OPEN ECONOMY MACROECONOMICS 1

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AGENDA

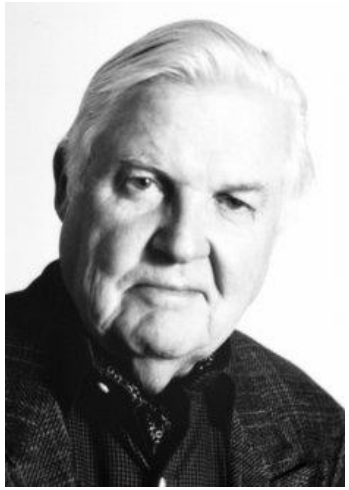
- **International linkage and Balance of payments**
- **Foreign exchange market and Exchange rate determination**
- Macroeconomics framework for open-economy
- Shocks and propagation under open-economy
- Policy effectiveness

Reading: Froyen Ch. 14

This lecture slide will be focusing on the first two agendas.

INTERNATIONAL LINKAGE AND BALANCE OF PAYMENTS

HOW CAN A COUNTRY BECOME OPENED?



Nobel Laureates 1999

Robert A. Mundell (1956)

"The world is still closed, but countries have become increasingly opened."

Countries become *opened and linked* in two dimensions: ***Trade and Finance***

RECORD OF INTERNATIONAL TRANSACTIONS: THE BALANCE OF PAYMENTS

- Officials record all international activities (trades/finances) by using international accounting standard, so called **Balance Of Payments (BOPs)**
  - Accounting statement that summarizes all the economic transactions between **residents of the home country** and **residents of all other countries**
  - **Credit/Debit records**
- **The intuitive rules for credit/debit:**
  - If a domestic resident has to pay a foreign resident, normally in exchange for **something** that you bring into the country, then the something counts as a **debit** → outflows or uses of foreign exchange
  - If a foreign resident has to pay a domestic resident for something, then the something counts as a **credit** → inflows or sources of foreign exchange

RECORD OF INTERNATIONAL TRANSACTIONS: THE BALANCE OF PAYMENTS

1	Exports (f.o.b.)
2	Imports (f.o.b.)
3	Trade balance
4	Net services, primary income and secondary income
5	Current account balance
6	Capital account
7	Financial account
8	Central Bank
9	General government
10	Other depository corporations
11	Other sectors
12	Other financial corporations
13	Nonfinancial corporations, households, and NPISHs
14	Net errors & omissions
15	Overall balance

- The balance of payment accounts are separated into 3 broad accounts:
  - **current account**: accounts for flows of goods and services (imports and exports).
  - **capital account**: flows of *special categories of assets* (capital), typically non-market, non-produced, or intangible assets like debt forgiveness, copyrights and trademarks.
  - **financial account**: accounts for flows of financial assets (financial capital).

BALANCE OF PAYMENTS: CURRENT ACCOUNT

1	Exports (f.o.b.)
2	Imports (f.o.b.)
3	Trade balance **TB = (3) = (2) –(1)**
4	Net services, primary income and secondary income
5	Current account balance **CA = (5) = (3)+(4)**
6	Capital account
7	Financial account
8	Central Bank
9	General government
10	Other depository corporations
11	Other sectors
12	Other financial corporations
13	Nonfinancial corporations, households, and NPISHs
14	Net errors & omissions
15	Overall balance

Each of the 3 broad accounts are more finely divided:

Current account: imports and exports

1. merchandise (goods like DVDs)
2. services (payments for legal services, shipping services, tourist meals,…)
3. income receipts (interest and dividend payments, earnings of firms and workers operating in foreign countries)

Current account: *net unilateral transfers*

- gifts (transfers) across countries that do not purchase a good or service nor serve as income

BALANCE OF PAYMENTS: CAPITAL ACCOUNT

		2019 p	2018 p	2017	2016	2015	2014
1	Exports (f.o.b.)	242,980.95	251,108.13	233,688.04	213,487.50	213,364.02	226,638.13
2	Imports (f.o.b.)	216,350.85	228,720.47	201,106.81	177,711.42	187,247.53	209,422.25
3	Trade balance	26,630.10	22,387.66	32,581.23	35,776.08	26,116.49	17,215.88
4	Net services, primary income and secondary income	10,677.69	6,068.99	11,370.63	7,661.92	1,636.42	-5,572.97
5	Current account balance	37,307.79	28,456.65	43,951.86	43,438.00	27,752.91	11,642.91
6	Capital account	....	-610.54	-140.94	12.72	0.08	100.33

TB= Merchandise balance = (3)=2-1

CA = (5)=2-1

Each of the 3 broad accounts are more finely divided:

Capital account: records special asset transfers, but this is a (relatively) minor account for Thailand.

BALANCE OF PAYMENTS: FINANCIAL ACCOUNT

1	Exports (f.o.b.)
2	Imports (f.o.b.)
3	Trade balance **TB = (3) = (2) –(1)**
4	Net services, primary income and secondary income
5	Current account balance **CA = (5) = (3)+(4)**
6	Capital account
7	Financial account
8	Central Bank
9	General government
10	Other depository corporations
11	Other sectors
12	Other financial corporations
13	Nonfinancial corporations, households, and NPISHs

Each of the 3 broad accounts are more finely divided:

Financial account: the difference between **sales of domestic assets to foreigners** and **purchases of foreign assets by domestic citizens.**

Financial (capital) inflow

- Foreigners loan to domestic citizens by acquiring domestic assets.
- Foreign owned (sold) assets in the domestic economy are a credit (+)

Financial (capital) outflow

- Domestic citizens loan to foreigners by acquiring foreign assets.
- Domestically owned (purchased) assets in foreign economies are a debit (-)

BALANCE OF PAYMENTS: BOP IDENTITY

1	Exports (f.o.b.)
2	Imports (f.o.b.)
3	Trade balance **TB = (3) = (2) –(1)**
4	Net services, primary income and secondary income
5	Current account balance **CA = (5) = (3)+(4)**
6	Capital account
7	Financial account
8	Central Bank
9	General government **FA**
10	Other depository corporations
11	Other sectors
12	Other financial corporations
13	Nonfinancial corporations, households, and NPISHs
14	Net errors & omissions
15	Overall balance

1. Theoretically, as of the double-entry booking,

BOP = CA + KA + FA = 0

2. Practically, there is some errors about data compiled.

BOP = CA + KA + FA + Net errors&omissions = 0

3. In the reality, BOP could be positive or negative. That is, we have a deficit or surplus in the BOP.

Surplus: BOP = CA + KA + FA + Net errors&Omissions > 0

Deficit: BOP = CA + KA + FA + Net errors&Omissions < 0

What is the overall balance?

BALANCE OF PAYMENTS: BOP IDENTITY

Bank of Thailand

EC_XT_047 : Balance of Payments (Summary) (US$)

(Unit: Millions of US Dollars)

Last Updated : 31 Jan 2020 14:43

Retrieved date : 18 Feb 2020 18:43

	2019 p	2018 p	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
1 Exports (f.o.b.)	242,980.95	251,108.13	233,688.04	213,487.50	213,364.02	226,638.13	227,455.34	227,655.21	221,399.03	192,902.97	151,763.79	175,233.07	151,258.35	127,941.33	109,362.01
2 Imports (f.o.b.)	216,350.85	228,720.47	201,106.81	177,711.42	187,247.53	209,422.25	227,415.75	227,625.14	209,213.42	166,225.24	120,561.53	157,884.96	124,618.05	114,271.76	105,960.14
3 Trade balance	26,630.10	22,387.66	32,581.23	35,776.08	26,116.49	17,215.88	39.59	30.07	12,185.61	26,677.73	31,202.26	17,348.11	26,640.30	13,669.56	3,401.87
4 Net services, primary income and secondary income	10,677.69	6,068.99	11,370.63	7,661.92	1,636.42	-5,572.97	-8,873.05	-4,929.33	-2,758.76	-15,191.65	-9,013.16	-16,417.20	-11,056.55	-11,354.85	-11,043.68
5 Current account balance	37,307.79	28,456.65	43,951.86	43,438.00	27,752.91	11,642.91	-8,833.46	-4,899.26	9,426.85	11,486.08	22,189.10	930.91	15,583.75	2,314.71	-7,641.81
6 Capital account	....	-610.54	-140.94	12.72	0.08	100.33	281.23	234.43	-40.87	244.59	67.61	n.a.	n.a.	n.a.	n.a.
7 Financial account	....	-14,948.38	-12,497.70	-20,839.74	-16,799.24	-15,954.70	-2,487.99	12,789.99	-8,269.15	23,572.85	1,386.06	17,289.02	-183.33	7,388.73	7,857.30
8 Central Bank	....	-1,711.65	3,151.49	1,061.91	-1,405.09	-2,956.03	-4,562.79	1,038.54	-89.58	2,718.52	1,483.35	325.76	-855.88	415.91	452.34
9 General government	....	4,382.88	3,161.83	950.49	-1,720.77	1,426.90	4,579.07	6,513.43	3,438.01	3,615.75	530.79	-334.88	-2,249.02	-756.41	-934.18
10 Other depository corporations	....	-5,869.01	4,219.59	-691.03	-12,819.43	-5,472.08	3,187.35	16,350.78	-8,244.03	8,249.34	9,207.13	11,186.51	-1,739.50	-9,106.25	76.97
11 Other sectors	....	-11,750.59	-23,030.61	-22,161.11	-853.95	-8,953.50	-5,691.62	-11,112.77	-3,373.54	8,989.23	-9,835.21	6,111.64	4,661.07	16,835.47	8,262.17
12 Other financial corporations	....	-59.36	-11,038.07	-11,919.53	-281.16	-9,575.35	-12.85	-10,942.29	-937.82	-967.70	-10,197.13	8,526.76	-10,305.44	13,627.69	-471.59
13 Nonfinancial corporations, households, and NPISHs	....	-11,691.23	-11,992.54	-10,241.58	-572.79	621.86	-5,678.77	-170.48	-2,435.72	9,956.92	361.91	-2,415.12	14,966.51	3,207.78	8,733.75
14 Net errors & omissions	....	-5,631.37	-5,356.52	-9,766.48	-5,094.84	3,001.27	5,991.12	-2,860.46	96.77	-3,979.12	483.84	6,473.37	1,701.77	3,038.16	5,206.82
15 Overall balance	13,582.95	7,266.36	25,956.70	12,844.50	5,858.90	-1,210.20	-5,049.10	5,264.70	1,213.60	31,324.40	24,126.60	24,693.30	17,102.20	12,741.60	5,422.30
5+6+7+14 (BOP)		7,266.36	25,956.70	12,844.50	5,858.91	-1,210.19	-5,049.10	5,264.70	1,213.60	31,324.40	24,126.61				

CA + KA + FA + Net Errors&Omissions + (-Overall balance) = 0

Overall balance = Net flow of official international reserve assets

OFFICIAL (INTERNATIONAL) RESERVE ASSETS

Balance sheet of BOT

Assets	Liabilities
Official (international reserve) assets of BOT Other items	Currency (Baht) Commercial bank reserve (Baht)

Balance sheet of BOJ

Assets	Liabilities
Official (international reserve) assets of BOJ Other items	Currency (Yen) Commercial bank reserve (Yen)

Official (international) reserve assets: foreign assets held by central banks to cushion against instability in international markets.

