Topic 2: Exchange Rate and the Foreign Exchange Market

Juthathip Jongwanich

Exchange rate arrangement (Number of countries)	Monetary Policy Framework							
	Exchange rate anchor						Monetary aggregate target (24)	Inflation-targeting framework (41)
	US dollar (38)		Euro (25)		Composite (9)	Other (9)		
Currency board (11)	Djibouti Hong Kong SAR **ECCU** Antigua and Barbuda Dominica Grenada	St. Kitts and Nevis St. Lucia St. Vincent and the Grenadines	Bosnia and Herzegovina Bulgaria			Brunei Darussalam		
Conventional peg (43)	Aruba The Bahamas Bahrain Barbados Belize Curaçao and Sint Maarten Eritrea	Iraq Jordan Oman Qatar Saudi Arabia Turkmenistan United Arab Emirates	Cabo Verde Comoros Denmark[2] São Tomé and Príncipe **WAEMU** Benin Burkina Faso Côte d'Ivoire Guinea Bissau Mali Niger Senegal	**CEMAC** Cameroon Central African Rep. Chad Rep. of Congo Equatorial Guinea Gabon	Fiji Kuwait Morocco[3] Libya	Bhutan Eswatini Lesotho Namibia Nepal		

Exchange rate arrangement (Number of countries)	Monetary Policy Framework						
	Exchange rate anchor					Monetary aggregate target (24)	Inflation-targeting framework (41)
	US dollar (38)		Euro (25)	Composite (9)	Other (9)		
Stabilized arrangement (27)	Guyana Lebanon	Maldives Trinidad and Tobago	Croatia North Macedonia	Singapore Vietnam[5]			
Crawling peg (3)	Honduras Nicaragua			Botswana			
Crawl-like arrangement (15)				Iran[5]			
Pegged exchange rate within horizontal bands (1)							
Floating (35)						Argentina Madagascar Seychelles	Albania Armenia Brazil Colombia Czech Republic (4/17) Georgia Ghana Hungary Iceland India
Free floating (31)							Australia Canada Chile Japan Mexico

AREAER - Status Compa

Ye	Country	III.C.2. Currency bo	III.C.3. Conventional	III.C.4. Stabilized arrangem	III.C.5. Crawling	III.C.6. Crawl-like arrangeme	III.C.7. Pegged exchange rate within horizontal bands	III.C.8. Other managed arrangeme	III.C.9. Floating	III.C.10. Free float
2016	People's Republic of China			yes						
2016	Hong Kong, China	yes								
2016	India								yes	
2016	Indonesia								yes	
2016	Korea								yes	
2016	Malaysia								yes	
2016	Philippines								yes	
2016	Singapore			yes						
2016	Thailand								yes	
2016	Vietnam			yes						

Currency Board

- an explicit legislative commitment to exchange domestic currency for a specified foreign currency at a fixed exchange rate
- Domestic currency is usually fully backed by foreign assets
- no restrictions on current-account or capital-account transactions.
- A currency board has no discretionary powers to affect monetary policy and CB cannot lend to the government.

Conventional Peg

- The country formally pegs its currency at a fixed rate to another currency or a basket of currencies
- The country authorities stand ready to maintain the fixed parity through direct intervention (Foreign exchange market) and indirect (e.g. control policy)
- CB could lend to gov.
- the exchange rate may fluctuate within narrow margins of less than ±1% around a central rate or the maximum and minimum value of the spot market exchange rate must remain within a narrow margin of 2% for at least six months.

Stabilized Arrangement

- a *stabilized arrangement* entails a spot market exchange rate that remains within a margin of 2% for six months or more
- The required margin of stability can be met either with respect to a single currency or a basket of currencies

Crawling peg

- The currency is adjusted in small amounts at a fixed rate or in response to changes in selected quantitative indicators, such as past inflation differentials vis-à-vis major trading partners
- The rate of crawl can be set to generate inflation-adjusted changes in the exchange rate (backward looking)
- or set at a predetermined fixed rate and/or below the projected inflation differentials (forward looking).

Pegged exchange rate within horizontal bands [similar to conventional]

- The central rate and width of the band are public or notified to the IMF
- E.g. The value of the currency is maintained within certain margins of fluctuation of at least ±1% around a fixed central rate or the margin between the maximum and minimum value of the exchange rate exceeds 2%.

Managed Floating

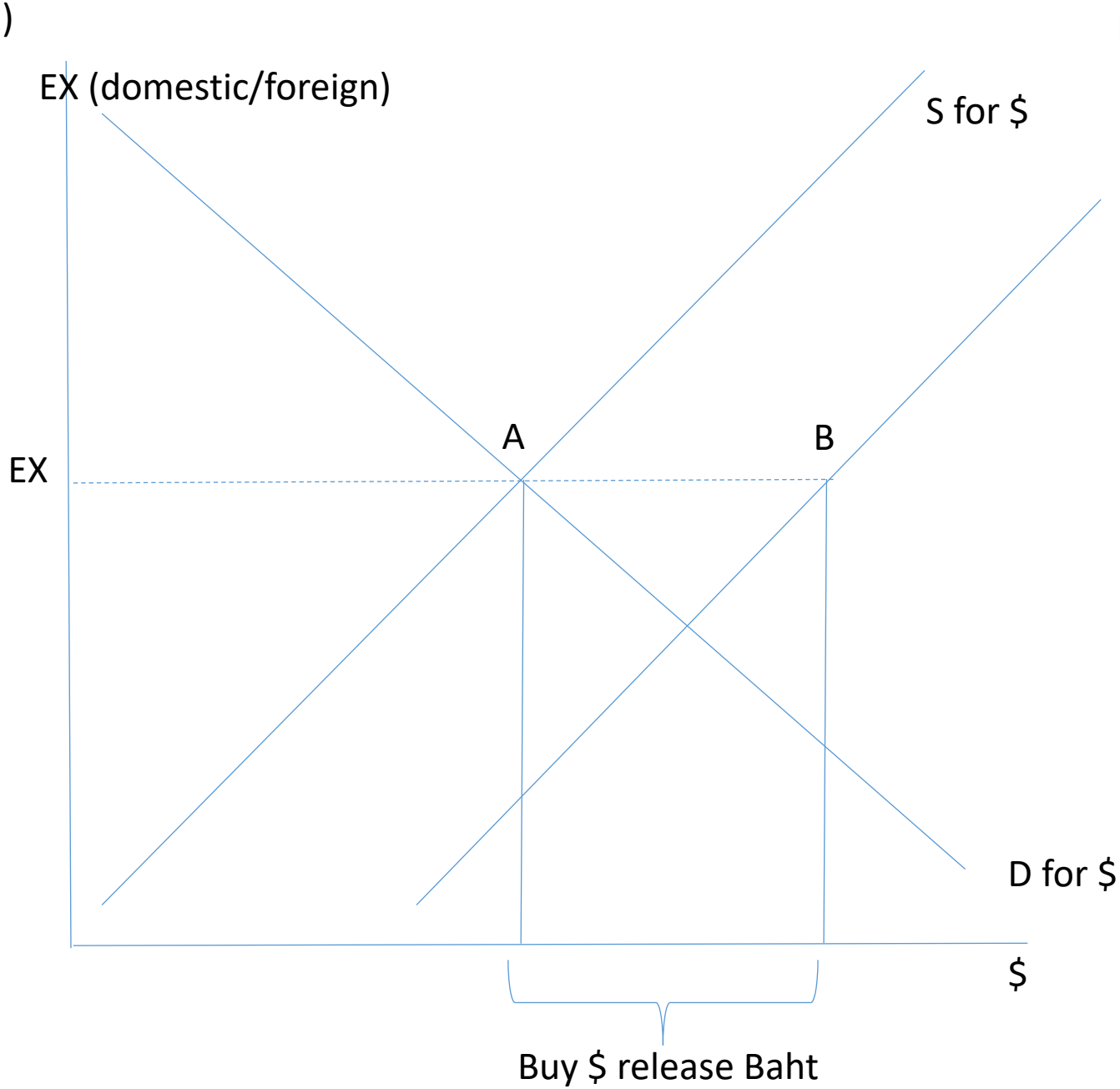
- exchange rate is largely market determined
- Foreign exchange market intervention is mainly to moderate the rate of change and prevent undue fluctuations in the exchange rate
- Indicators for managing the rate are broadly judgmental

