Lesson I: Overview

1. International financial markets

2. Foreign exchange markets

International financial markets

Getting started

All finance has become more and more "international"

Growing importance due to both
   1. International trade
   2. Foreign investments

International trade I

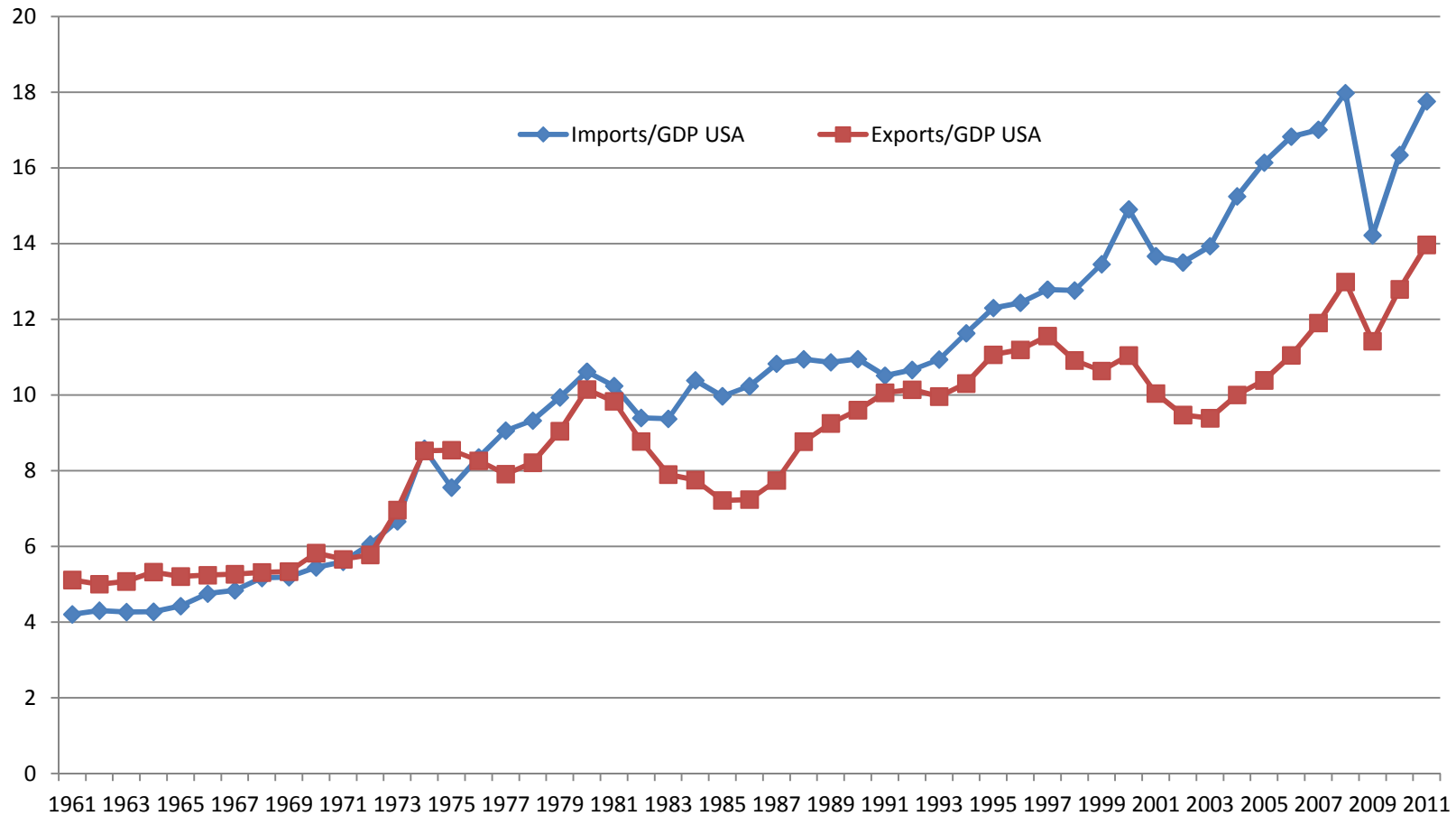Amazing growth of international trade flows all over the last decades