- Assets include **government bonds, currency, gold and accounts at the International Monetary Fund.**
- Official reserve assets owned by (sold to) foreign central banks are a credit (+).
- Official reserve assets owned by (purchased by) the domestic central bank are a debit (-).

OFFICIAL (INTERNATIONAL) RESERVE ASSETS

The negative value of the official reserve assets is called the **overall balance** or "**balance of payments**".

- It is the sum of the current account, the capital account, the non-reserve portion of the financial account, and the statistical discrepancy.

- A negative official settlements balance may indicate that a country is depleting its official international reserve assets *or* may be incurring debts to foreign central banks.
  - selling foreign currency by the domestic central bank and buying domestic assets by foreign central banks are credits for official international reserve assets, and therefore reduce the official settlements balance.

THAILAND BALANCE OF PAYMENTS DYNAMIC

		2019 p	2018 p	2017	2016	2015	2014
1	Exports (f.o.b.)	242,980.95	251,108.13	233,688.04	213,487.50	213,364.02	226,638.13
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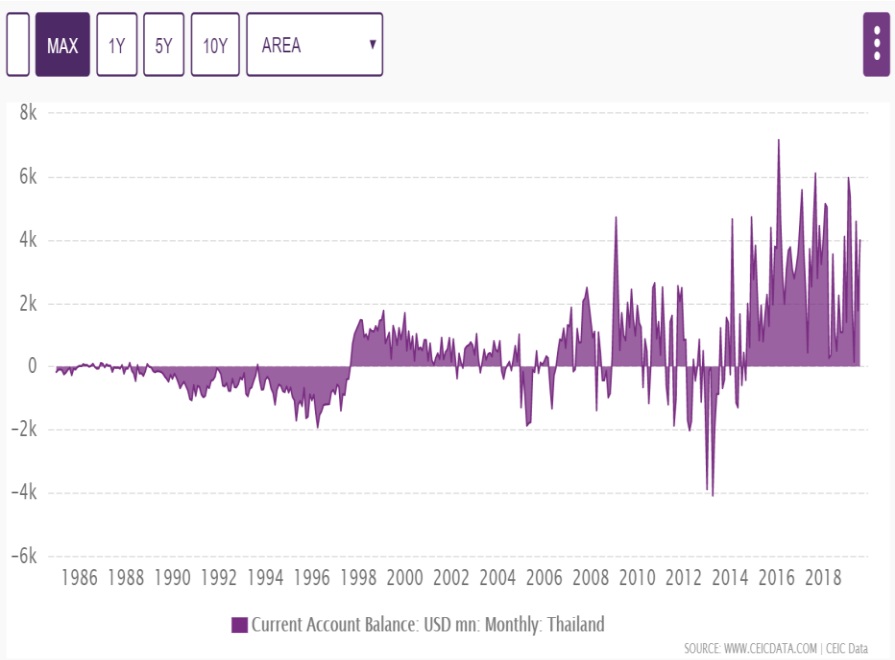
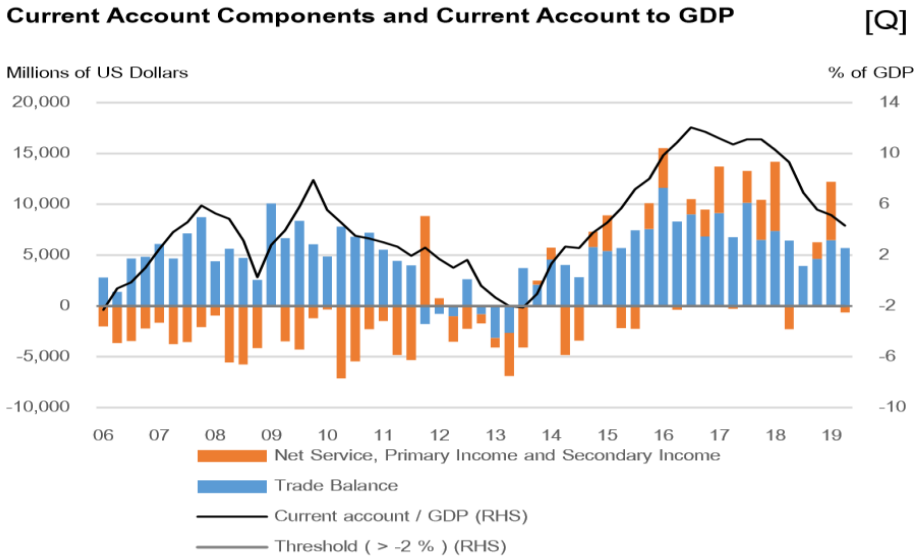
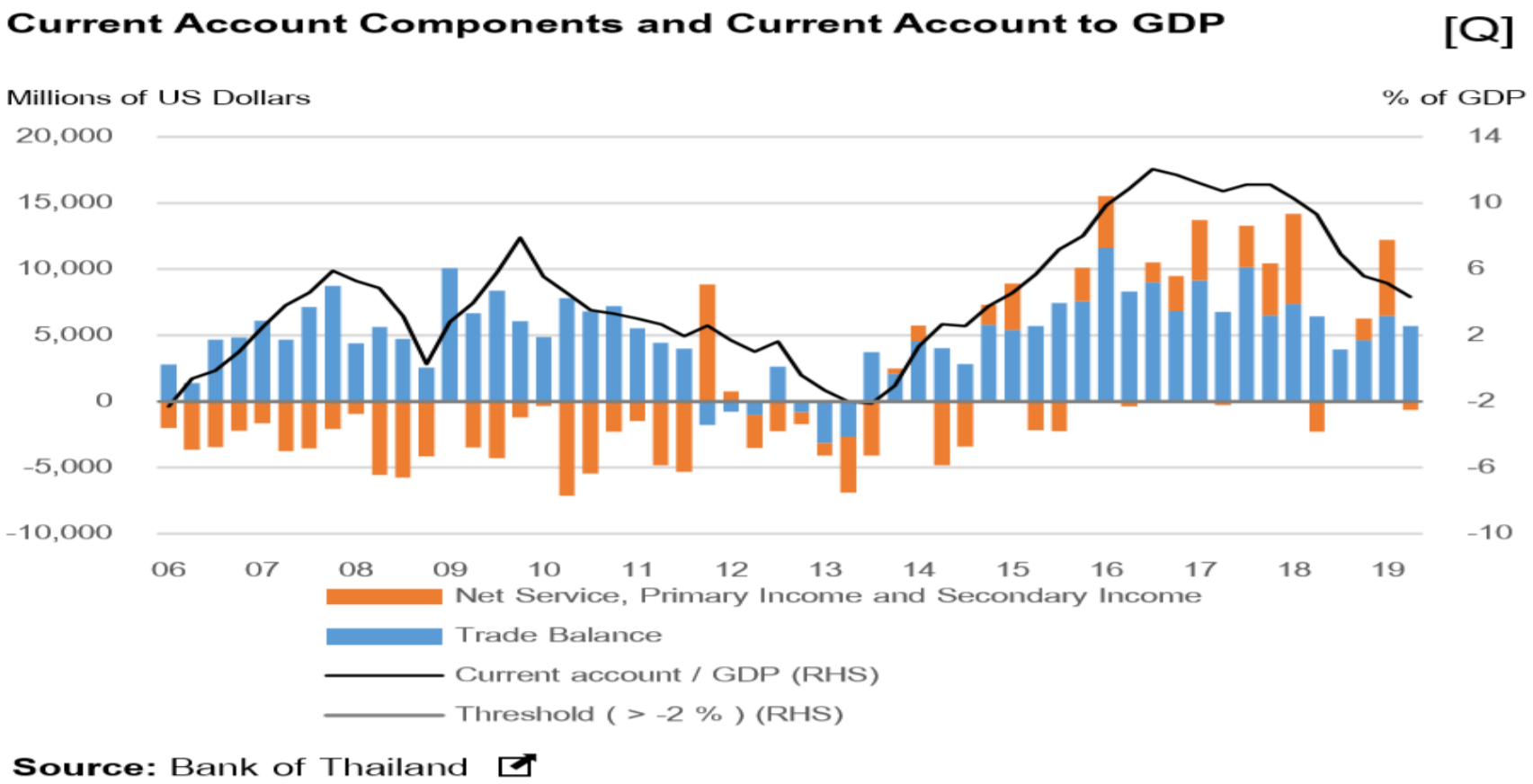
CA = (5)=2-1





Source: Bank of Thailand

THAILAND BALANCE OF PAYMENTS DYNAMIC



WHAT DOES THE CURRENT ACCOUNT TELL US?

National saving (S) = national income (Y) that is not spent on consumption (C) or government purchases (G).

$Y - C - G$

$(Y - C - T) + (T - G)$

$S^p + S^g = S$ 

$$CA = Y - (C + I + G)$$

implies

$$CA = (Y - C - G) - I$$

$$= S - I$$

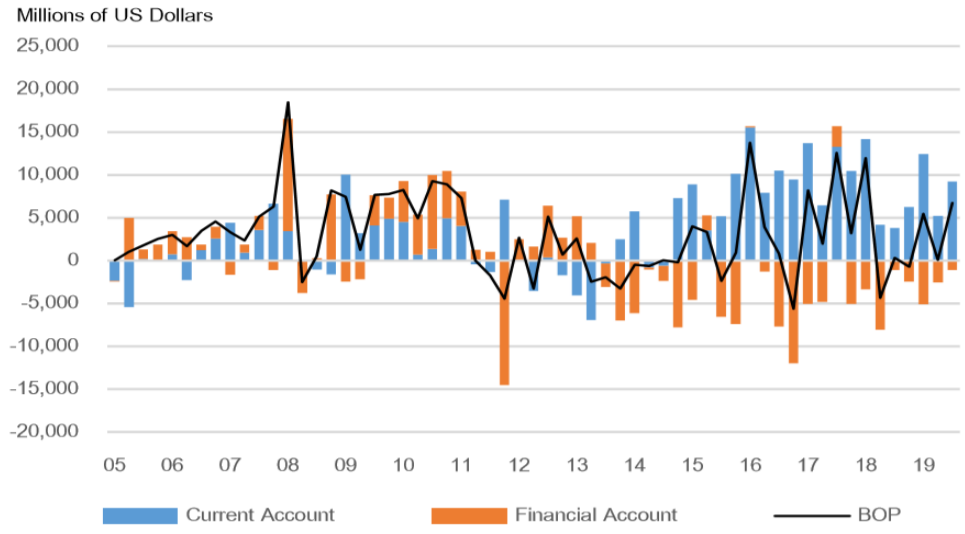
current account = national saving – investment

current account = net foreign investment

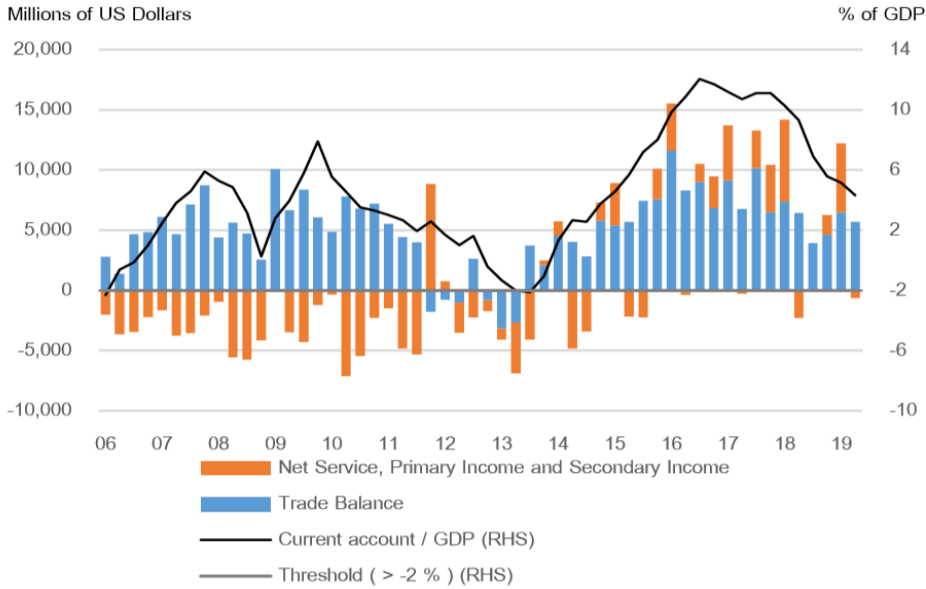
- A country that imports more than it exports has low national saving relative to investment.