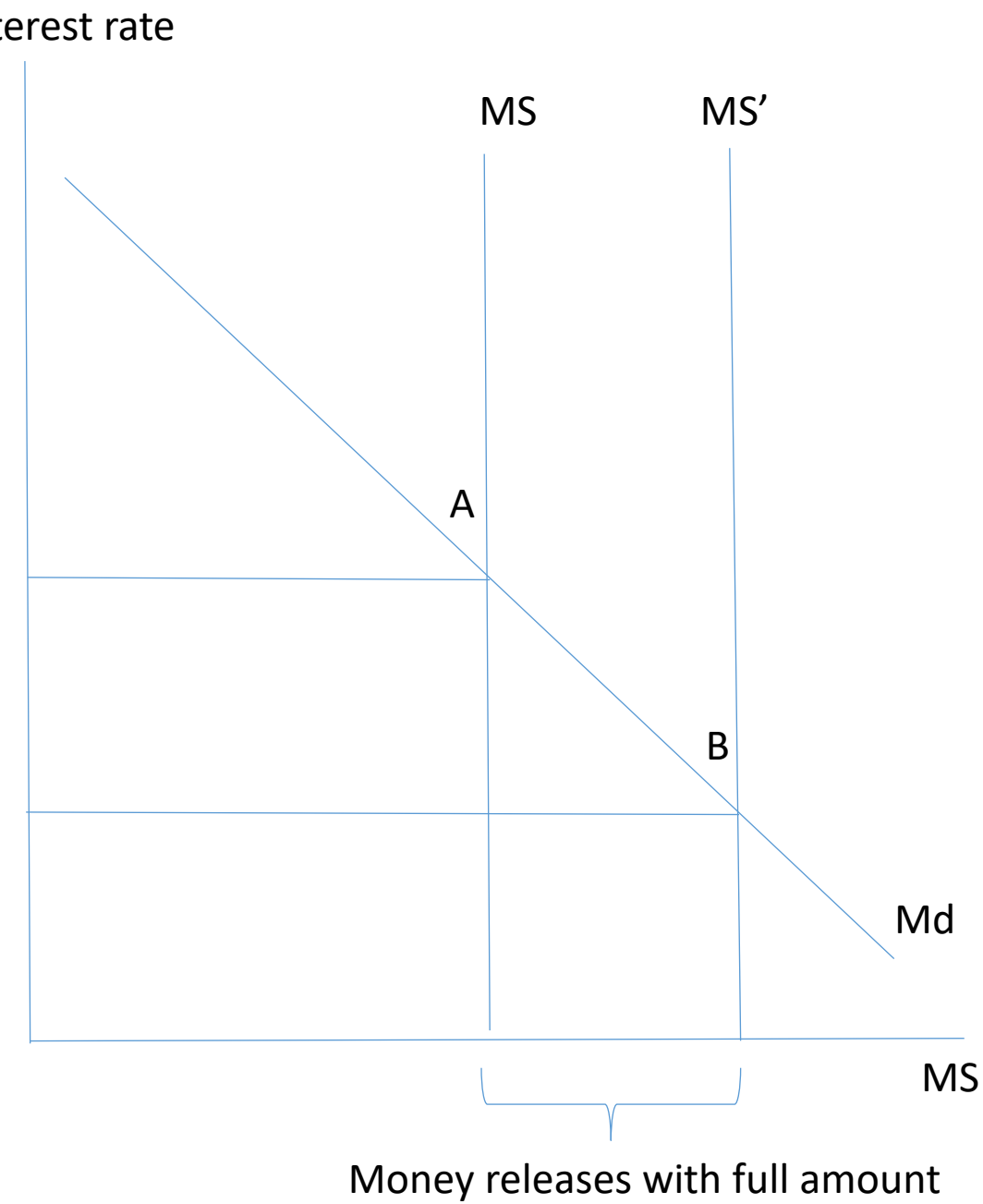
Freely Floating

- A floating exchange rate can be classified as *free floating* if intervention occurs only exceptionally and aims to address disorderly market conditions
- Prove that intervention has been limited to at most three instances in the previous six months, each lasting no more than three business days.

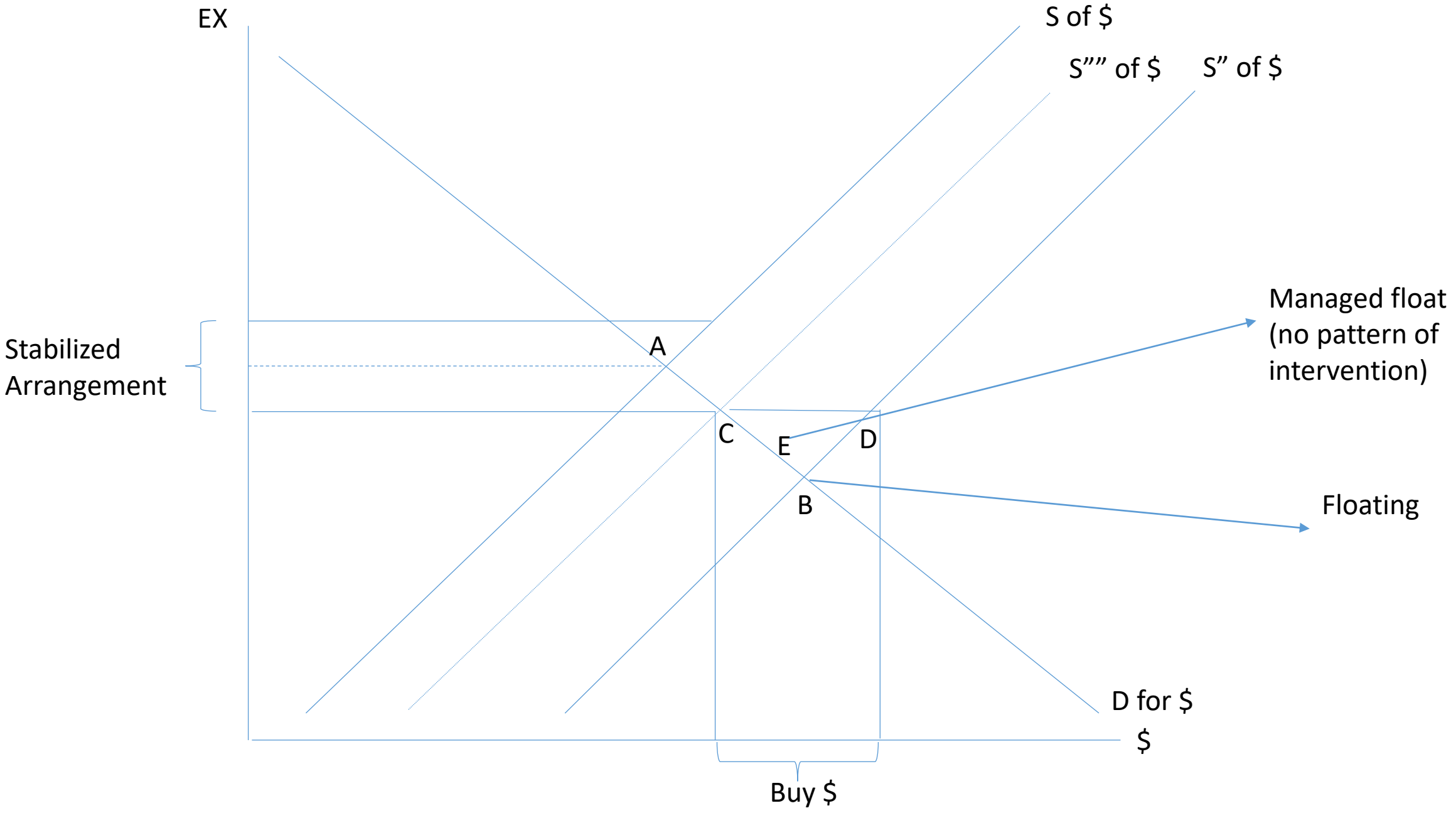
Differences between Currency Board and Conventional Peg

1)