Twofold reason:

1. Liberalization of trade (tariffs, quotas..)
2. Improvements in communication and transportation technologies → thinner economic space
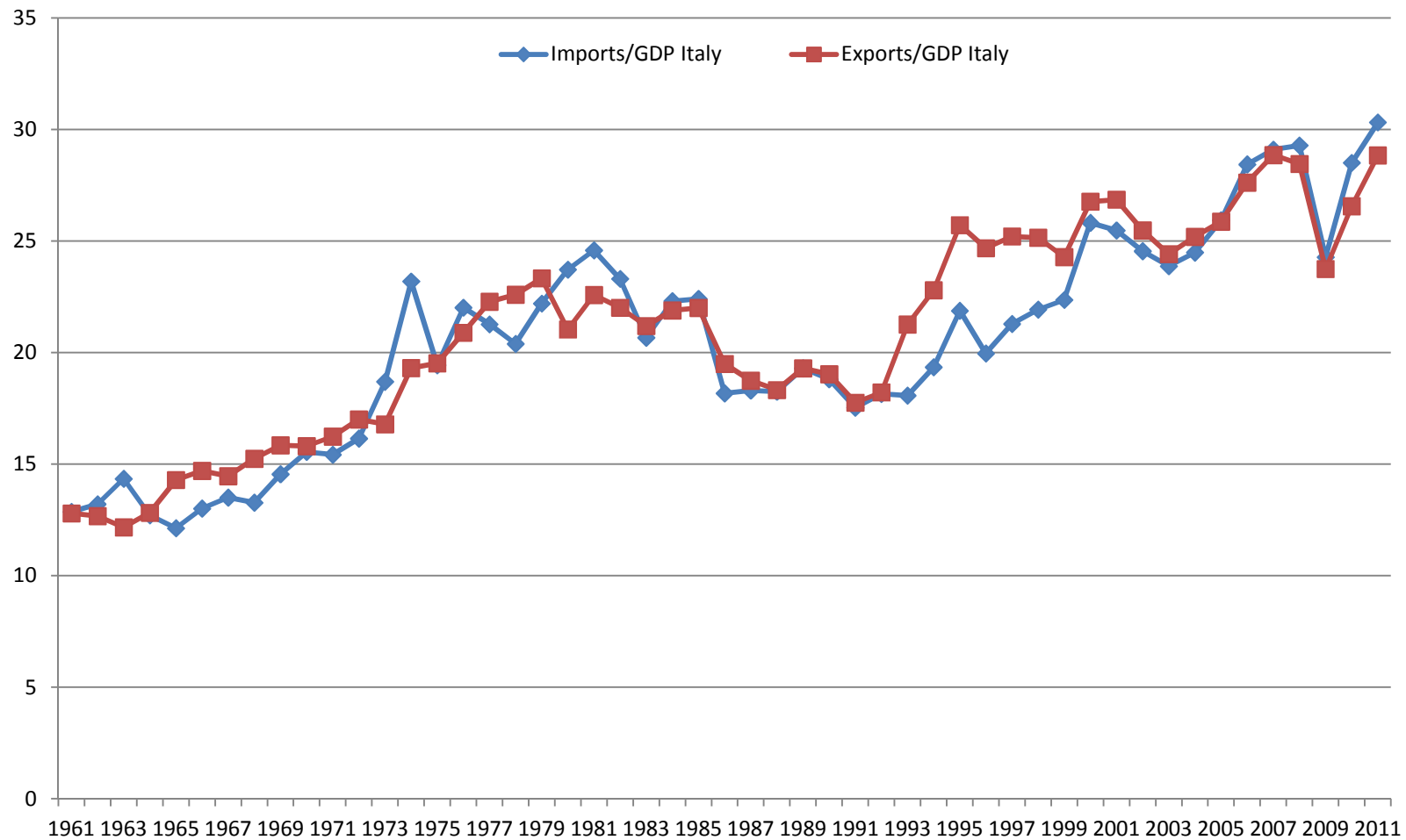
International trade II