CA = Net flow of claims on the rest of the world

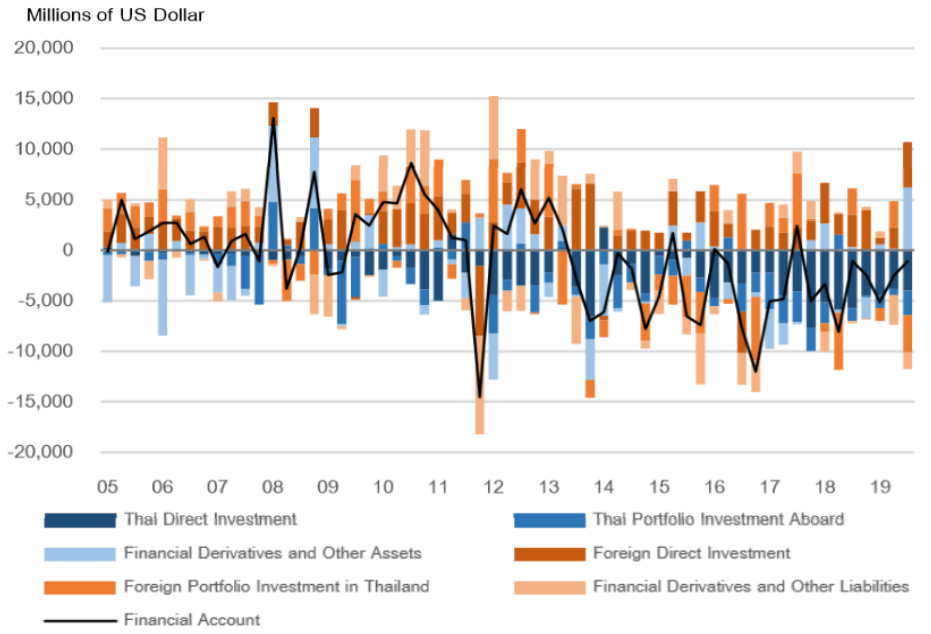
Balance of Payments [Q]



Current Account Components and Current Account to GDP [Q]

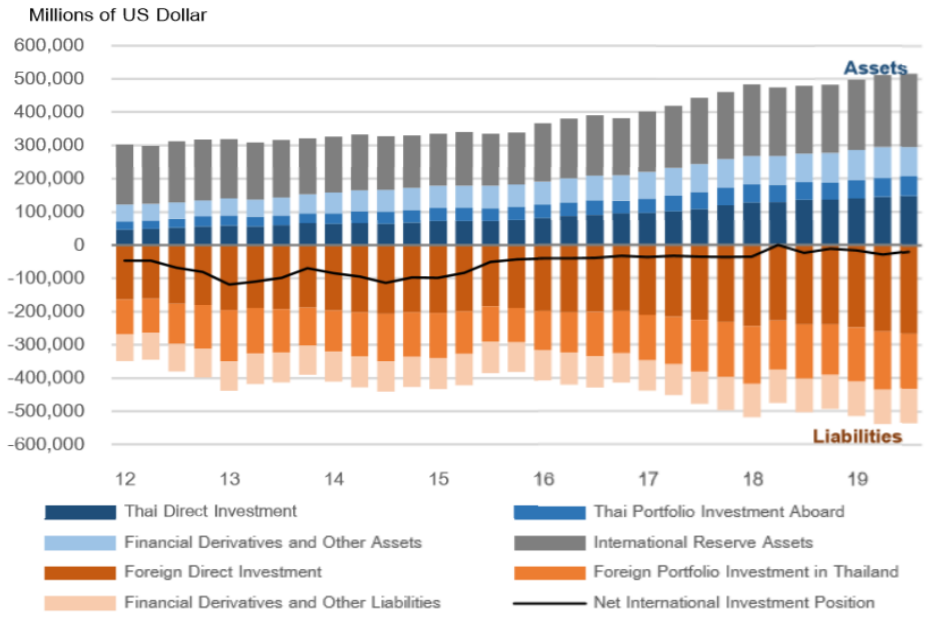


Financial Account [Q]



Source: Bank of Thailand

International Investment Position [Q]

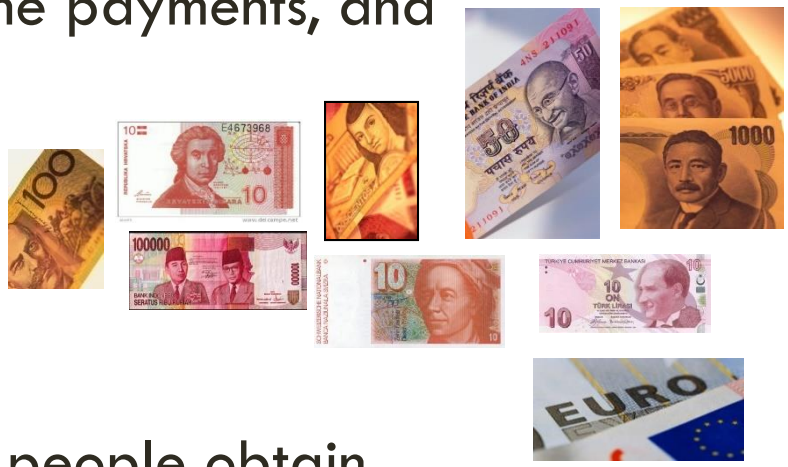


Source: Bank of Thailand

FOREX MARKET AND FOREX DETERMINATION

INTERNATIONAL PAYMENTS AND FOREIGN EXCHANGE MARKET

- International transactions require the payments, and hence foreign currency.
  - Each country has their own national currency.



- **Foreign currency market** is where people obtain foreign currency, i.e. trading/converting one currency into another currency.
  - Example: Thai baht traded into USD, Euro traded into JPY etc.

FOREIGN EXCHANGE MARKET

- **Foreign exchange rate** is determined in the foreign currency market; price of one currency in term of another currency
  - **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

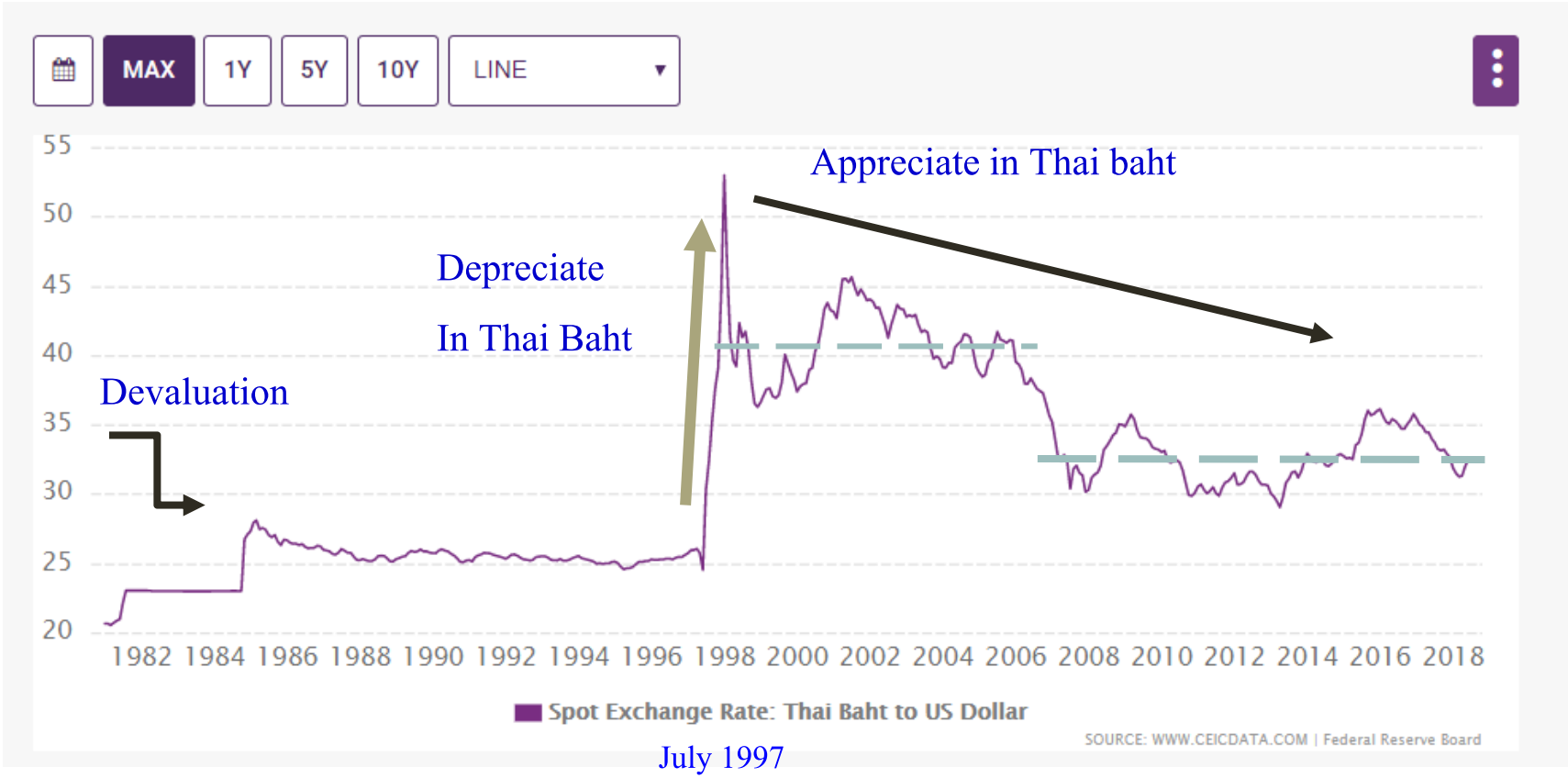
- **The nominal value** of exchange rate can be quoted in several ways, e.g.
  - **Direct quotation:** domestic per a unit of foreign (Baht per 1 USD)
  - **Indirect quotation:** foreign per a unit of domestic (USD per 1 baht)

FOREIGN EXCHANGE MARKET

- The value of exchange rate implies us about the purchasing power of a currency
  - **Appreciation**: a currency rises in (purchasing) value relative to another currency
  - **Depreciation**: a currency falls in (purchasing) value relative to another currency