2) Allow exchange rate to adjust (but not much as managed floating



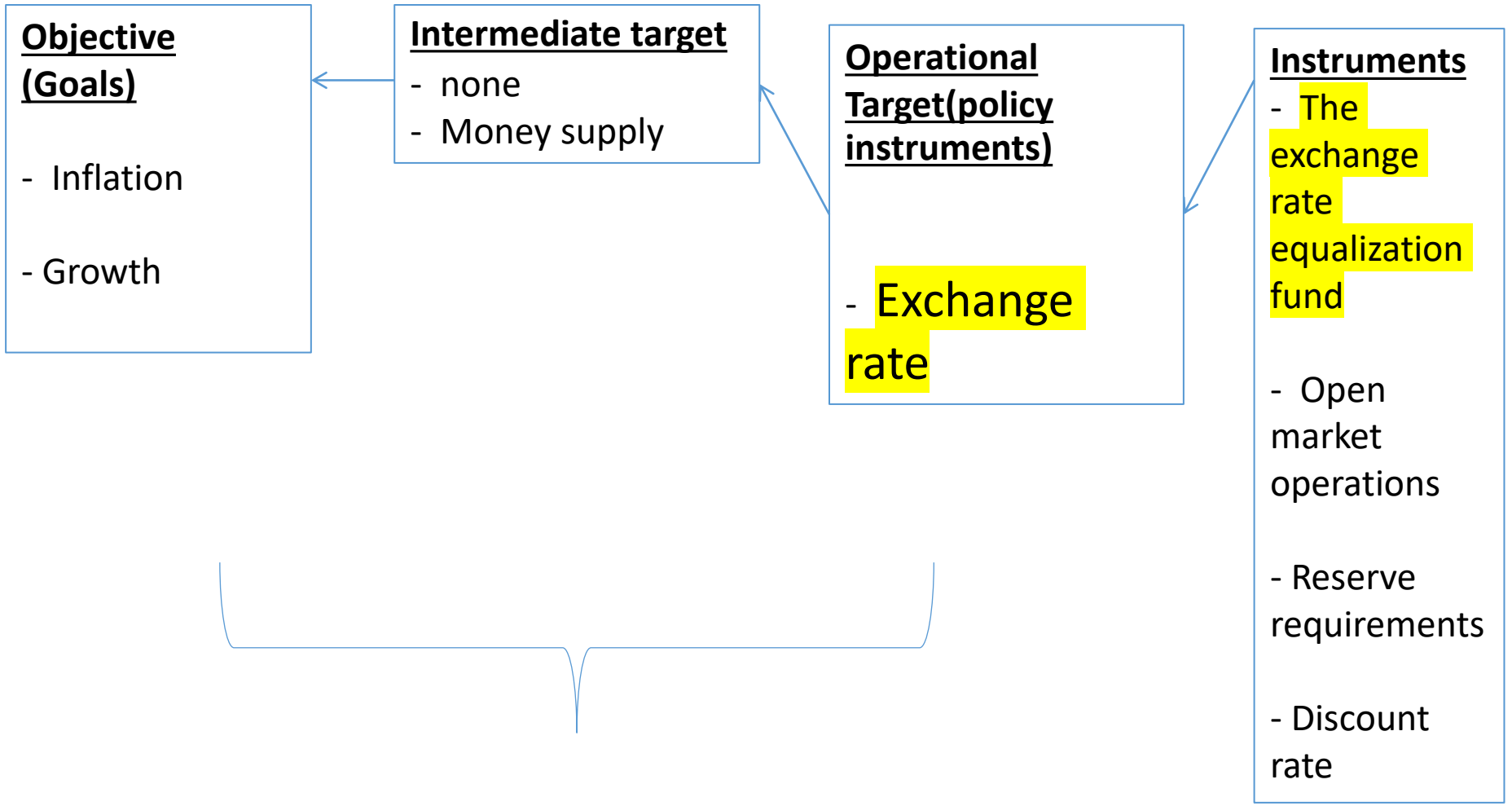
Crawling peg

- Concept is from real exchange rate (RER)

$$RER = \frac{E_{domestic/\ foreign} \cdot P^*}{P_{domestic}}$$

If $P_{domestic}$ is higher than P^* exchange rate needs to be adjusted to keep real exchange rate constant

