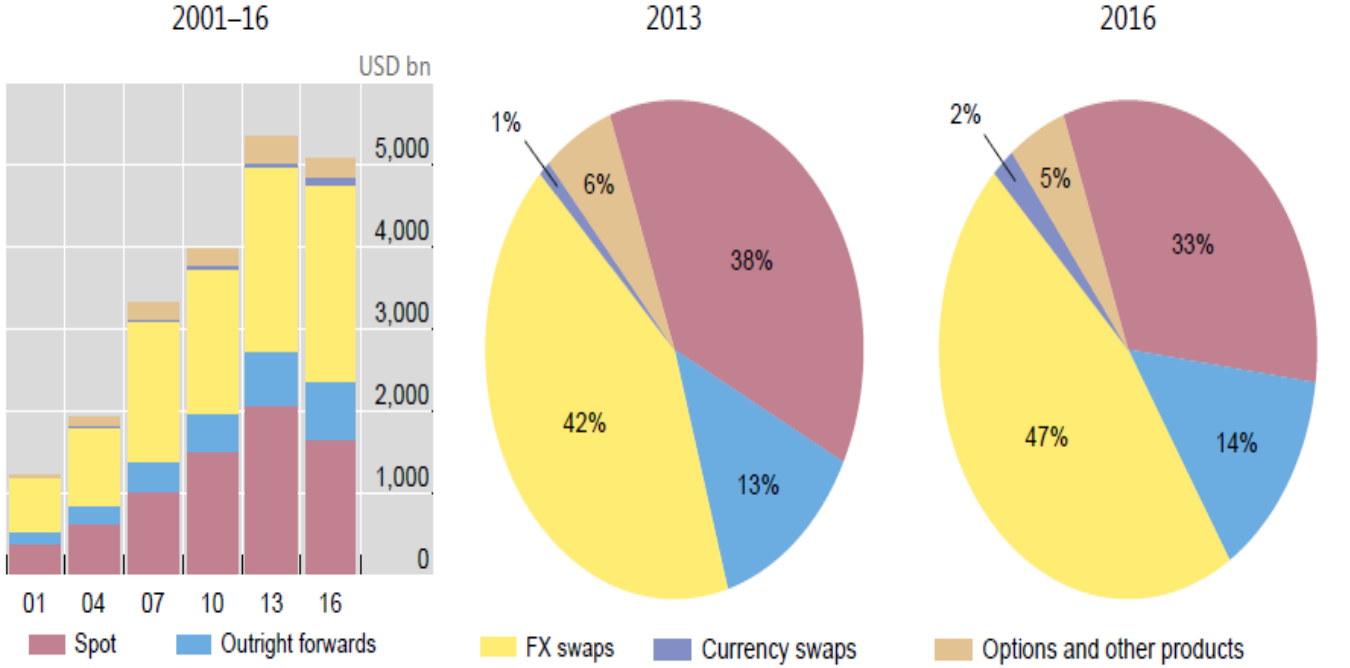
[1] Adjusted for local and cross-border inter-dealer double-counting. [2] As two currencies are involved in each transaction, the sum of shares in individual currencies will total 200%. [3] Emerging market currencies.

Source: BIS Triennial Central Bank Survey. For additional data by currency and currency pairs, see Tables 2 and 3 on pages 10 and 11.

Triennial Central Bank Survey of foreign exchange and OTC derivatives markets in 2016

Foreign exchange market turnover by instrument

Net-net basis,[1] daily averages in April — Graph 2



[1] Adjusted for local and cross-border inter-dealer double-counting.

Source: BIS Triennial Central Bank Survey. For additional data by instrument, see Table 1 on page 9.

Exchange Rates determination: long-run theory

- **Law of one price:**

$$P_i = e * P_i^*$$

Assumptions: No physical and trade barriers

Price equalization results from the no-arbitrage condition with identical product.

Exchange Rates determination: long-run theory

- **Purchasing power parity**

" If the law of one price holds for every items, we obtain that $P = e * P^*$

or $\mathrm{e} = \frac{\mathrm{P}}{P^*}$. That is, nominal exchange rate is determined the relative CPI level in

the two countries."