- Higher value of direct quoted exchange rate → depreciation in domestic currency, but an appreciation in foreign currency
  - **e = 25 B/ 1USD → e = 30 B / 1USD (Baht depreciates/USD appreciates)**

NOMINAL EXCHANGE RATE: THB V.S. USD



July 1997

Fixed exchange rate

Flexible / managed-float

FOREIGN EXCHANGE RATE: NOMINAL V.S. REAL

- **Nominal exchange rate, e = 31 baht / USD**

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

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

EFFECTIVE EXCHANGE RATE:

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

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

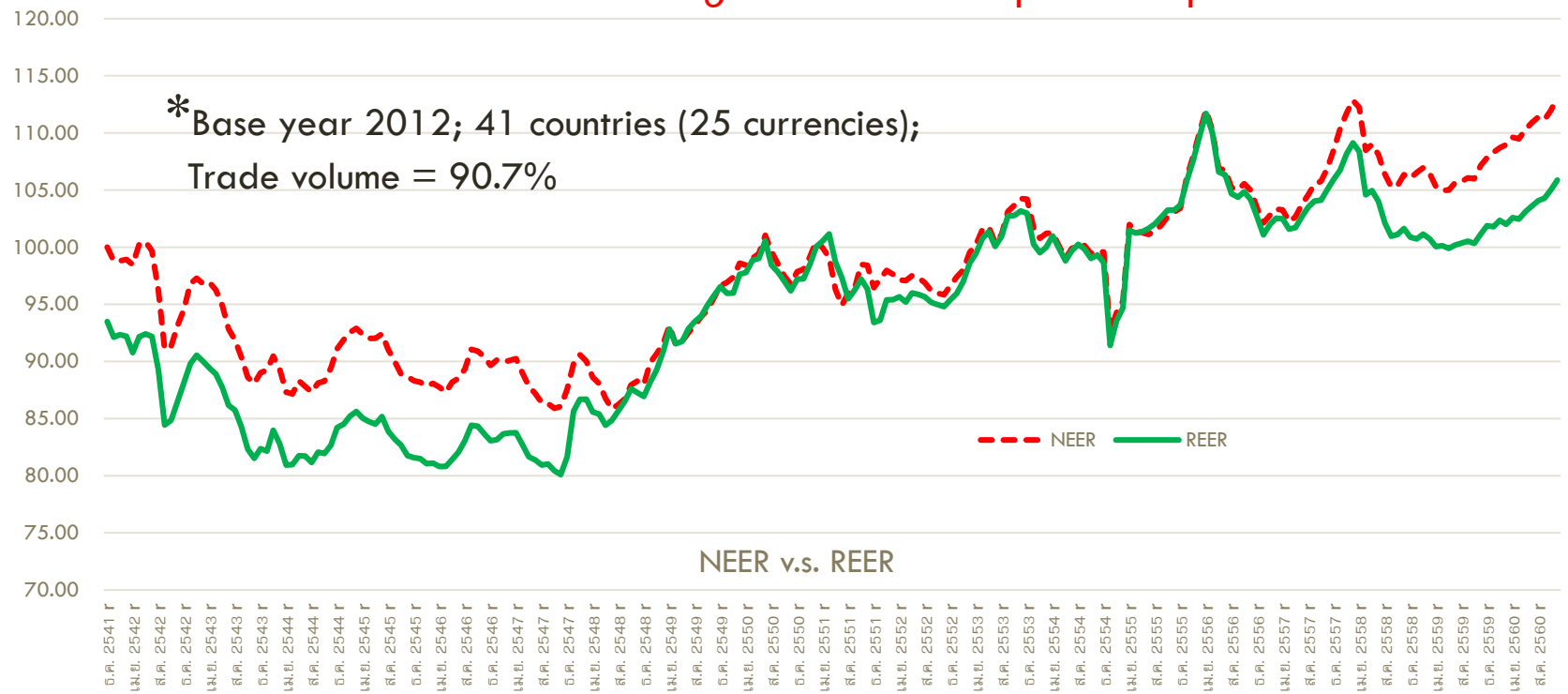
- $w_{i,0}$: $trading\ basket\ (bilateral\ trade\ share\ with\ country\ \ i)$

- **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 BOT)

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 relative *disadvantage* of the baht in price competitiveness.



THEORY AND ISSUES ON EXCHANGE RATE DETERMINATION

- **Long-run v.s. Short-run theory**

- Institutional details and how a country run its **exchange rate regime.**
  - Flexible Exchange Rate
  - Fixed or Pegged Exchange Rate
  - Managed Float

LONG-RUN THEORY: THE PURCHASING POWER PARITY (PPP)

- Accounting for the ***long-run*** **(trend) movement of nominal exchange rate** is often referred to the theory of purchasing power parity, i.e. PPP.

- The theorem is founded upon one of the most important concepts in international trade theory so called "**the law of one price (LoP)**"

- **LOP: an identical product should be priced the same across countries.**
  - Holds under (i) zero transport cost and (ii) no trade barriers.

THE PURCHASING POWER PARITY (PPP)

- **The law of one price: $P_i = eP_i^*$.**
- If the condition doesn't hold, we are under the **arbitrage condition.**
  - Profit-making with no risk!
- If $eP_i^* > P_i$, domestic good-i is cheaper.
  - Foreigners buy more domestic good-i; P_i is rising.
- If $eP_i^* < P_i$, foreign good-i is cheaper.
  - Domestic consumers buy more foreign good-i; P_i is falling.

THE PURCHASING POWER PARITY (PPP)

- The idea is ***extended*** to the *aggregate level*.

$$e = \frac{P}{P^*}$$

where P and P* are the consumer price index (CPI).

- This version is called an "***absolute***" PPP.
  - **Holds under two assumptions**: LOP with Identical basket of consumption across countries
- An alternative (more relaxed) version is called a "***relative***" PPP.

$$\hat{e} = \hat{P} - \widehat{P^*}$$

where $\hat{x}$ is the growth rate of x.

THE PURCHASING POWER PARITY (PPP)

- Following the relative version, **domestic currency should be depreciating if domestic inflation rate exceeds the inflation rate of foreign country.**

- Question is: **"what are the determinants of inflation rate?"**

THE PURCHASING POWER PARITY (PPP)

- Inflation occurs when **too much money** chasing **too few goods**.
  - Output does not grow as fast as the rate at which money grows.

- In the long-run, **money growth and productivity growth** matters for the exchange rate movement – e.g.,
  - A high money growth country should be experiencing a depreciation in its national currency.
  - A fast-growing productive economy (such as China) should have its national currency appreciated.

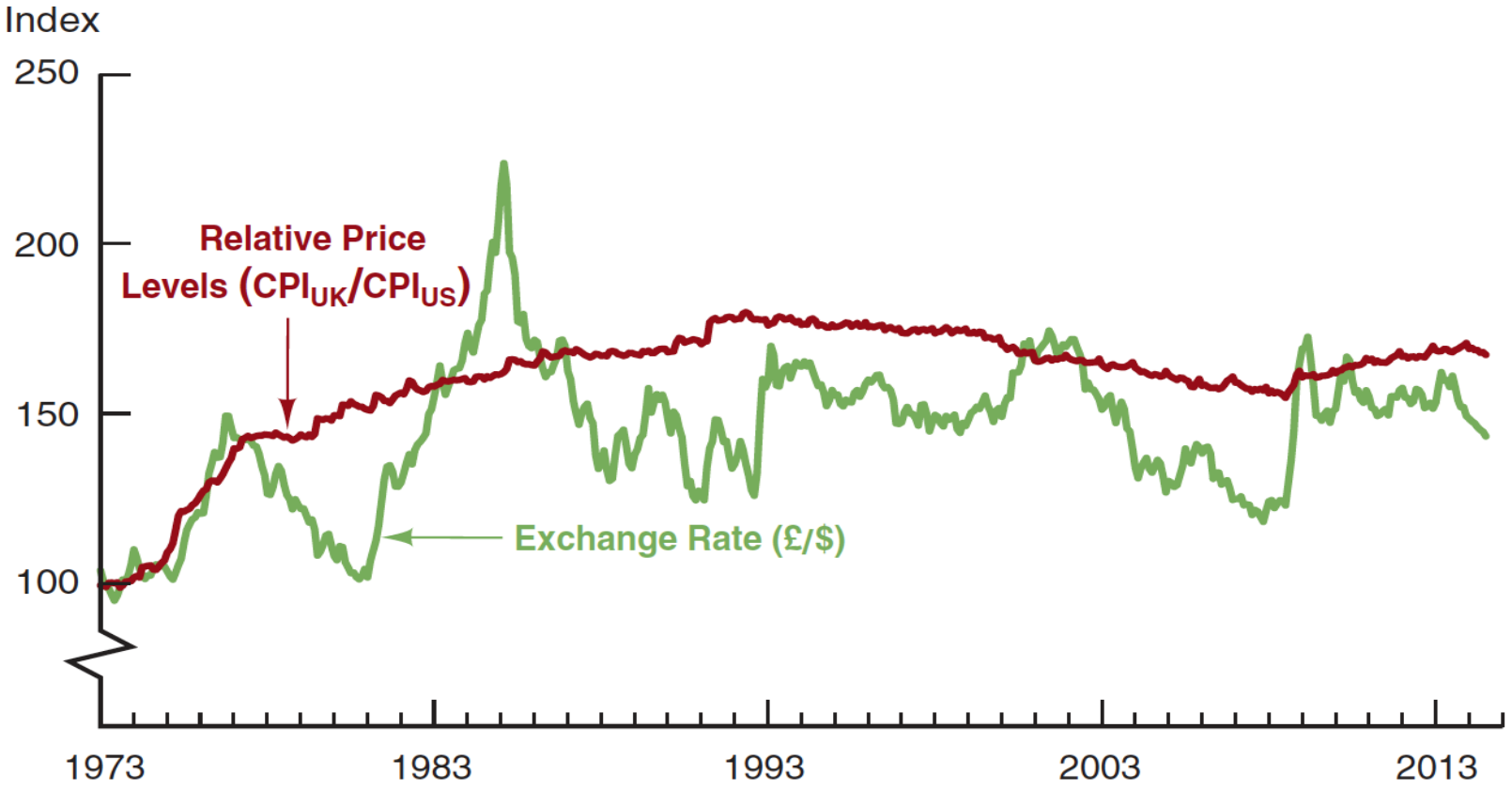
HOW WELL DOES THE PPP ACCOUNT FOR THE EXCHANGE RATE MOVEMENT?

- Testable implications?
  - If PPP holds, **the real exchange rate is fixed over time.**

$$RER = \frac{eP^*}{P} = \frac{\left(\frac{P}{P^*}\right)P^*}{P} = 1$$

- Studies have found that RER (real) has **strong positive correlation** with NER (nominal).

HOW WELL DOES THE PPP ACCOUNT FOR THE EXCHANGE RATE MOVEMENT?



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

HOW WELL DOES THE PPP ACCOUNT FOR THE EXCHANGE RATE MOVEMENT?

- Better theory of guiding the **long-run trend** of exchange rate!
  - PPP holds in the case of **traded goods** with low transport cost, e.g., crude oil.
  - PPP may not hold with **non-traded goods** (due to physical and legal barriers), e.g., **services**.