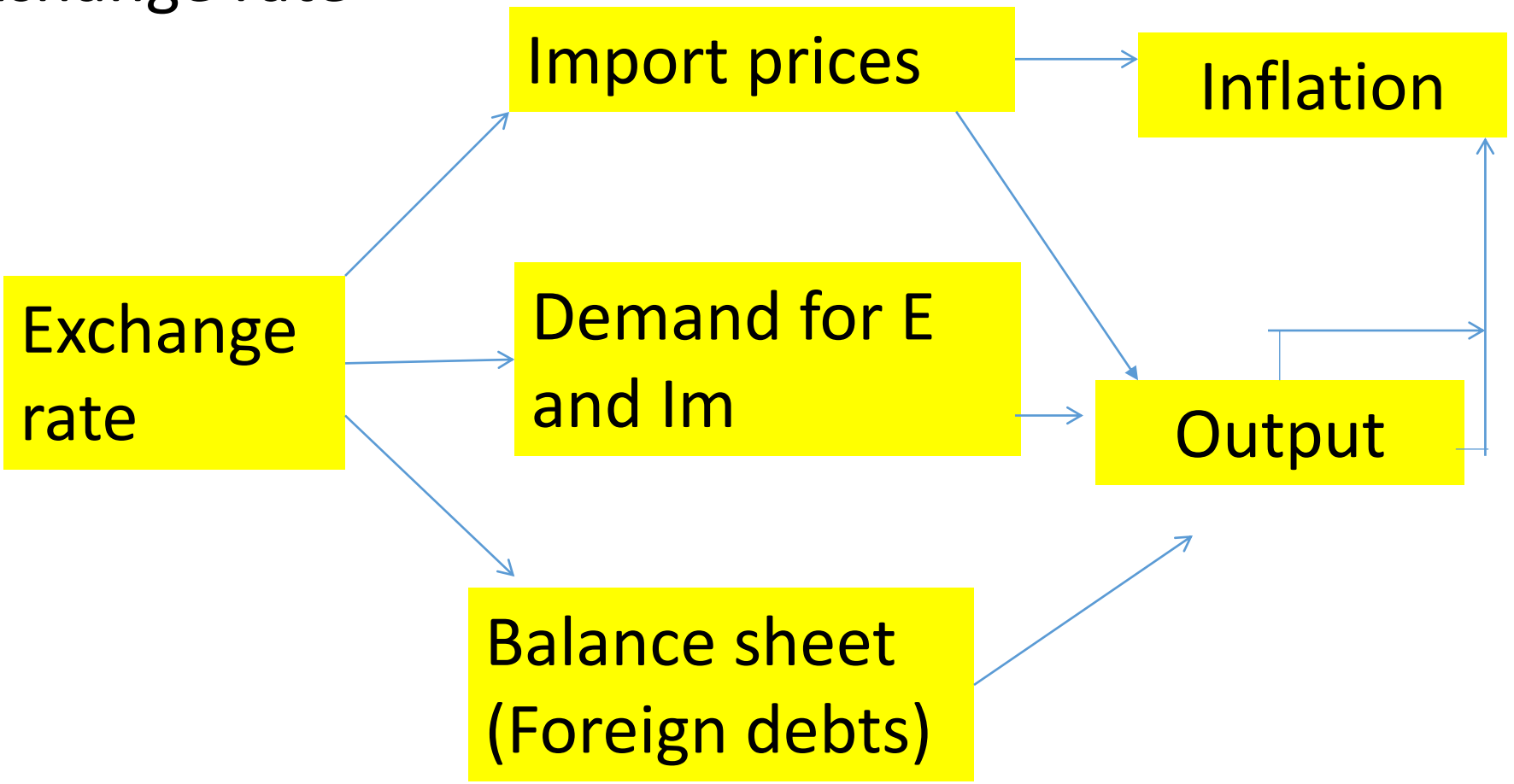
- **Pegged exchange rate**



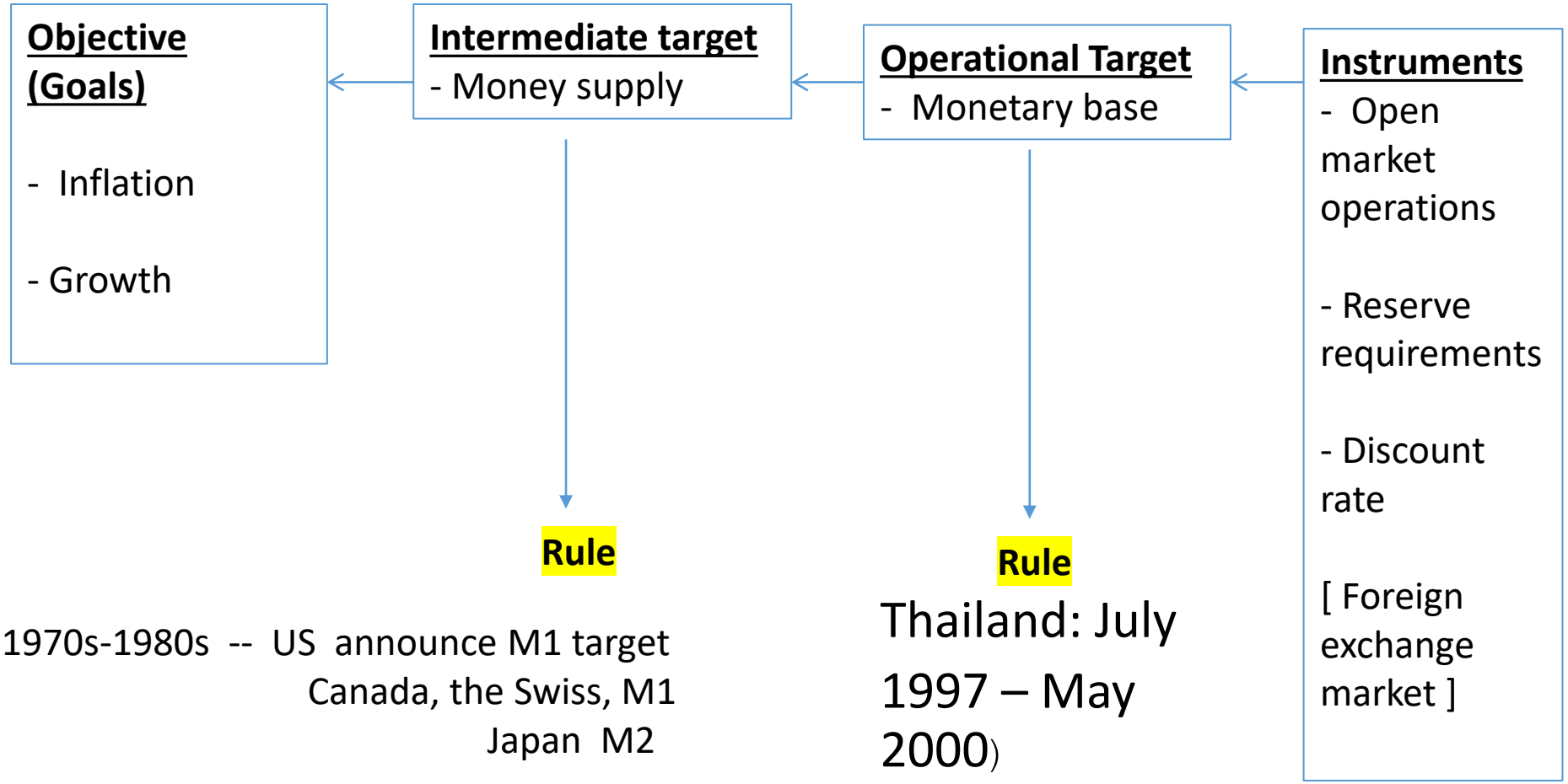
Announce for operational target of FX (bilateral / a basket of currency)

Advantage

Exchange rate

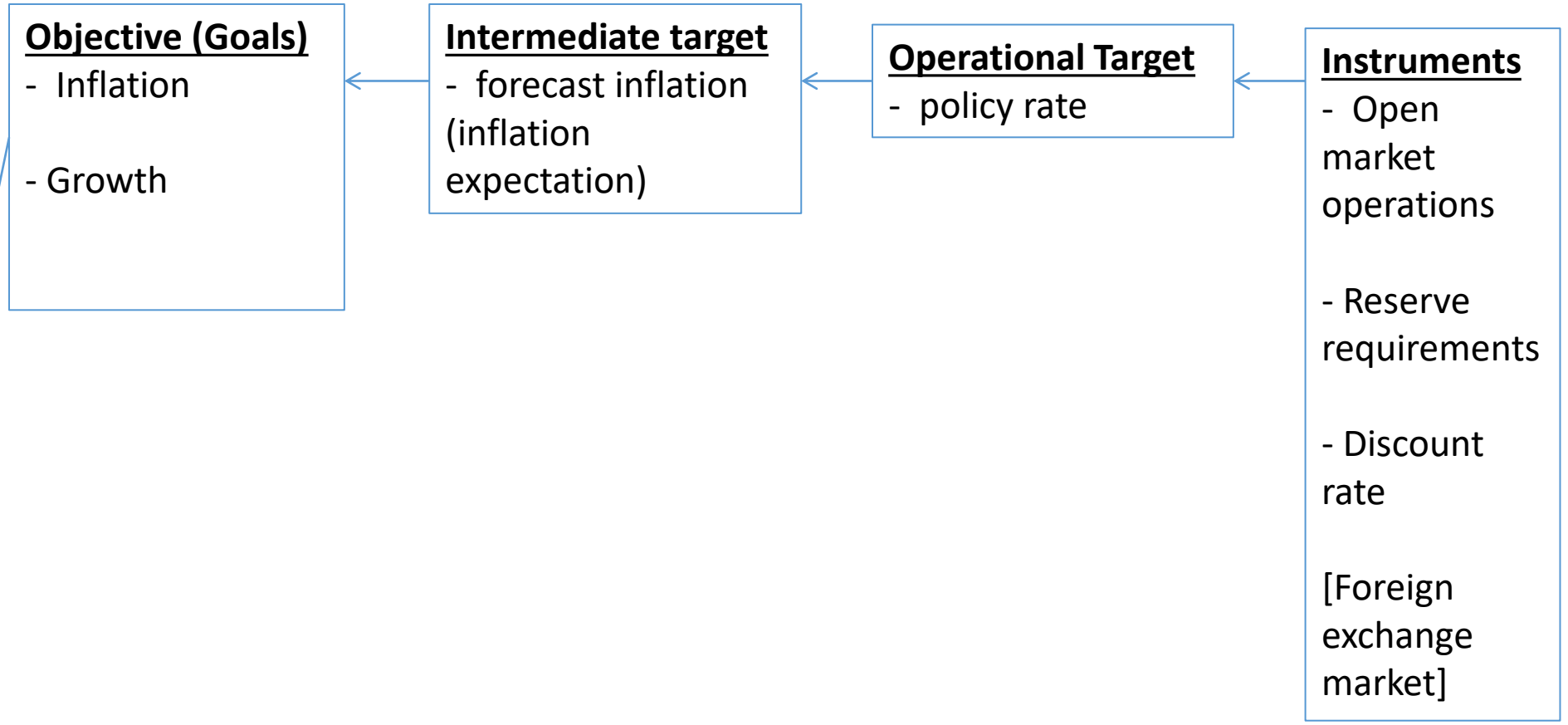


- **Monetary aggregates (Flexible exchange rate)**



Announce intermediate target; may Announce for operational target of money

- Inflation targeting



Thailand:
23 May 2000 - present

Announce for clear objective and operational target

Nominal and real effective exchange rate (NEER and REER)

What is the (nominal) exchange rate?

- Exchange rate is the price of a domestic currency expressed in terms of a foreign currency.

$30\ Baht/US\$ \rightarrow$ we have to use 30 baht to get 1 US$

6.8 Yuan/US$ $\rightarrow$ we have to use 6.8 yuan to get 1 US$

How about Baht/Yuan (Cross exchange rate)

$$\frac{Baht}{US\$} \div \frac{Yuan}{US\$} \rightarrow \frac{Baht}{Yuan} = 30 \div 6.8 = 4.41$$