Imports & Exports on GDP (USA)

International trade III

Imports & Exports on GDP (ITALY)

International trade IV

Rewards & Risks

1. Enhanced comparative and competitive advantages.
2. Development of related "industrial clusters".
3. Uncertainty about the exchange rate (FX risk*).
4. Operating and Country risk**.

* Refer to Lecture IX

** Refer to Lecture IX

Terminology I

Comparative advantage: relative efficiency (lower opportunity cost) in producing something→ static production efficiency

Competitive advantage: the edge a country enjoys from dynamic factors affecting international competitiveness→ dynamic factors such as the existence of supportive industries, experienced management…
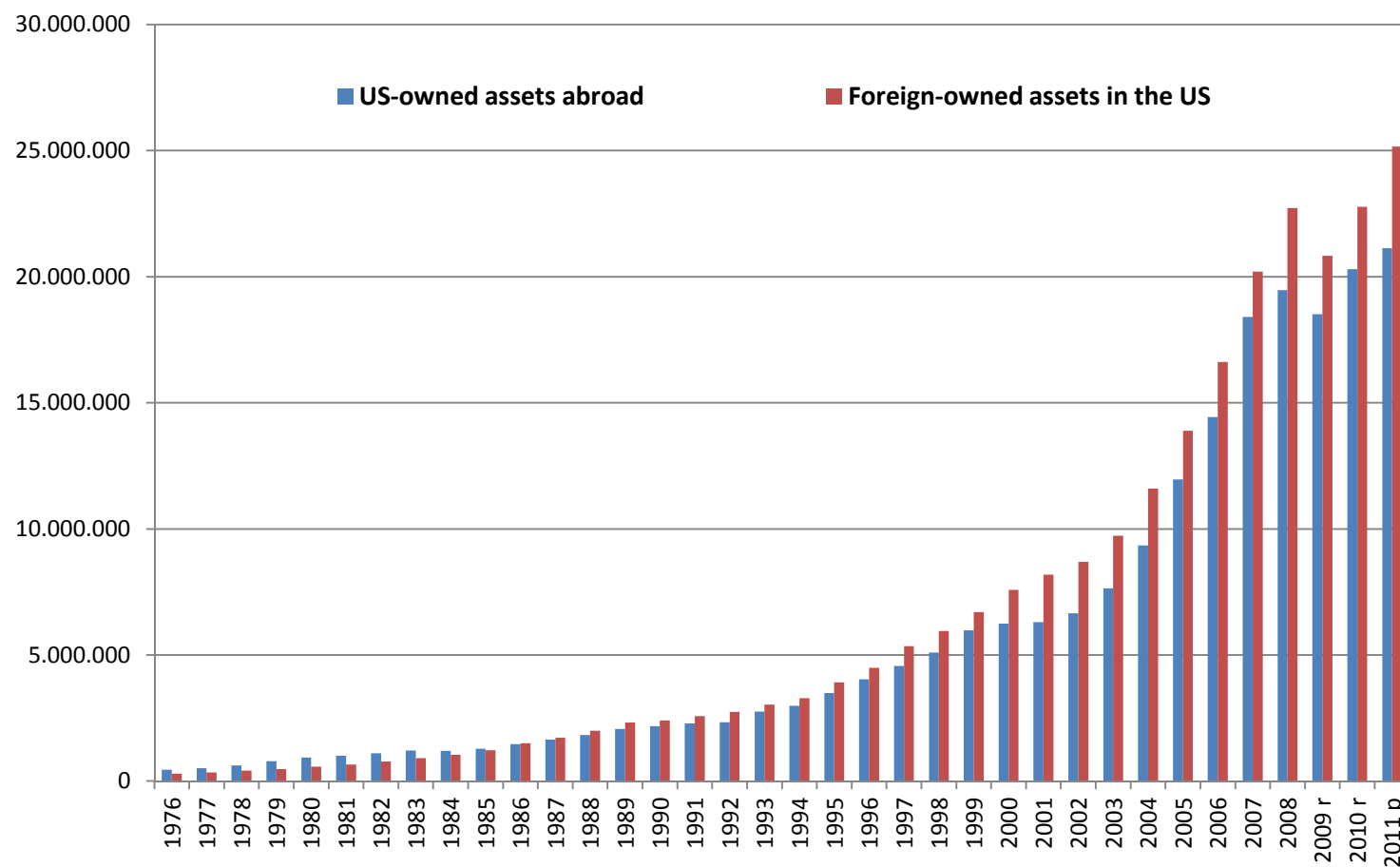
Terminology II