- In the long-term, strong market forces push foreign and domestic prices towards PPP.
  - Physical and legal barriers tend to be overcome by consumers and firms as the **technology has become more advanced**.

APPLICATION: THE IMPLIED PPP EXCHANGE RATE / OVERVALUATION AND UNDERVALUATION

- The nominal exchange rate implied by PPP is treated as *the long-run equilibrium rate*.
- **Ex**: Item X is an **internationally-traded** good.
  - **The US**: the price of X is $10.
  - **Thailand**: the price of X is THB200.
  - The PPP rate: THB200/$10 = THB20/$1.
  - But the nominal rate is THB30/$1.
  - So the Thai baht is **undervalued** by 33%!
- **The Big Mac Index** by *the Economist*.

BURGERNOMIC INDEX

The Big Mac index

Country		2000 — 2018	Under/over valued, %
New Zealand	NZ$		-23.2
Britain	Pound		-23.2
Colombia	Peso		-24.9
Chile	Peso		-26.5
South Korea	Won		-26.8
Costa Rica	Colón		-26.8
UAE	Dirham		-30.8
Sri Lanka	Rupee		-33.9
Thailand	Baht		-34.9
Honduras	Lempira		-35.7
Japan	Yen		-36.4
Kuwait	Dinar		-37.0

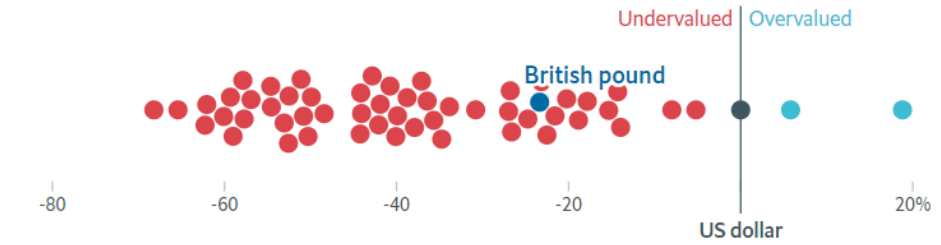
Choose a base currency: US dollar

Show index at: Jul 2018

Adjust the index to account for GDP per person: Raw index | GDP-adjusted

The British pound is 23% undervalued against the US dollar

July 2018



A Big Mac costs £3.19 in Britain and US$5.51 in the United States. The implied exchange rate is 0.58. The difference between this and the actual exchange rate, 0.75, suggests the British pound is 23.2% undervalued

2000-2018

BURGERNOMIC INDEX

The Big Mac index

Country		2011 —— 2018	Under/over valued, %
Brazil	Real		34.7
Colombia	Peso		33.3
Chile	Peso		15.6
Thailand	Baht		15.0
Sweden	Krona		11.5
Pakistan	Rupee		6.7
Euro area	Euro		5.1
Canada	C$		4.3
Peru	Sol		2.6
Switzerland	Franc		1.3
Israel	Shekel		0.8
United States	US$		BASE CURRENCY

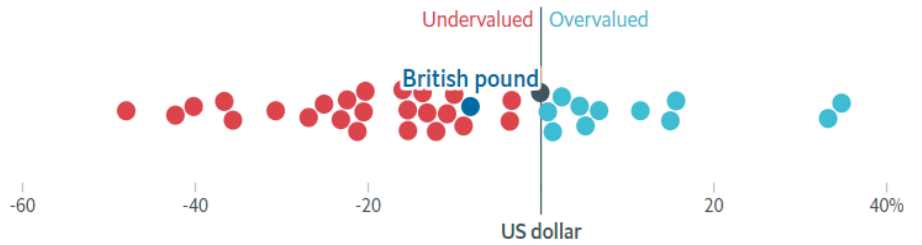
Choose a base currency: US dollar

Show index at: Jul 2018

Adjust the index to account for GDP per person: Raw index | GDP-adjusted

The British pound is 8% undervalued against the US dollar

July 2018



A Big Mac costs 23% less in Britain (US$4.23) than in the United States (US$5.51) at market exchange rates. Based on differences in GDP per person, a Big Mac should cost 16% less. This suggests the pound is 8.4% undervalued

2011-2018

150%

EXCHANGE RATE DETERMINATION: SHORT-RUN THEORY

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

- Notation:

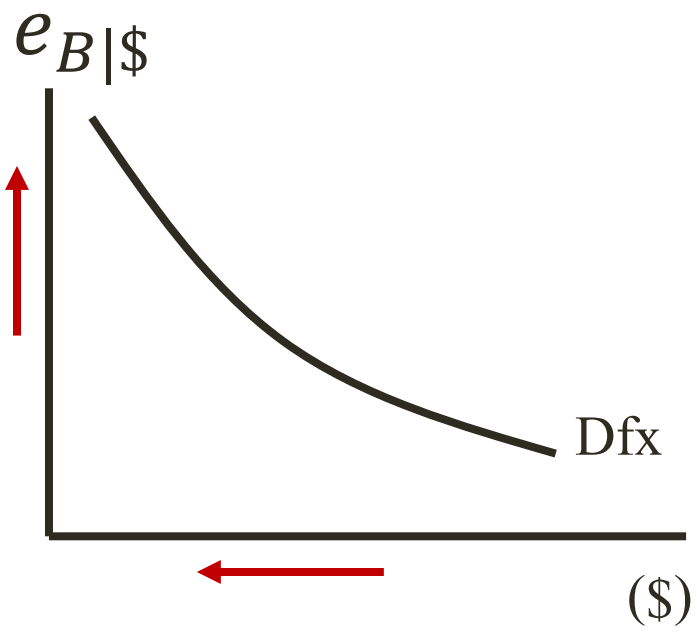
  $e_{B|\$}$ = units of baht required for a USD dollar

  - 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 $e_{B|\$}$.

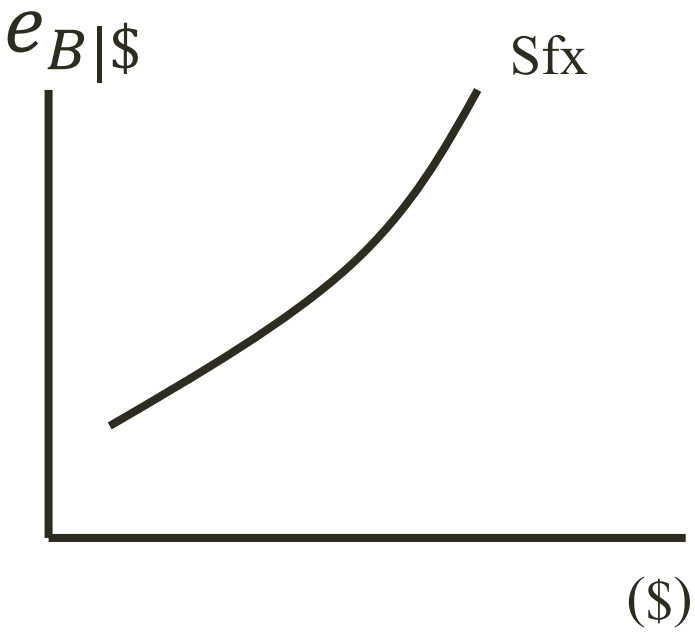
  Supply for foreign currency is upward sloping in $e_{B|\$}$.

FX DEMAND



- Rising e (= domestic depreciation)
  - higher value of imported product (in terms of Thai Baht) $rer = \frac{e*P^*}{P}$ → lower quantity demanded for imports
  - higher foreign asset value (in terms of Thai Baht) → lower relative return on foreign asset: $(1+r) - \frac{(1+r^*)e_{t+1}}{e_t}$ → lower demand for foreign assets.
- Less USD needed → **Downward sloping demand**

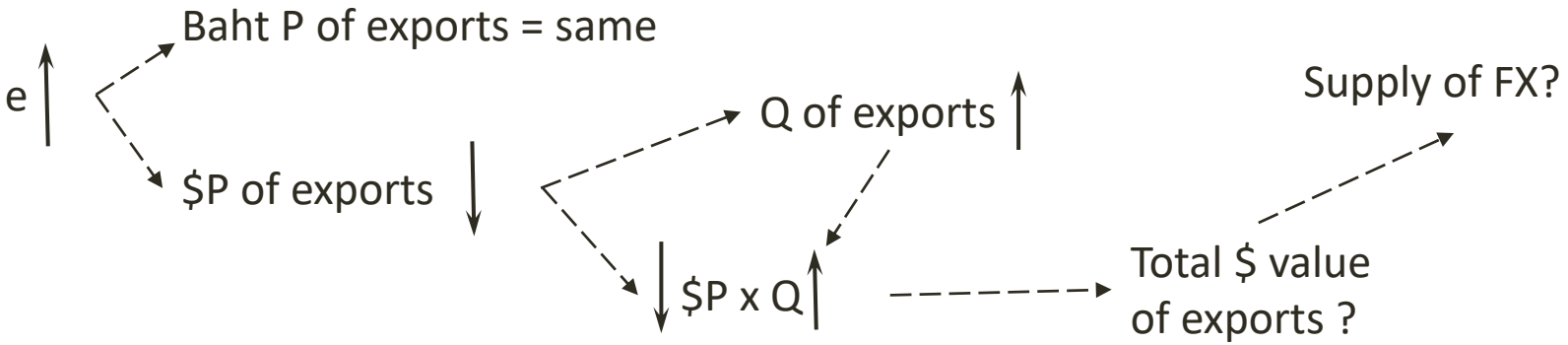
FX SUPPLY



- Rising e (= foreign appreciation) →
  - Lower value of domestic product (in terms of USD) $rer = \frac{e*P^*}{P}$ → higher quantity demanded for domestic product from ROTW
  - Lower domestic asset value (in terms of USD) → higher relative return on domestic asset: $(1+r) - \frac{(1+r^*)e_{t+1}}{e_t}$ → higher quantity demanded for domestic asset from ROTW.

- Always more USD supplied? (More Thai Baht needed?) **Upward sloping supply?**
  - **Quantity v.s. Value!**

- Turn out to be **yes if elasticity of exports is greater than one.**



If $|\varepsilon^d_x| < 1$ ⟶ $\Delta Q < \Delta \$P$ ⟶ Total $ value of exports ↓ ⟶ Supply of FX ↓

If $|\varepsilon^d_x| > 1$ ⟶ $\Delta Q > \Delta \$P$ ⟶ Total $ value of exports ↑ ⟶ Supply of FX ↑

The famous elasticity condition: Marshall-Learner condition
Further study in EE452!