We have to use 4.41 *baht to get* 1 *yuan*

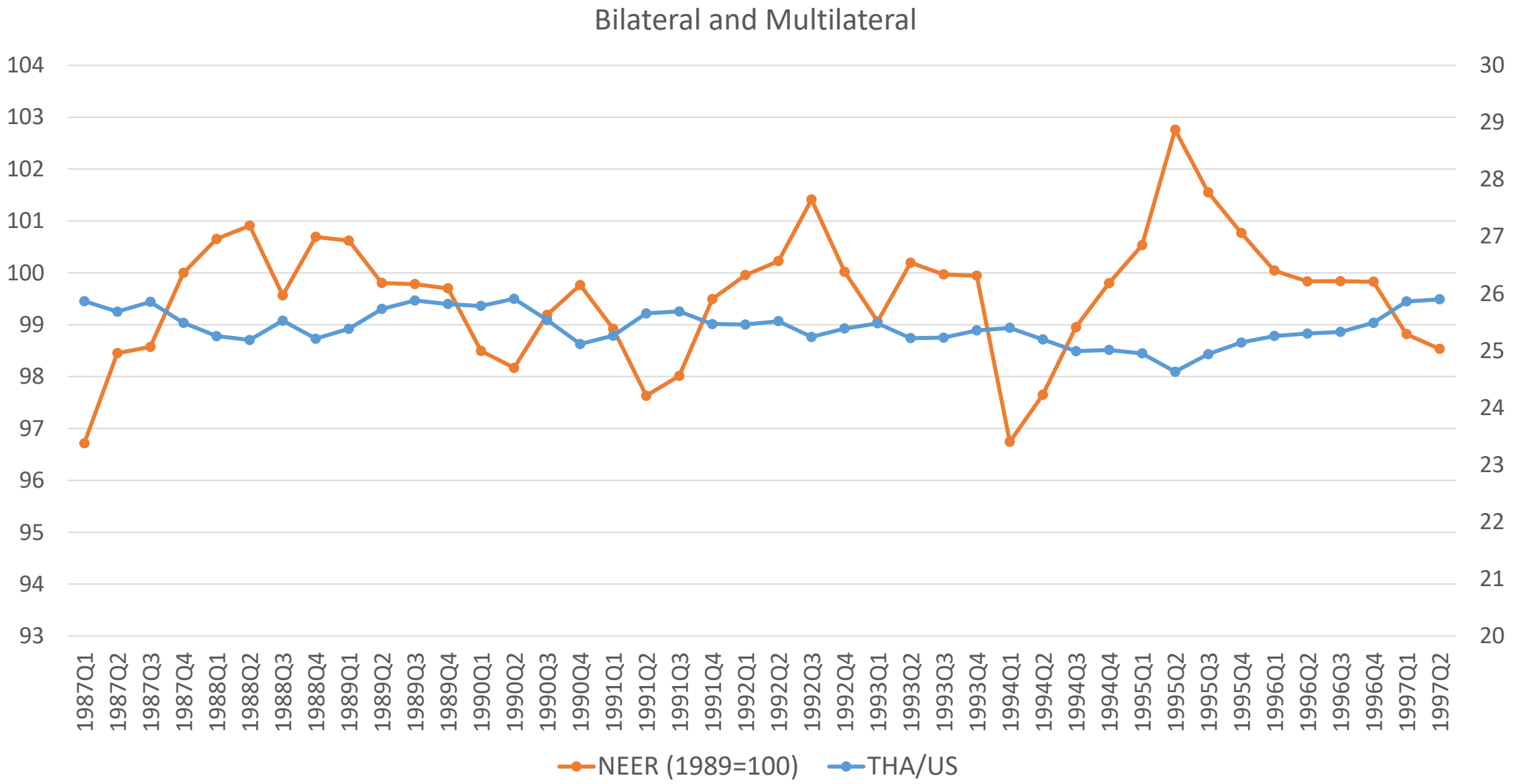
When exchange rate is fixed to the base currency, does this mean that we are fixing with other currencies? [If you still have transactions with other countries]

No need

Multilateral (or effective) exchange rate

(Nominal Effective exchange rate – NEER)

Movements of Bilateral and Multilateral



How to construct ‘effective’ exchange rate?

1) Set the weight to be applied to each of the bilateral indexes (exports or total trade with key trading partners / competitors)

   - Practically, should more than 70% of total (exports, trade)
   - Base year for weights
     - Fixed weights [can become outdated]
     - Adjust every year [Not sure change from weights or exchange rate]
     - Occasional updating [5 years, e.g.]

2) The relevant bilateral exchange rates (trade with (key transaction with))

   [Convert into indexes – to avoid unit of measurement]

3) The bilateral indexes are averaged together using these weight

Miontiel, Ch. 3 page 48-49

Example Weight,

Total exports from Thai to	$ million			Re-weight	
United States of America	14613.5	17.9		(100*17.9)*76	23.5
Japan	11688.3	14.3			18.8
Singapore	6241.4	7.6			10.0
China	5206.1	6.4			8.4
Hong Kong	4322.3	5.3			7.0
Malaysia	3904.0	4.8			6.3
United Kingdom	2588.0	3.2			4.2
Taiwan	2375.1	2.9			3.8
Netherlands	2322.7	2.8			3.7
Indonesia	2311.5	2.8			3.7
Australia	2073.7	2.5			3.3
Germany	1728.8	2.1			2.8
Korea, South	1601.7	2.0			2.6
Philippines	1507.0	1.8			2.4
Others			76%		100
Total	81773.42	100			

				25.70	0.19		Index (1989=100)			
	THA/US	JAP/US	etc.	THA/US	THAI/JAP	etc	THA/US	THAI/JAP	Weight	NEER
1987Q1	25.9	153.2		25.87	0.17		100.6	90.5	(100.6^0.23)*(90.5^0.18)*(XX^0.1)*……	96.7
1987Q2	25.7	142.7		25.68	0.18		99.9	96.5		98.5
1987Q3	25.9	146.9		25.86	0.18		100.6	94.3		98.6
1987Q4	25.5	135.8		25.49	0.19		99.2	100.6		100.0
1988Q1	25.3	128.0		25.25	0.20		98.3	105.7		100.7
1988Q2	25.2	125.6		25.19	0.20		98.0	107.5		100.9
1988Q3	25.5	133.7		25.53	0.19		99.3	102.3		99.6
1988Q4	25.2	125.3		25.21	0.20		98.1	107.9		100.7
1989Q1	25.4	128.5		25.38	0.20		98.8	105.9		100.6
1989Q2	25.7	138.1		25.73	0.19		100.1	99.9		99.8
1989Q3	25.9	142.3		25.88	0.18		100.7	97.5		99.8
1989Q4	25.8	143.0		25.82	0.18		100.4	96.7		99.7
1990Q1	25.8	147.9		25.78	0.17		100.3	93.4		98.5
1990Q2	25.9	155.3		25.91	0.17		100.8	89.4		98.2

But more details need to be considered

1) Geometric or Arithmetic Weighting

Geometric

$$\text{Effective Ex} = \text{E}_{baht/us} \wedge \left(\frac{Trade_{withUS}}{TotaltradeinThai} \right) \cdot \text{E}_{baht/Euro} \wedge \left(\frac{Trade_{withEuro}}{TotaltradeinThai} \right) \cdot \text{E}_{baht/Yuan} \wedge \left(\frac{Trade_{withChina}}{TotaltradeinThai} \right) ....$$

$$= \prod_{i=1}^{n} (e_{domestic/\ foreigncountry\ i})^{W_i}$$

$$W_i = trade\ weight = \frac{Trade_{withcountryi}}{Totaltrade}$$

Arithmetic

$$\text{Effective Ex} = \text{E}_{baht/us} \cdot \left(\frac{Trade_{withUS}}{TotaltradeinThai} \right) + \text{E}_{baht/Euro} \cdot \left(\frac{Trade_{withEuro}}{TotaltradeinThai} \right) + \text{E}_{baht/Yuan} \cdot \left(\frac{Trade_{withChina}}{TotaltradeinThai} \right) ....$$

$$= \sum_{i=1}^{n} e_{domestic/\ foreigncountry\ i} \cdot W_i$$

$$W_i = trade\ weight = \frac{Trade_{withcountryi}}{Totaltrade}$$

- Geometric is better
  - One currency appreciated against domestic currency while
  - Another depreciated against the domestic current
  - You expect “effective should stay the same” --- true only Geometric

		weight	**0.2**	
			0.2	
			0.6	
4	6	5	5.000	5.377
8	3	5	5.200	5.388
			↓	↓
			Arithmetic	Geometric

Real exchange rate

- Nominal exchange rate --- look only movements of currency

- Think about when you trade (other activities)
  - Nominal rate (convert currency)
  - Price of home
  - Price of the other

RER

$$Bilateral\ RER = \frac{E_{domestic/\ foreign} \cdot P^*}{P_{domestic}}$$

Real Effective Exchange Rate (RER)

$$Bilateral\ RER = \frac{E_{domestic/\ foreign} \cdot P^{*}}{P_{domestic}}$$

$$Multilateral\ RER = \left(\frac{E_{domestic/\ foreign1} \cdot P^{*1}}{P_{domestic}} \right)^{W_1} \cdot \left(\frac{E_{domestic/\ foreign2} \cdot P^{*2}}{P_{domestic}} \right)^{W_2} \cdot \left(\frac{E_{domestic/\ foreign3} \cdot P^{*3}}{P_{domestic}} \right)^{W_3} \ldots$$

$$= \prod_{i=1}^{n} \left(\frac{E_{domestic/\ foreign(i)} \cdot P^{*1}}{P_{domestic}} \right)^{W_i} = \prod_{i=1}^{n} \frac{\left(E_{domestic/\ foreign(i)}\right)^{W_i} \left(P^{*i}\right)^{W_i}}{P^{domestic}}$$

$$W_i = \frac{\text{Trade with countryi}}{\text{Total trade of home}}$$

Since we do not trade with only one country, REER is useful

Concerns on Choice of Prices

Consumer Prices [More on Non-tradable products]