Assumptions:

(i) No-home biased consumption pattern (identical consumption basket)

(ii) Tradability

(iii) Free mobility of factors of production

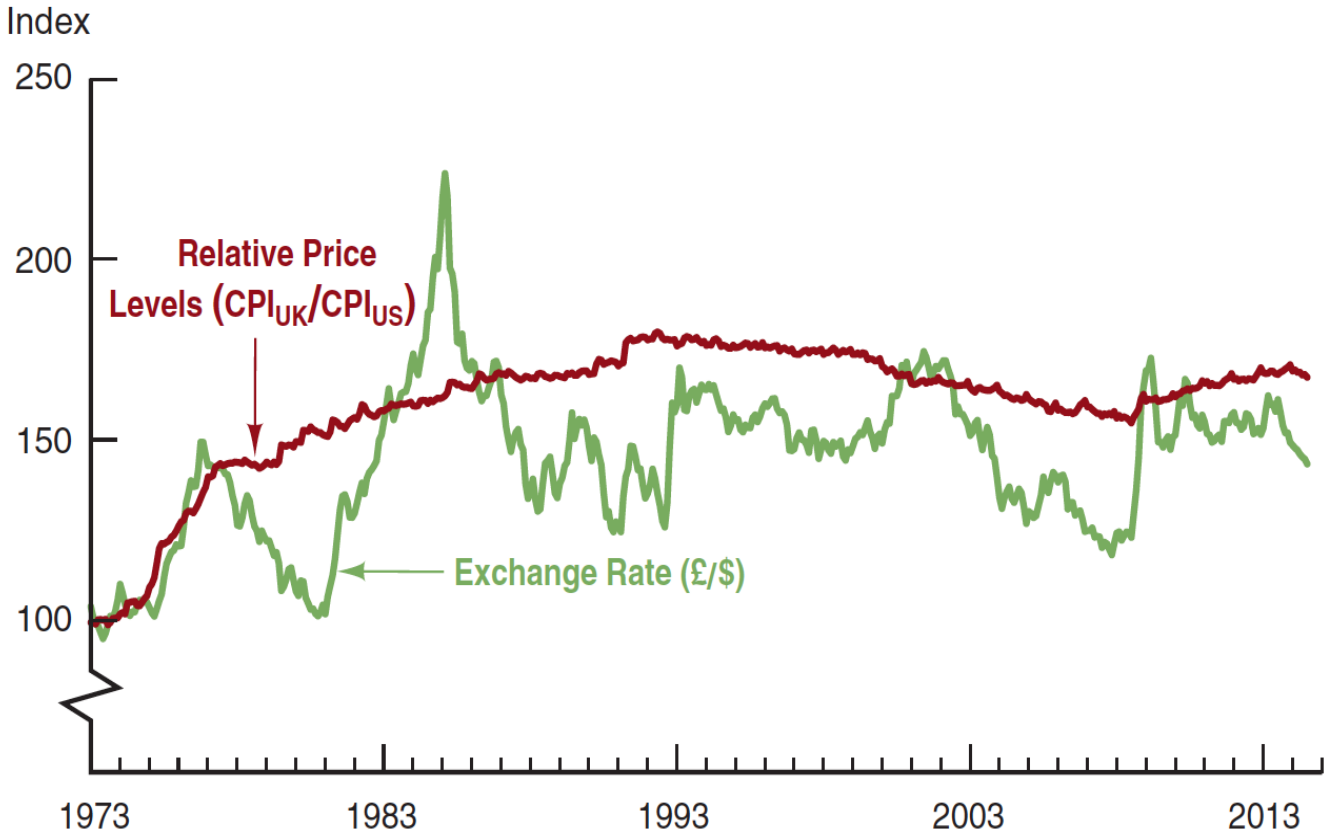
Exchange Rates determination: long-run theory

- Theorem explains what the exchange rate ought to be if all the conditions are met.

- The theory does not explain well in the short-run.

- **Evidences:**
  (i) Deviation from the implied PPP exchange rate
  (ii) Positive correlation of RER and nominal exchange rate.

Figure 2 Purchasing Power Parity, United States/United Kingdom, 1973–2014 (Index: March 1973 = 100.)



Why does it fail?

Non-tradability: many goods and services are not traded across borders

Barriers to trade.

However, the theorem predicts long-term trend.

Source: Federal Reserve Bank of St. Louis, FRED database: http://research.stlouisfed.org/fred2/.