Tariffs (excise taxes): taxes on imports, generally based on value (ad valorem) or on weight.

Quotas: restrictions on the quantity of a good that can be imported.

Foreign Investments I

US International Investments Dynamics
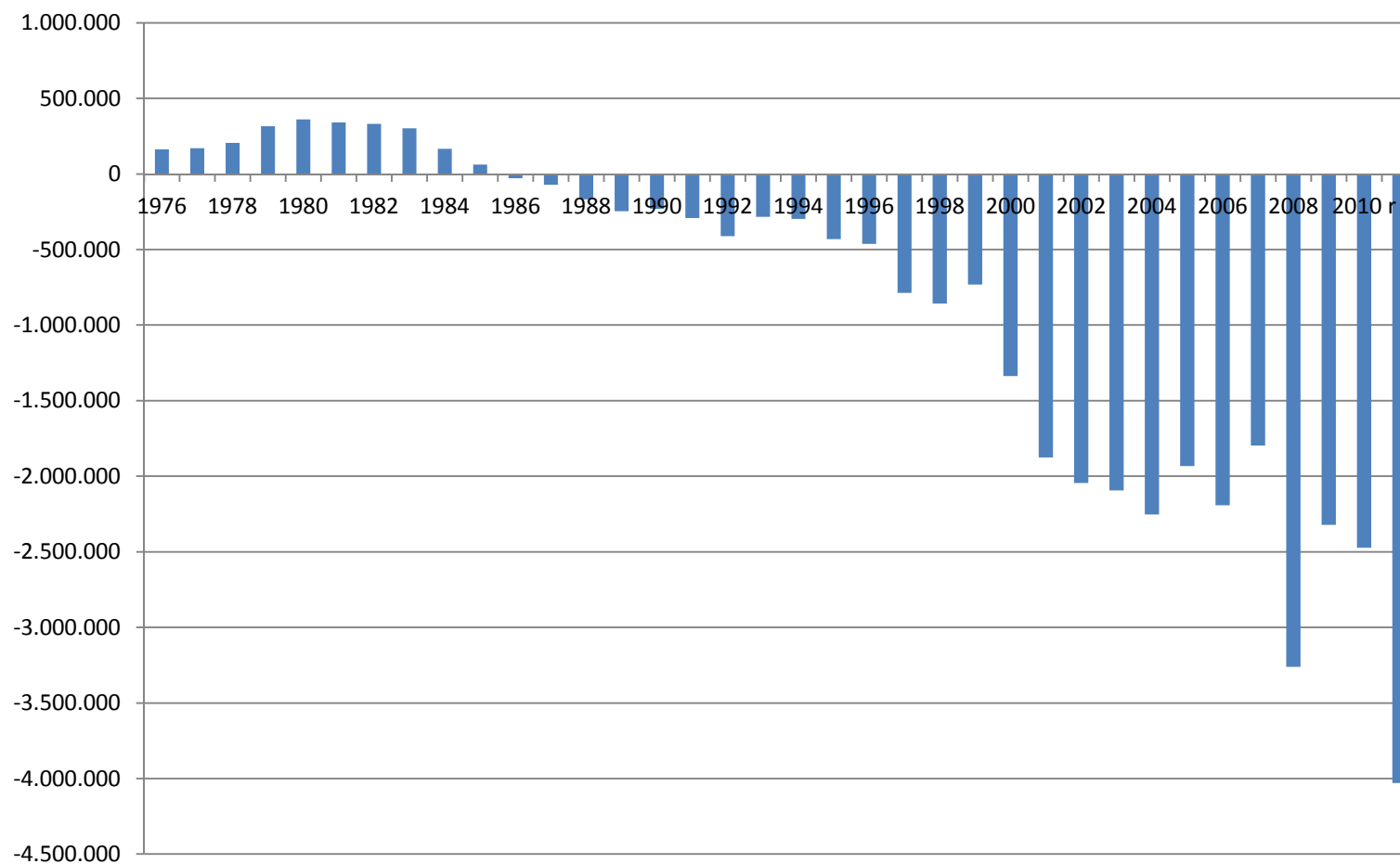
Foreign Investments II