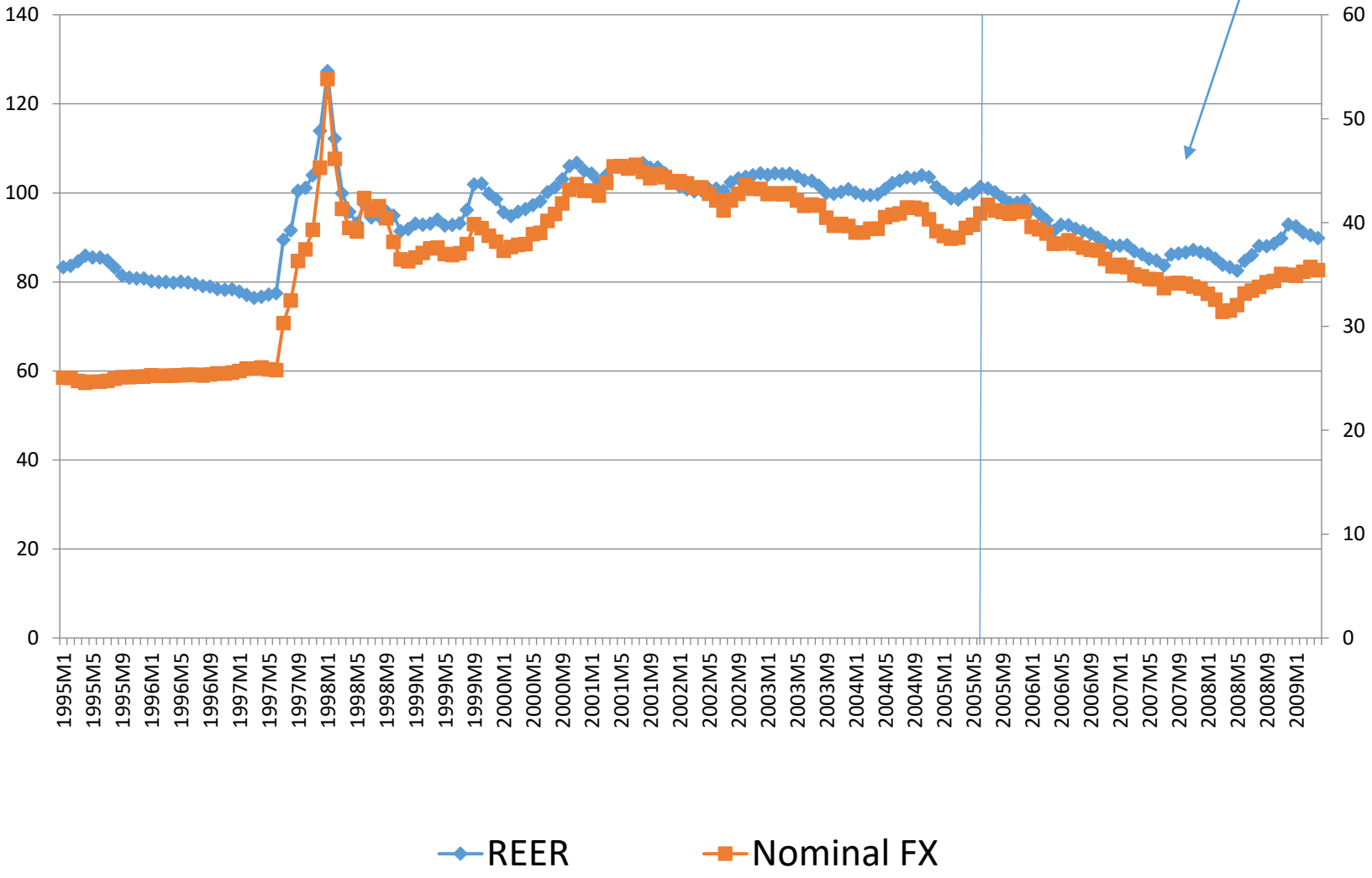
Producer Prices [More on tradable products]

	Thailand	
	PPI	CPI
All items		
Primary	10.9	33.5
Fuel& Power		
Manufactured products	86.1	
Food Products	14.3	
Clothing and footwear	4.7	3.1
Rubber and Plastic Products	4.3	
Coal & Petroleum products	8.4	
Chemicals and Chemical Products	4.8	
Non- Metallic Mineral Products	2.5	
Basic Metals, Alloys and Metal Products	3.4	
Machinery and Machine Tools	27.7	
Transport Equipments and Parts	7.8	
Non-tradable		
Housing&Furnishing		
electricity, gas and other fuels		29.0
Health		6.5
Transport		17.7
Communication		4.1
Recreation and culture		
Education		6.0
Restaurants and hotels		
Others	11.2	0.1

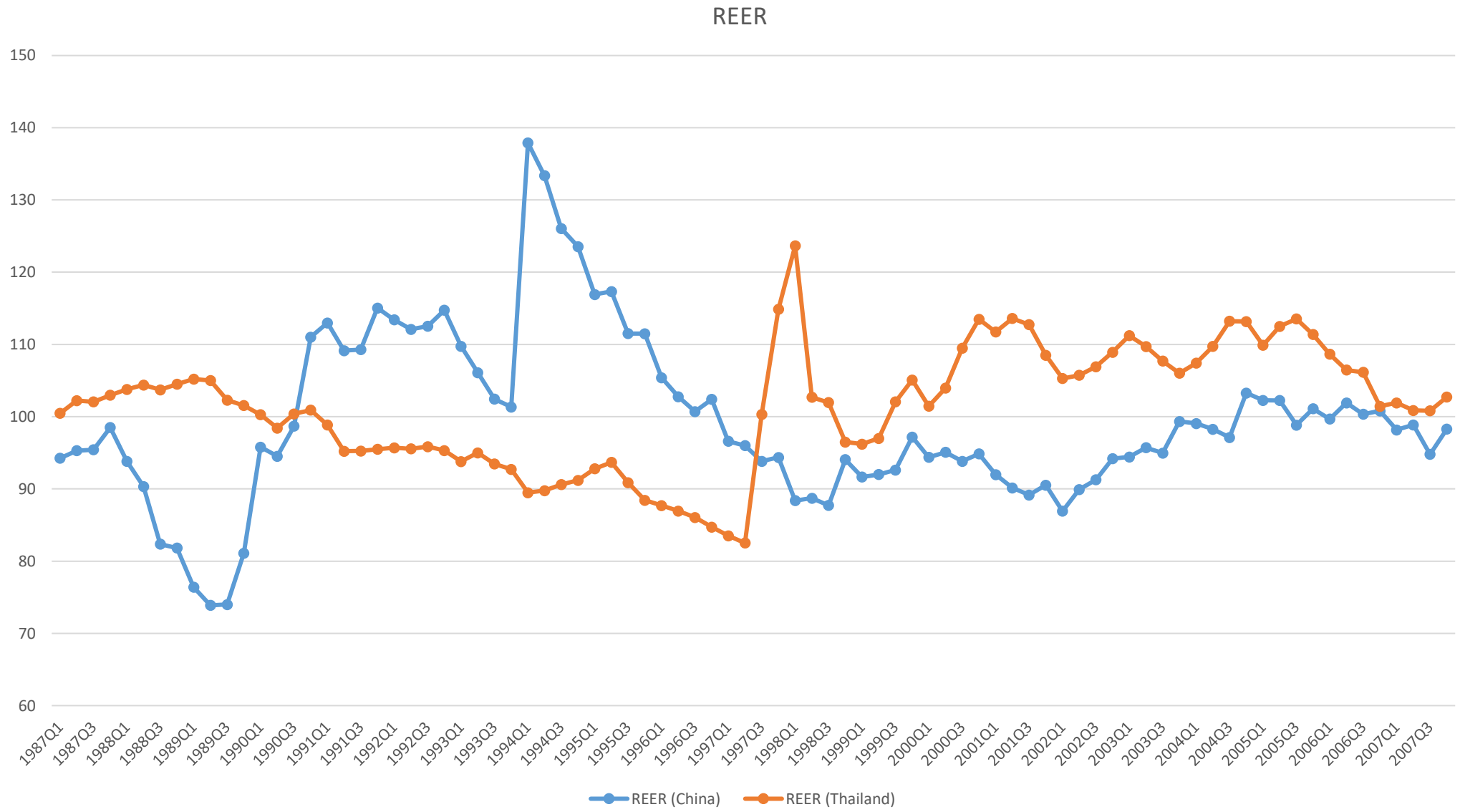
		Prices of foreign countries (1989=100)					Price of Thai			
	NEER	US	Japan	etc…..		Weighted F. prices	1989=100		REER	REER (1989=100)
1987Q1	96.7	89.9	98.4		(89.9^0.23)*(98.4^0.18)*(XX^0.1)……	90.3	90.0		(NEER*Weighted F. Prices)/Prices of Thai)	97.1
1987Q2	98.5	91.3	98.1			91.1	90.8			98.8
1987Q3	98.6	92.4	99.0			92.0	91.9			98.6
1987Q4	100.0	92.8	99.2			92.4	92.8			99.5
1988Q1	100.7	93.3	98.2			93.1	93.5			100.3
1988Q2	100.9	94.9	97.9			94.5	94.5			100.8
1988Q3	99.6	96.2	98.2			96.0	95.4			100.2
1988Q4	100.7	96.7	98.1			96.5	96.3			100.9
1989Q1	100.6	98.8	98.1			98.4	97.4			101.6
1989Q2	99.8	100.5	100.3			100.3	98.7			101.4
1989Q3	99.8	100.1	101.0			100.5	101.5			98.8
1989Q4	99.7	100.5	100.6			100.7	102.3			98.1
1990Q1	98.5	102.0	101.0			101.7	103.4			96.9
1990Q2	98.2	101.8	101.0			101.9	105.2			95.1