Factors That Affect Exchange Rates in the Long Run

- Relative price levels
- Trade barriers
- Preferences for domestic versus foreign goods
- Productivity

Exchange Rates in the Short Run: A Supply and Demand Analysis

- Determined by demand and supply for foreign currency in the foreign exchange rate market.
- Notation:

  $e_{B|\$}$ = units of baht required for a USD dollar

  - If $e_{B|\$}$ rises (falls), more (less) baht is required for a USD.
  - USD dollar appreciates (depreciates); Thai baht depreciates (appreciates).

  Demand for foreign currency is downward sloping in $e_{B|\$}$.

  Supply for foreign currency is upward sloping in $e_{B|\$}$.

Exchange Rates in the Short Run: A Supply and Demand Analysis

- **Demand for foreign currency is downward sloping in $e_{B|\$}$.**
  - Demand for USD is derived from **demand for foreign product**, and **demand for foreign assets.**
  - Higher $e_{B|\$}$ implies a depreciation in Thai baht (domestic currency)
    - Import less
    - Less quantity demanded for the investment in US financial market. (why?)

Relative return on investment

- **Return on Thai assets**, measured in Thai baht
  - $(1 + i^D)$: gross interest rate on Thai-denominated asset (in baht)
- **Return on US assets**, measured in Thai baht
  - 1 baht converted into $\frac{1}{\mathrm{E_t}}$ *USD*
  - $1 + i^F$: gross interest rate on US-denominated asset (in USD)
  - $\frac{1}{\mathrm{E_t}}(1 + i^F)$: return in USD for 1 bath of investment.
  - $\frac{\mathrm{E^e_{t+1}}}{\mathrm{E_t}}(1 + i^F)$: "expected" return on US asset for 1 baht of investment.
- **Relative return :** $(1 + i^D) - \frac{\mathrm{E^e_{t+1}}}{\mathrm{E_t}}(1 + i^F)$

Exchange Rates in the Short Run: A Supply and Demand Analysis

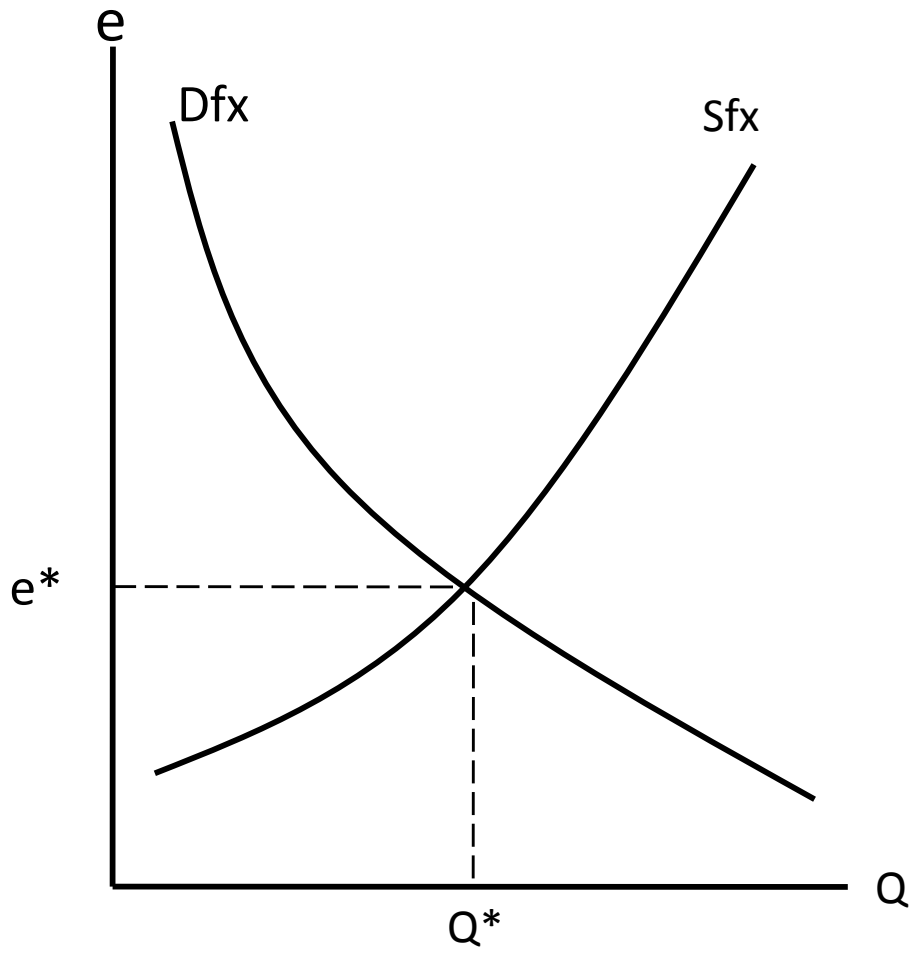
- **Supply for foreign currency is upward sloping in $e_{B|\$}$.**
  - Supply for USD is obtained from **demand for Thai (domestic) product**, and **demand for Thai (domestic) assets.**
  - Higher $e_{B|\$}$ implies a depreciation in Thai baht (domestic currency)
    - Export more (Foreign countries buy more Thai products)
    - More quantity demanded for the investment in Thai financial market.