FX MARKET EQUILIBRIUM

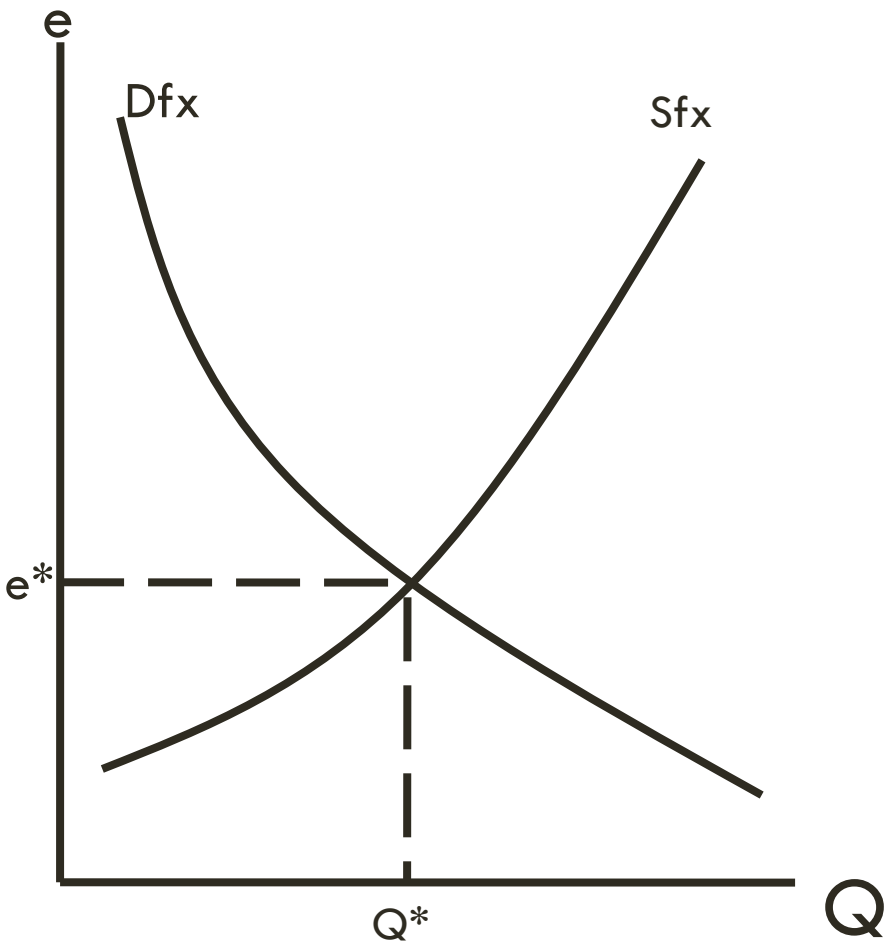
$Q^s_{FX} = Q^d_{FX}$

$X + F_{in} = IM + F_{out}$

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

$CA + KA = 0$

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

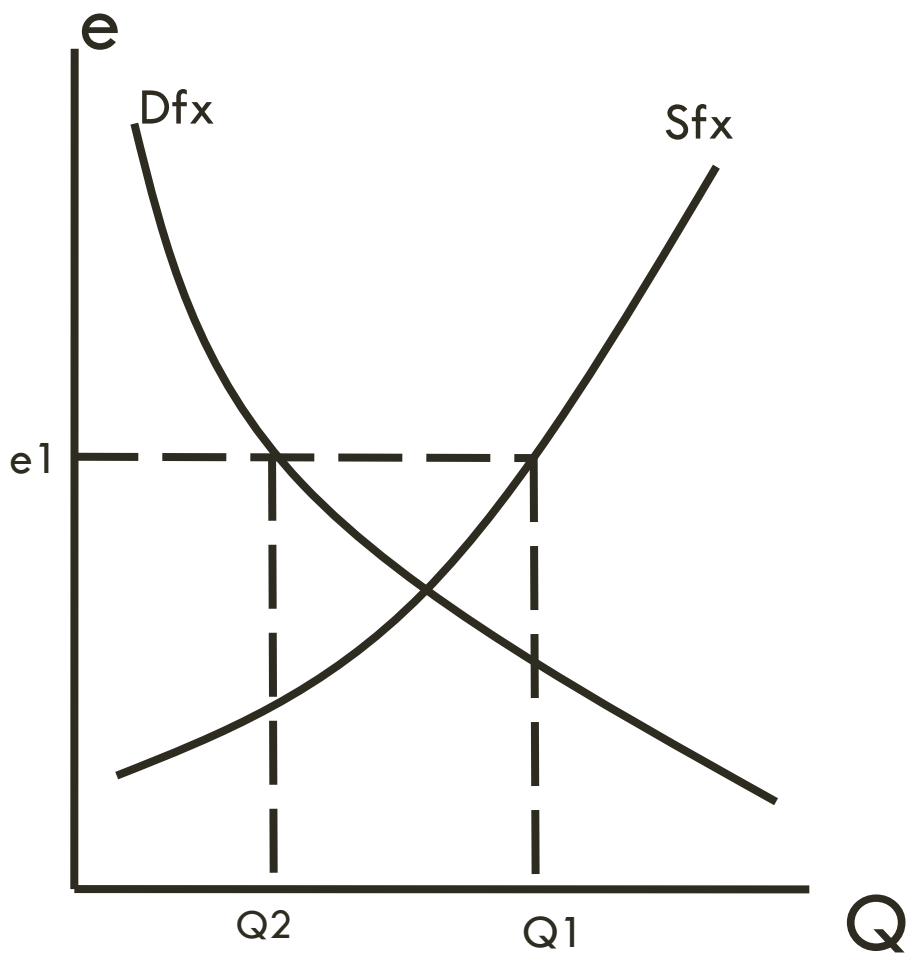


A BOP SURPLUS AND EXCESS SFX

At e1, excess supply of FX.

(CA) + (KA) > 0

BOP registers a **surplus** (BOP > 0).

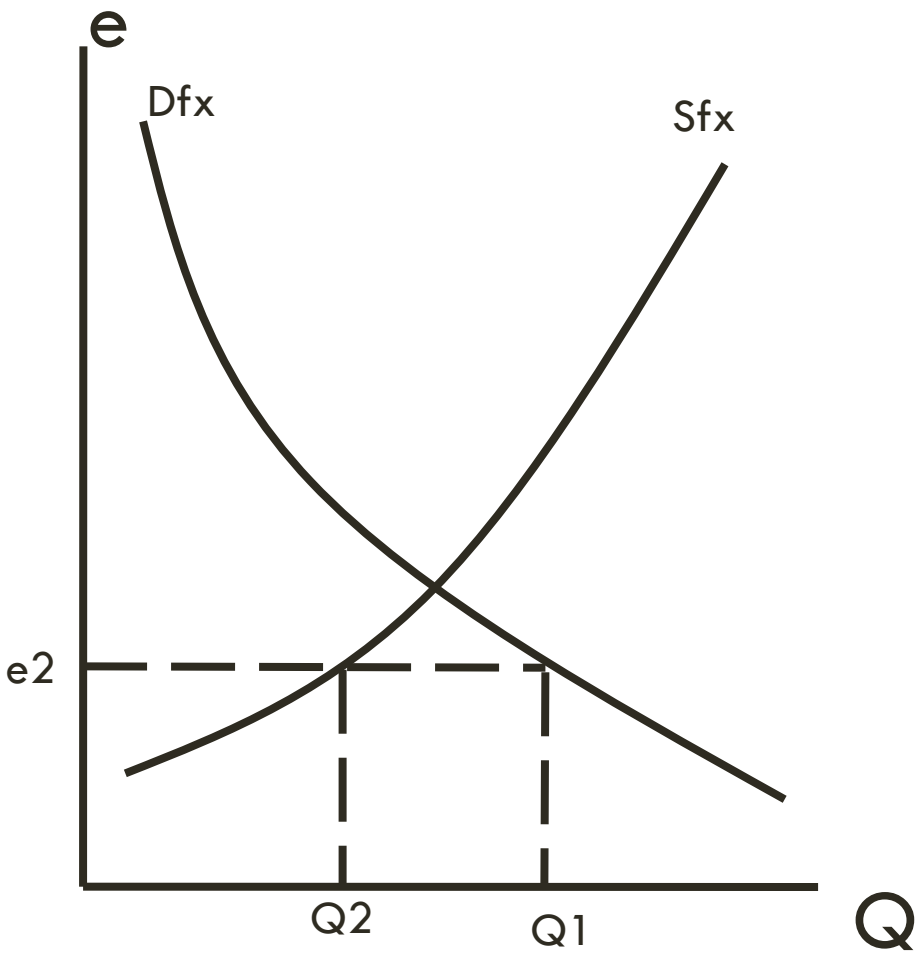


A BOP DEFICIT AND EXCESS DFX

At e2, excess demand of FX.

(CA) + (KA) < 0

BOP registers a **deficit** (BOP < 0).

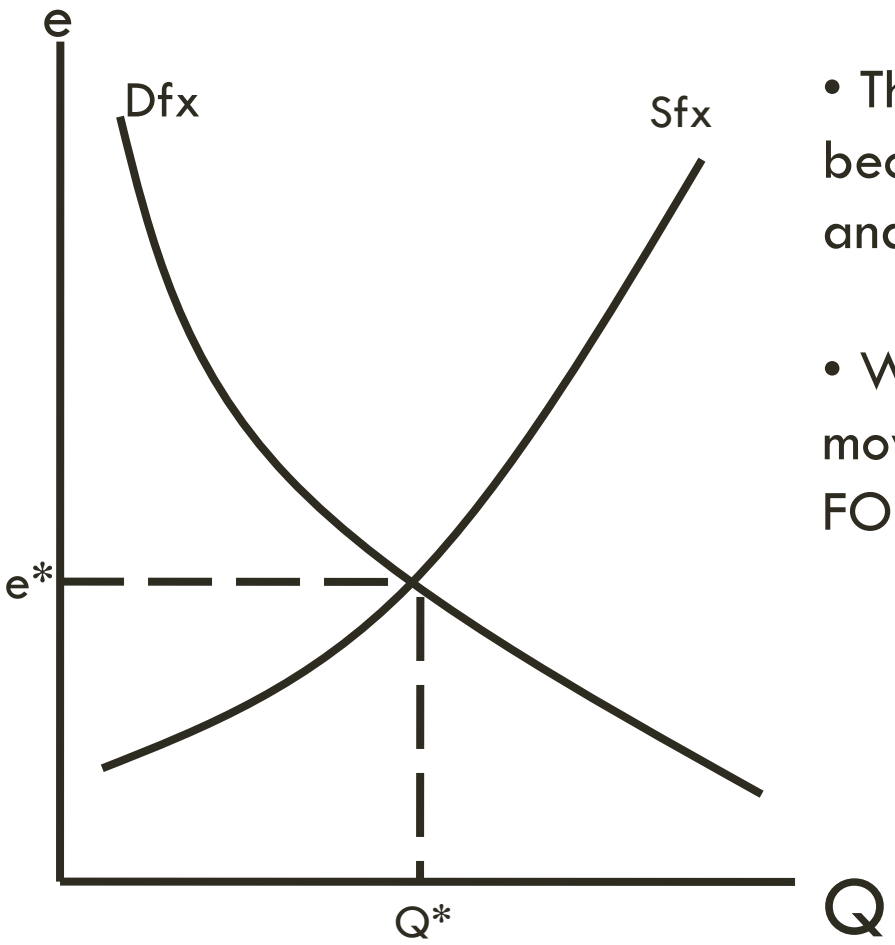


EXCHANGE RATE REGIME

- Institutional details and how a country run its **exchange rate regime** affect the way exchange rate is actually determined.