Explanation of REER (การอธิบายดัชนีค่าเงินที่แท้จริง)

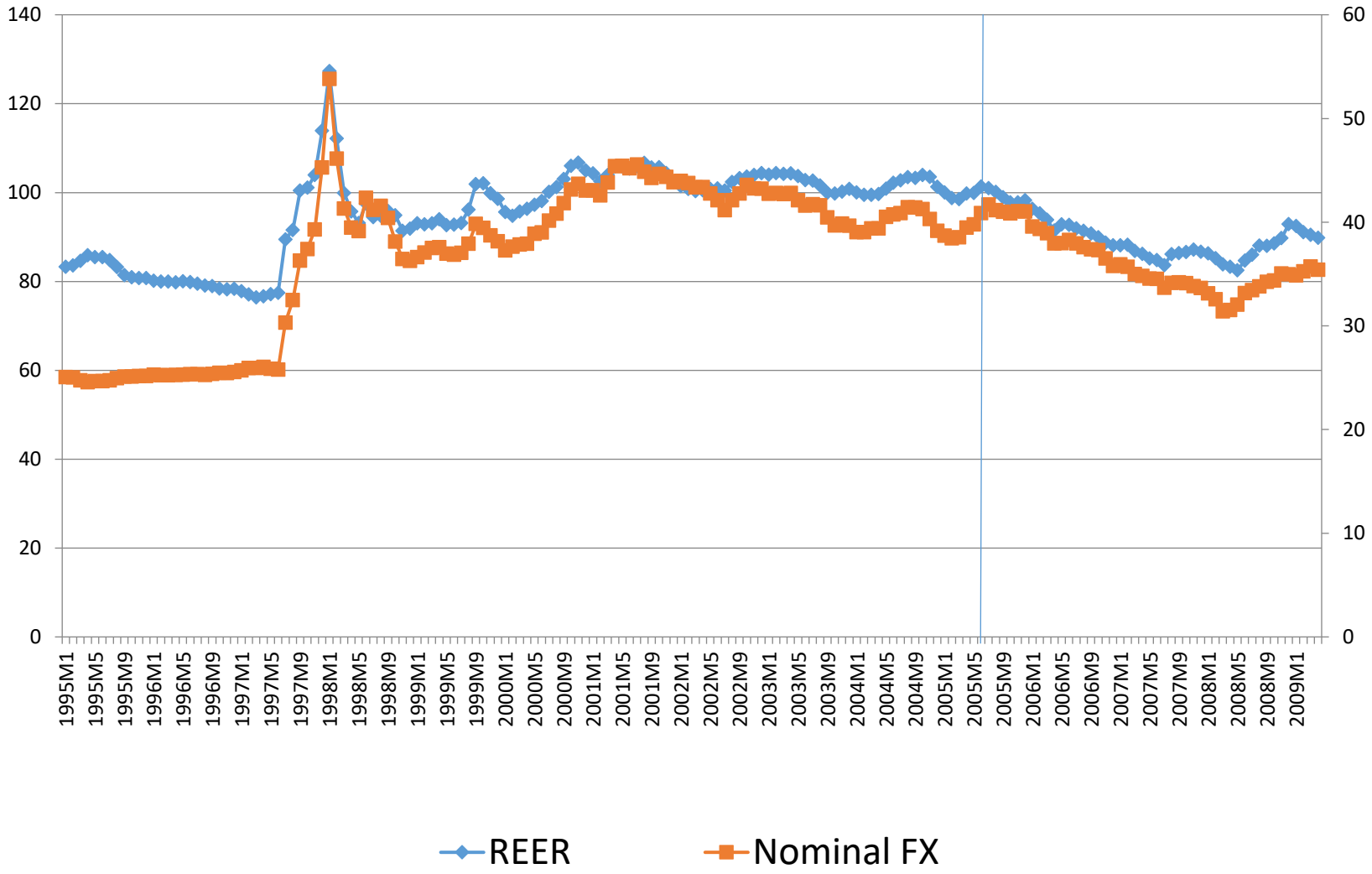
1) Comparing over the period



2) Comparing with other countries (key competitors)



NEER อธิบาย REER ได้ดีเมื่อเกิด Price rigidity



Foreign Exchange Market

Krugman et.cl., (2015): ch.14 p. 380-83

The market for foreign exchange

- Spot contract
  - A contract for the immediate exchange of one currency for another. [2 days to handle the currency]
  - The rate of exchange called “spot rate”
  - Individuals can buy and sell foreign currency through “a retail channel” (such as commercial banks / financial institutions)
    - Buy at the higher price than the midrange quote
    - Sell at the lower price
    - The difference between buy and sell rate is called “spread”