Exchange Rates in the Short Run: A Supply and Demand Analysis

- $Q^s_{FX} = Q^d_{FX}$

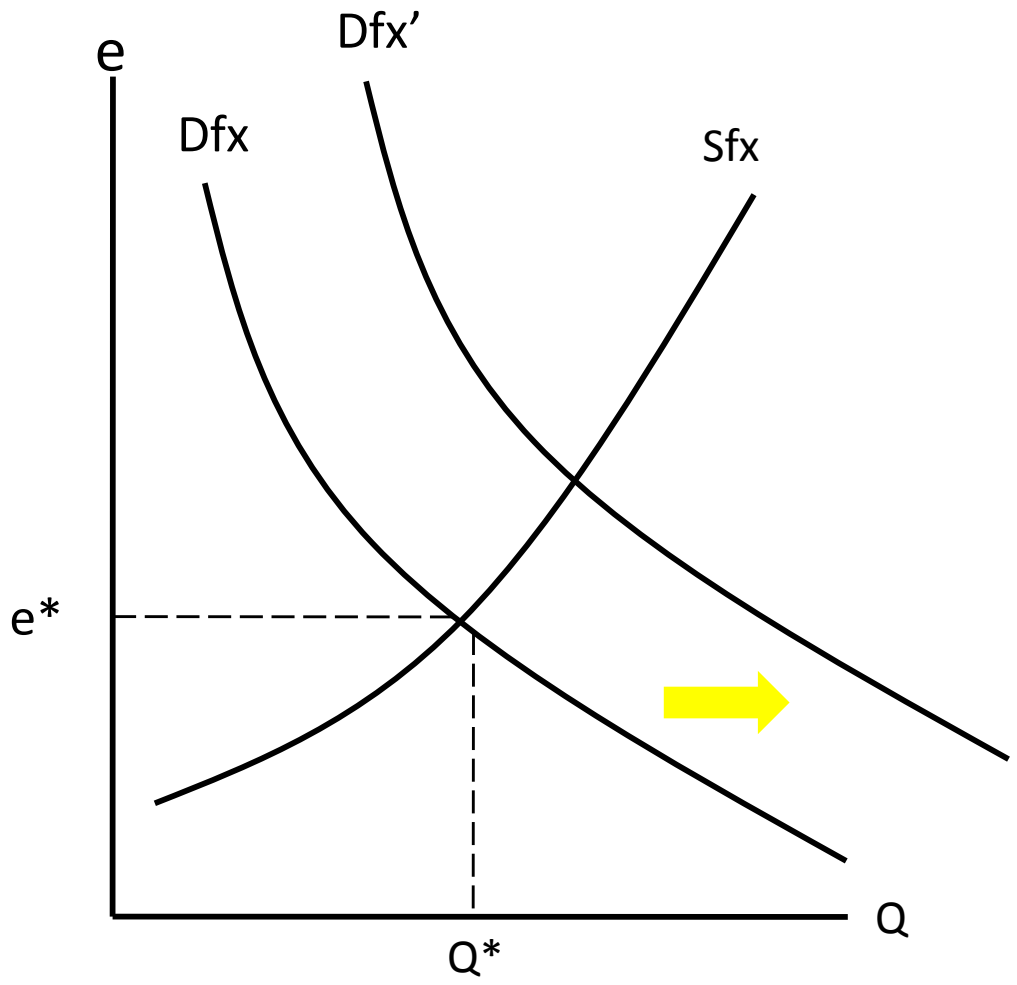
- $X + F_{in} = IM + F_{out}$
- $(X - IM) + (F_{in} - F_{out}) = 0$
- $CA + KA = 0$

➢ BOP = 0 when e = e* and FX market is in equilibrium.