- Three regimes:
  - Flexible Exchange Rate
  - Fixed or Pegged Exchange Rate (Exchange rate anchor)
  - Managed Float

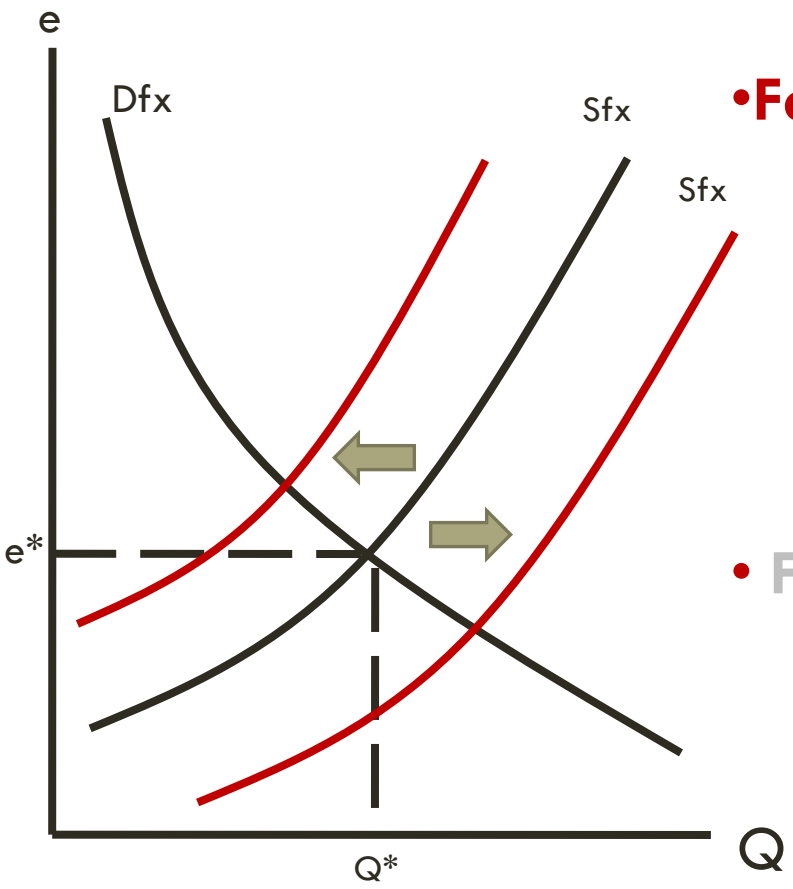
FLEXIBLE EXCHANGE RATE REGIME: FEATURES



- The exchange rate can **freely** move because of the shift/variation in the Dfx and Sfx.

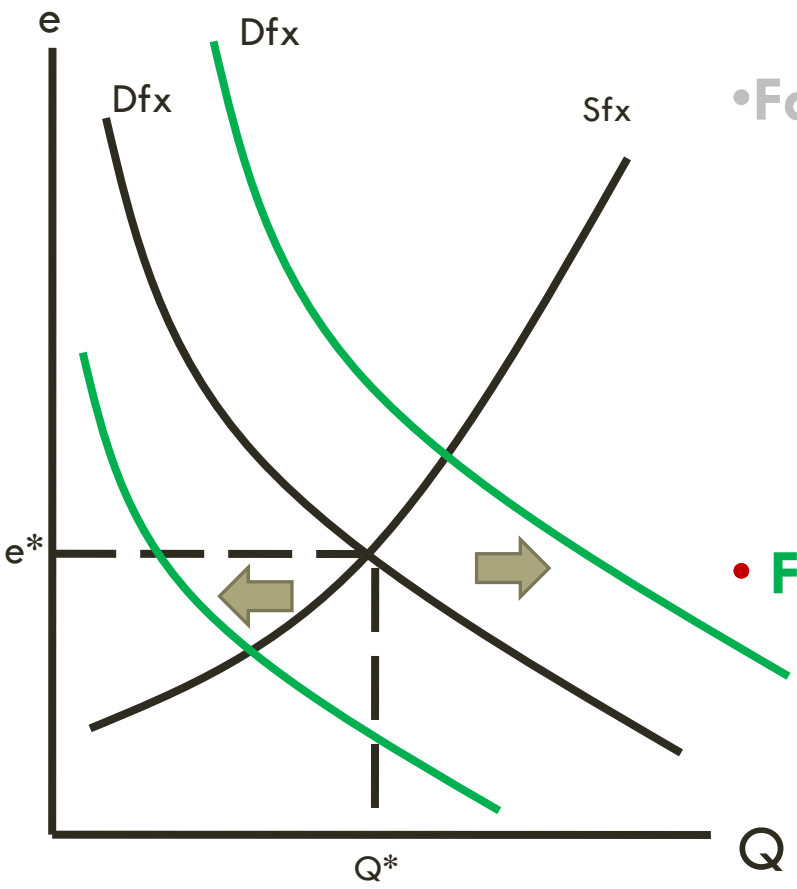
- What are the **factors** that cause the movement in the demand and supply of FOREX?

FLEXIBLE EXCHANGE RATE REGIME: FEATURES



- **Factors Affecting Sfx- e.g.,**
  - Change in the demand for domestic goods (exports): domestic price, ROTW income
  - Change in the demand for domestic asset (inflows): relative return, relative risk etc.
- **Factors Affecting Dfx - e.g.,**
  - Change in the demand for foreign goods (imports): foreign price, domestic income
  - Change in the demand for foreign asset (outflows): relative returns, relative risks etc.

FLEXIBLE EXCHANGE RATE REGIME: FEATURES



- **Factors Affecting Sfx- e.g.,**
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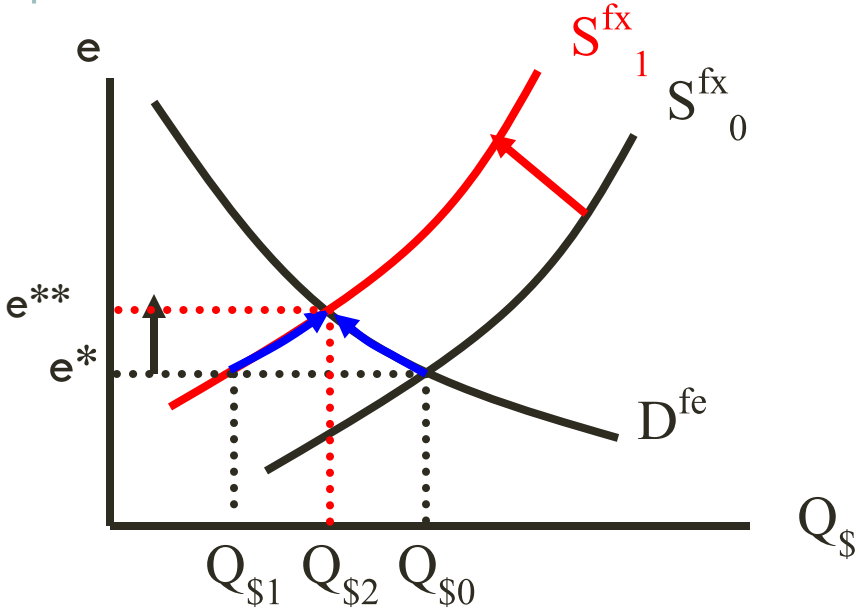
  - Change in the demand for domestic asset (inflows): relative return, relative risk etc.

- **Factors Affecting Dfx - e.g.,**
  - Change in the demand for foreign goods (imports): foreign price, domestic income
  - Change in the demand for foreign asset (outflows): relative returns, relative risks etc.

FLEXIBLE EXCHANGE RATE REGIME: EXAMPLE



Question: what would happen to the exchange rate if GDP growth of major trading partners has been slowing down?

- Initial level e*
- Slowdown growth will result in a **short-fall of export**, causing the **supply for USD to shift left**.
- Excess demand will be eliminated by having the foreign currency appreciated, i.e. depreciation in Thai baht.
- Exchange rate becomes e**.

FIXED EXCHANGE RATE REGIME: FEATURES

- Authority makes an **announcement in advance** for a targeted level of exchange rate, i.e. **anchoring**.

- The rate can be different from the rate the would arise under the flexible exchange rate regime, i.e. **shadow rate.**

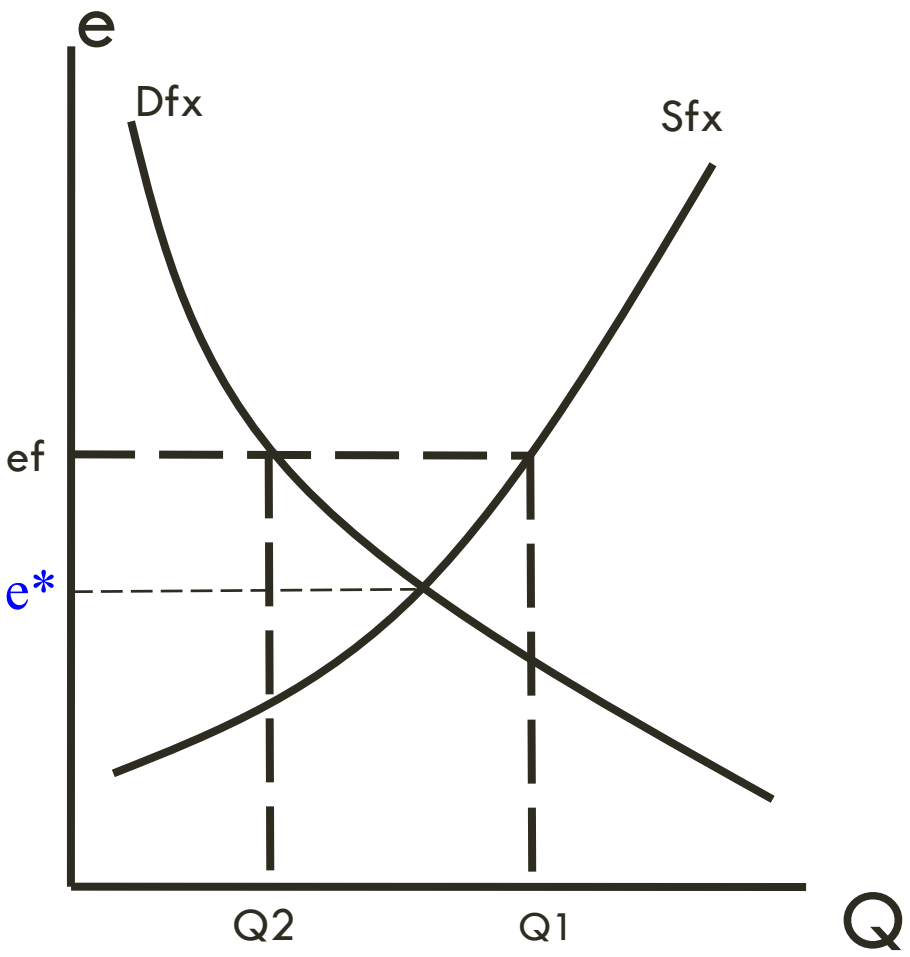
- To make a public commitment, authority (central bank) must be standing ready to ***intervene/support*** the market so that the targeted rate can be attained.

OFFICIAL RATE E_F ABOVE E*: IMPLEMENTATION

Domestic currency (ef) is undervalued.

- Excess Sfx; BOP > 0.
- Central bank **buys** FX to fix e_f.
- Accumulation of FX.
- Problem?

Revaluation of domestic currency; making domestic currency value stronger.