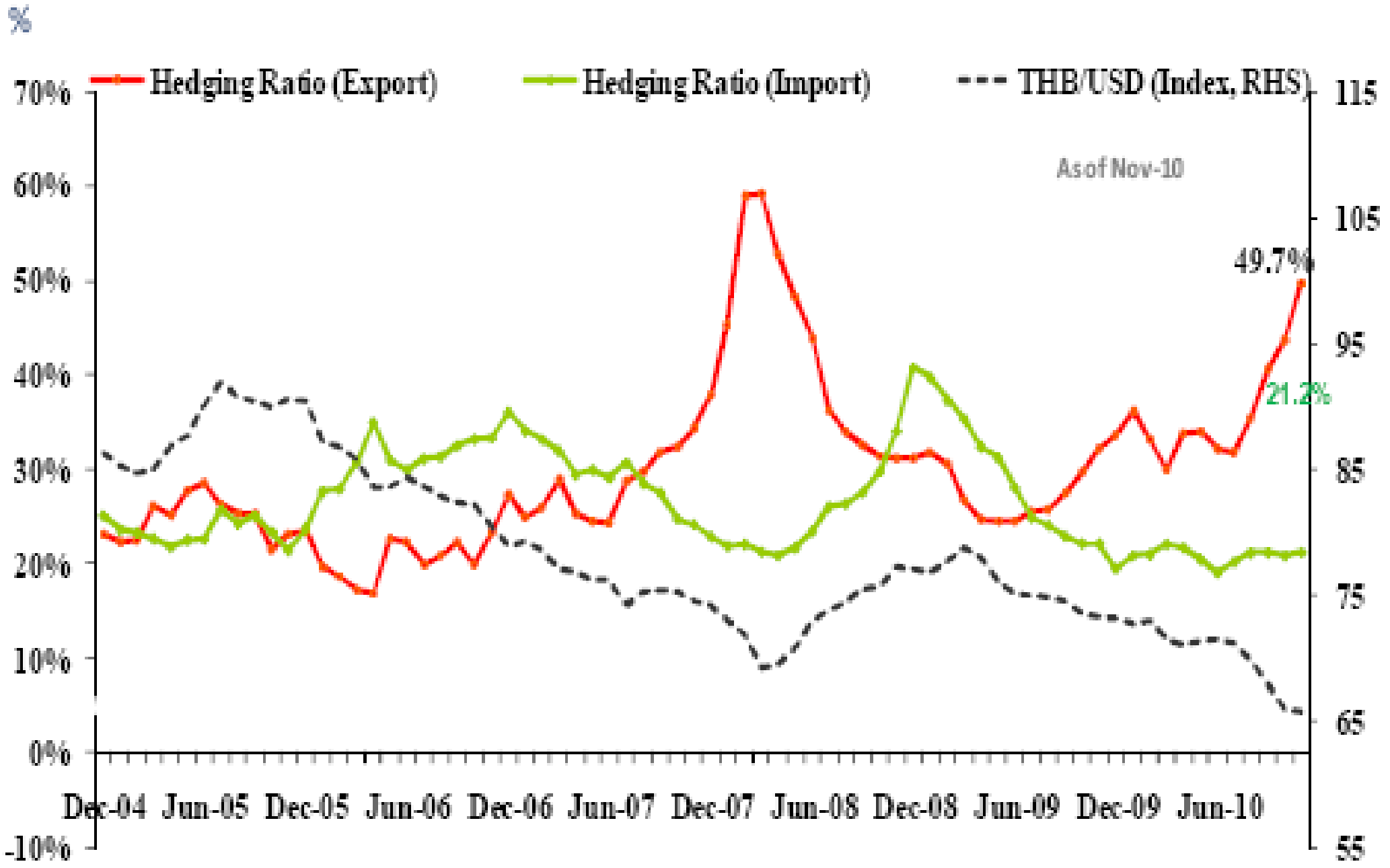
- **Derivative market**
  - There are many derivative contracts in the foreign exchange market
    - A **forward contract** is a customized contractual agreement where two private parties agree to trade a particular asset with each other at an agreed specific price and time in the future. Forward contracts are traded privately over-the-counter.

At the bank, 4 key things to discuss at the bank for forward contract;

- Rate,
- Amount of transaction,
- Types of transaction, **Sell 'baht' for 'dollar':** "Sold Baht forward" and "bought dollars forward"
- Date transaction that would take place in the future. (maturity) varies – 30 – 90 days, 6 months, a year or even longer

Derivatives allow investors to engage in hedging (risk avoidance) or speculation (risk taking)

- Hedging
  - An exporter from Thailand expect to receive payment from US $1 million in 90 days
    - Now spot rate = 30 baht/US$
    - The firm does not sure for another 90 days as the trend of appreciation is evidence (if you expect that exchange rate continued to appreciate)
    - Forward rate = 28.7 baht/US$
    - Suppose another 90 days, exchange rate (spot rate) is at 27, what will happen?


%
Hedging Ratio (Export)
Hedging Ratio (Import)
THB/USD (Index, RHS)
As of Nov-10
49.7%
21.2%
70%
60%
50%
40%
30%
20%
10%
0%
-10%
115
105
95
85
75
65
55
Dec-04
Jun-05
Dec-05
Jun-06
Dec-06
Jun-07
Dec-07
Jun-08
Dec-08
Jun-09
Dec-09
Jun-10

- A **futures contract**— often referred to as **futures** — is a standardized version of a forward contract that is publicly traded on a futures exchange. (equal for each contact $1,000)

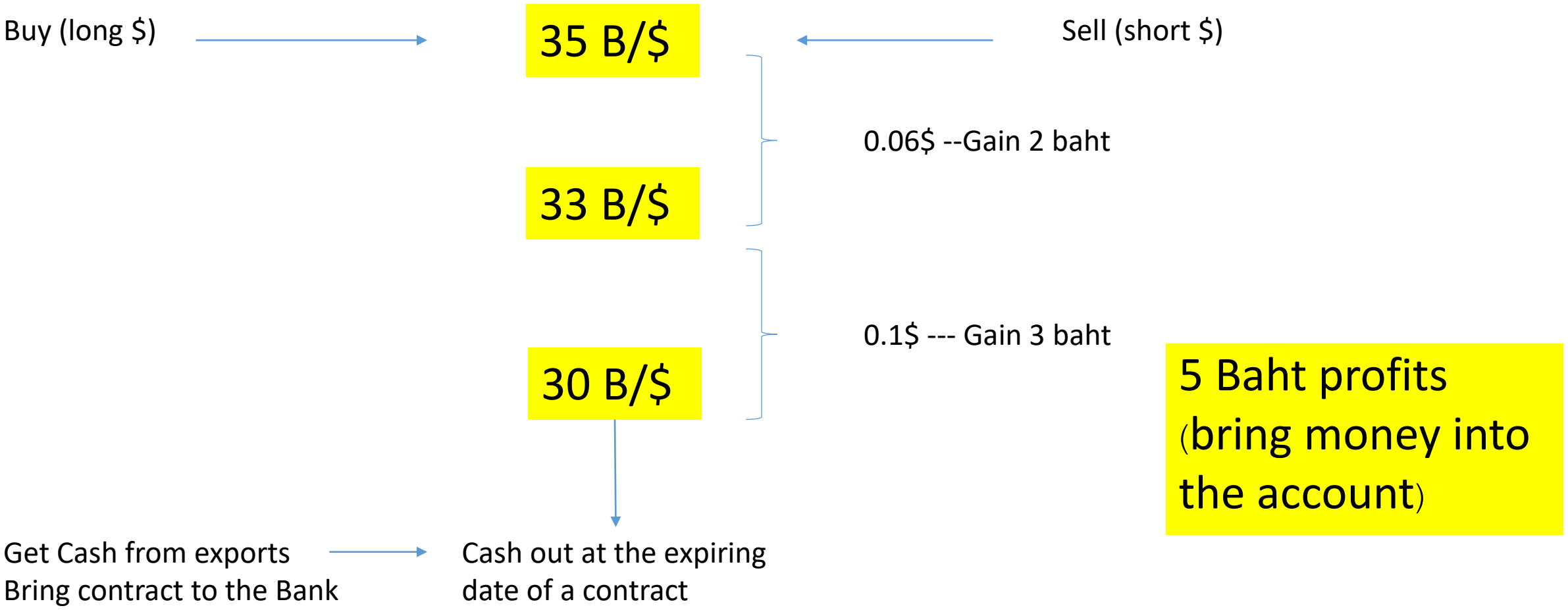
Name of contact	end of the contact	Buy ($)	Sell ($)
USDG17	Feb 60	35.18	35.58
USDH17	March 60		
USDJ17	April 60		

The main differentiating feature between futures and forward contracts — that **futures are publicly traded** on an exchange while forwards are privately traded

1) Open port to a broker/brokers

10-15% of money to invest

2) Decide to short (sell $) or long (buy $)



5 Baht profits
(bring money into
the account)

- A swap contract combines a spot sale of foreign currency with a forward repurchase of the same currency (reduce transaction costs of separating activity – spot and forward)

  - Swap contract (if you need $ today)
  - Spot rate 25 baht ------- 1 US$

    - Future return rate 24 baht ---- 1 US$ (15, 30 , 90 days)

  - Get $ today at rate 25B/$ ---- need to find $ to bring back baht

  - A firm performs as both importer and exporter

    1) Need to import -- 25B get 1 $

    2) Exports (in future) --- 1 $ get 24 baht

Profit when spot rate < 24 baht/$

- An option provides one party (the buyer), with the right to buy (call) or sell (put) a foreign currency at a pre-specified exchange rate at a future date, but the buyer is under no obligation to trade

- You have to pay ‘’Option premium’’ [the rate depends on each bank]

- Assume: 2 exporters, (1) forward contract (2) put options
- Deal date 21 June 2016
- On 21 June, exchange rate = 30.52 B/$

21 June 2016	Forward contract	Put options
Exchange rate (contract)	30.30 B/$	30.30 B/$
Exchange rate that you will get	30.30 B/$	30.52 B/$
Income (1,000,000 $)	30,300,000 B	30,520,000 – 200,000 30,320,000
Differences	-	> Option 20,000

- If baht appreciated to 30 B/$
- Exporter 2 will get less benefits than using forward contract.
- Because exporter 2 has to pay option premium 200,000 B.

Other ways

- Foreign currency deposit
- Natural hedging [match expenditures (imports) with income (exports)]
- Currency diversification