Explaining Changes in Exchange Rates

- Shifts in the demand for USD
  - Domestic output / growth
  - Foreign interest rate
  - Expected future exchange rate



Explaining Changes in Exchange Rates

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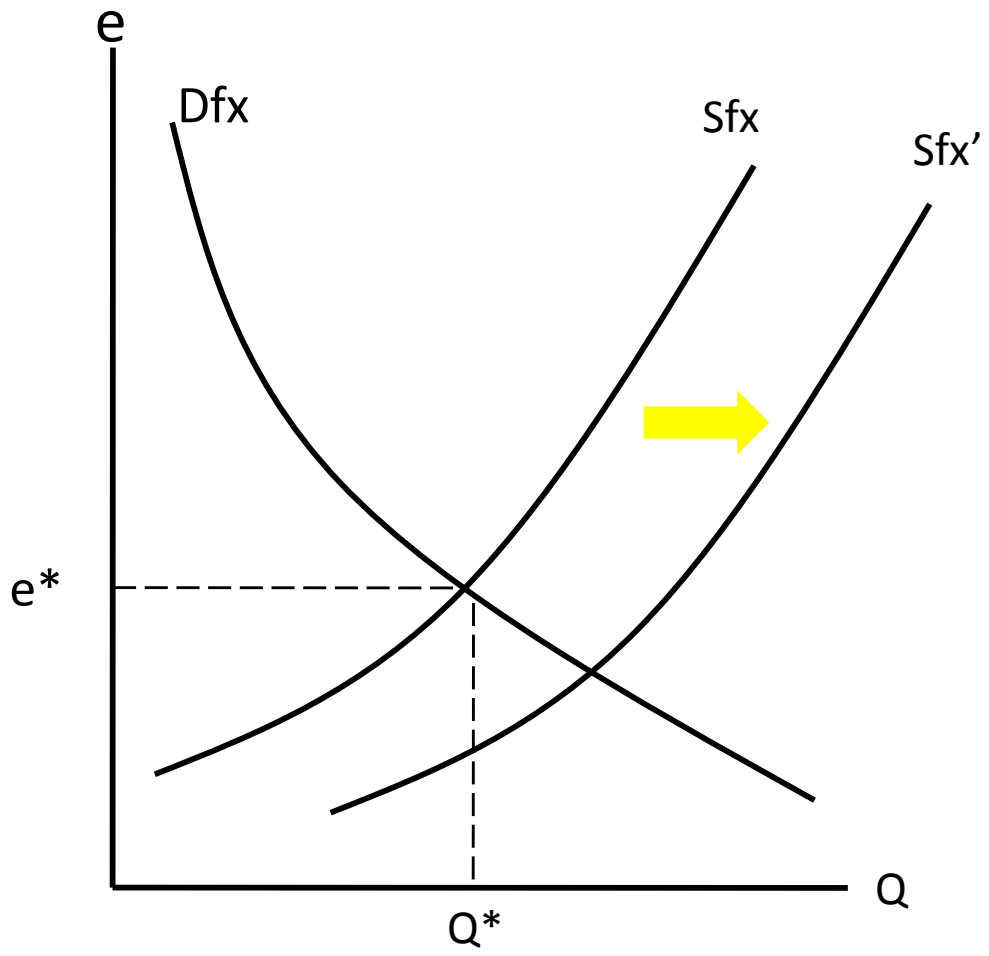

Application: Effects of Changes in Interest Rates on the Equilibrium Exchange Rate

- Changes in Interest Rates
  - When domestic real interest rates raise, the domestic currency appreciates.
  - When domestic interest rates rise due to an expected increase in inflation, the domestic currency depreciates.
- Changes in the Money Supply
  - A higher domestic money supply causes the domestic currency to depreciate.

Application: Why are Exchange Rates So Volatile?

- The volatility of exchange rates is due, in part, to the fact that they are based on **unstable expectations** regarding an uncertain future.

- Very much like other financial assets – i.e. expectation drives their price.

Application: Why are Exchange Rates So Volatile?

- Under Risk neutral world, relative rate of return should be equalized across countries – i.e. the famous interest parity condition.

$$(1 + i_t^D) - \frac{\mathrm{E}_{t+1}^{e}}{\mathrm{E}_t}(1 + i_t^F) = 0$$

unstable expectations

$$E_t = \frac{(1 + i_t^F)}{(1 + i_t^D)} \boldsymbol{E_{t+1}^{e}}$$