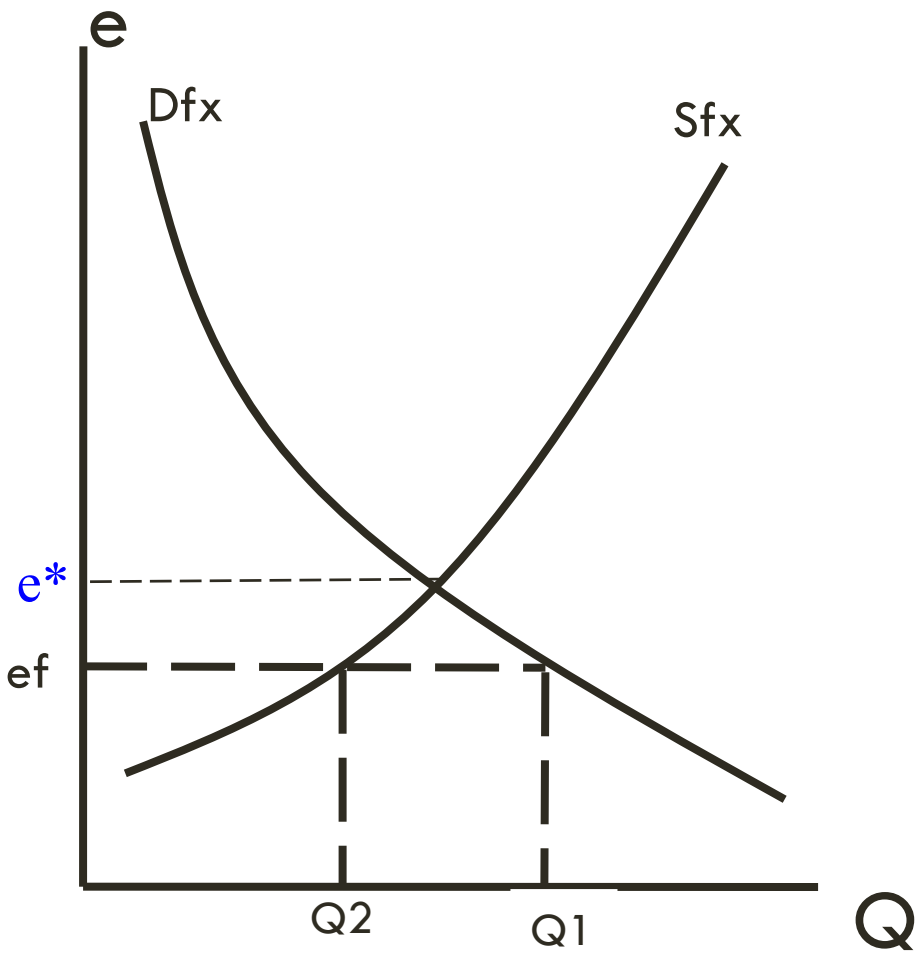


OFFICIAL RATE E_F UNDER E*: IMPLEMENTATION

Domestic currency (ef) is overvalued.

- Excess Dfx; BOP < 0.
- Central bank must **sell** FX to fix e_f.
- But official reserves are not unlimited?

Devaluation of domestic currency; making domestic currency value weaker.



SPECTRUM OF THE FIXED EXCHANGE RATE REGIME

- **Hard pegs**: the value of domestic currency is fixed relative to foreign currency for the indefinite future.
  - **Dollarization**: use foreign currency as the national medium of exchange (East Timor, Ecuador, El Salvador, Panama).
  - **Currency board**: central bank fixes the nominal exchange rate, then buys and sells foreign-denominated assets to maintain the rate (Bosnia, Bulgaria, Denmark, Hong Kong, Lithuania)

SPECTRUM OF FIXED EXCHANGE RATE REGIME

- **Soft pegs:** no permanent fixed rate.
  - The nominal rate is fixed for a long time period.
  - *Periodic adjustment* to correct imbalances: devaluation (raising e) or revaluation (reducing e).

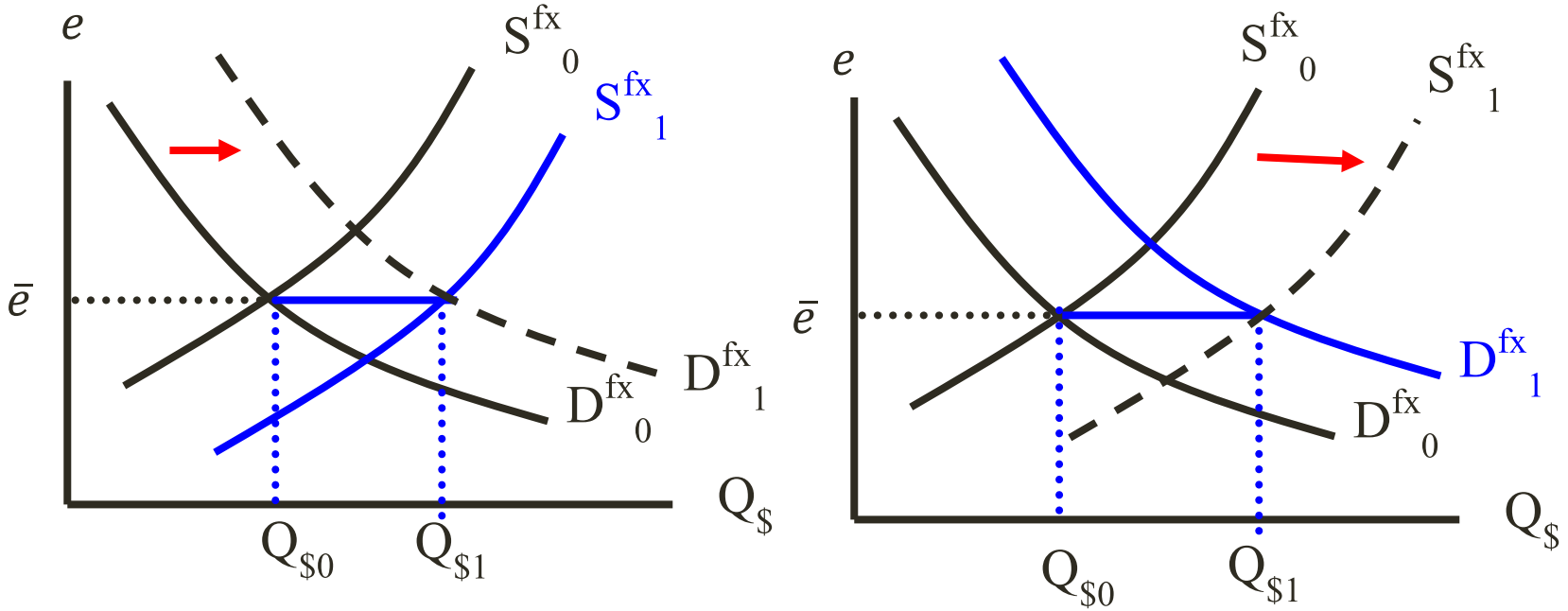
FIXED AND FLEXIBLE: CONS AND PROS

	Fixed exchange rate	Flexible exchange rate
Advantage	No uncertainty in exchange rate.	Reflecting fundamental of economy
Disadvantage	Likely to invite a financial crisis; slow to respond to imbalances.	Prone to subject to high volatility; resulting in unnecessarily high cost for hedging the exchange rate risk.

- **Managed float regime is more popularized regime.**
- Occasional intervention if rate changes at a very dramatic pace.
- So, what is the difference between soft pegged v.s. managed float?

MANAGED FLOAT REGIME: FOREIGN CURRENCY MARKET INTERVENTION

Suppose the authority needs to ***stabilize*** the exchange rate at $\bar{e}$



- $\bar{e}$ → Excess demand (more buy than sell)→ **Central bank** must supply USD to clear the excess demand in USD by $\$Q_{\$0}Q_{\$1}$.

- $\bar{e}$ → Excess supply (more sell than buy) → **Central bank** must buy USD to clear the excess supply in USD by $\$Q_{\$0}Q_{\$1}$

FOREX INTERVENTION AND ITS IMPLICATION FOR CENTRAL BANK BALANCE SHEET

With Forex intervention, domestic financial sector gets impacted.

Consider a simplified balance sheet of the central bank.

Asset	Liability
Government bond (Govt Bond) Gold	Currency in circulations
Foreign currency reserve (FRA) - Foreign-denominated assets - Foreign currencies - SDRs	Commercial bank reserve
	Capital + Net Worth

Monetary Base

- FOREX Intervention will affect the level of monetary base, and hence money supply.
- How? When central bank creates "demand" and "supply" for foreign currency, it buys and sells the foreign currency from commercial banks.

FOREX INTERVENTION AND ITS IMPLICATION FOR CENTRAL BANK BALANCE SHEET

A simplified balance sheet of the central bank.

Asset	Liability
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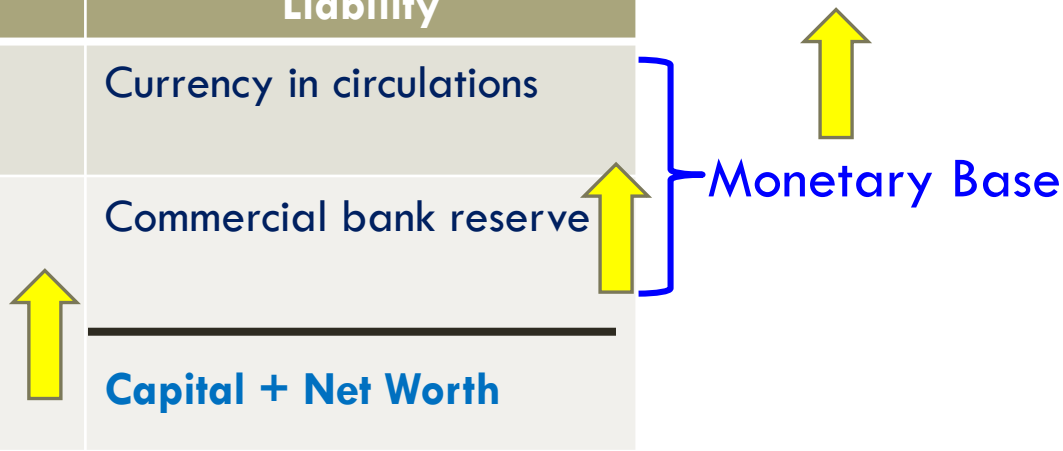

- BOP surplus → Buying $ (under ES in $) → Rising in FRA → **MB rises, and hence money supply**
- BOP deficit → Selling $ (under ED in $) → Depletion in FRA → **MB falls, and hence money supply**

FOREX INTERVENTION AND ITS IMPLICATION FOR CENTRAL BANK BALANCE SHEET: STERILIZATION

- Forex intervention affects the amount of liquidity in the financial system; *unintended outcome*

- Central bank might pursue some domestic policy actions to **counteract** the unintended outcome of the forex intervention

- The pursued action is called "*sterilized forex intervention*"
  - Intervene forex market, with **a simultaneous central bank's OMO to keep the monetary base fixed.**

FOREX INTERVENTION AND CENTRAL BANK BALANCE SHEET: STERILIZED INTERVENTION

A simplified balance sheet of the central bank.

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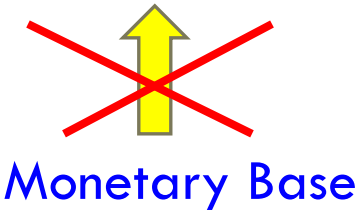

- Buying $ (ES in $) → ~~MB rises, and hence money supply~~ → Offset by OMO sale
- Selling $ (ED in $) → ~~MB falls, and hence money supply~~ → Offset by OMO purchase