Increased globalization of investments

Some countries have gone from being net creditors to net debtors

Foreign Investments III

US Net international investment position

Foreign Investments IV

Rewards & Risks

1. Improved efficiency in the global allocation of capitals.

2. Enhanced diversification*.

3. Exchange rate risk**.

4. Operating and Country risk***.
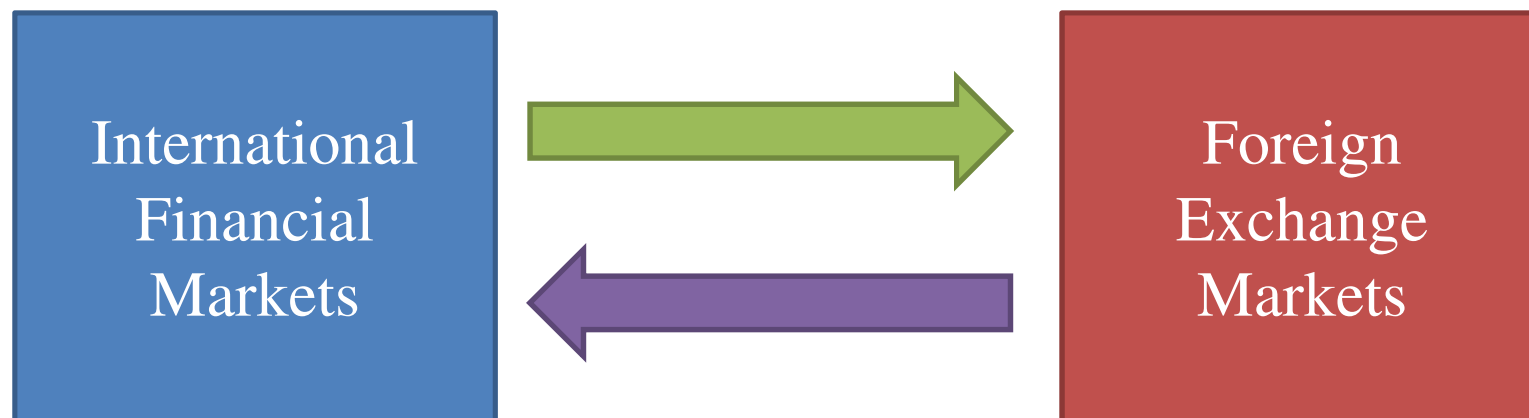
* Refer to Lecture XI

* * Refer to Lecture IX

* * * Refer to Lecture IX

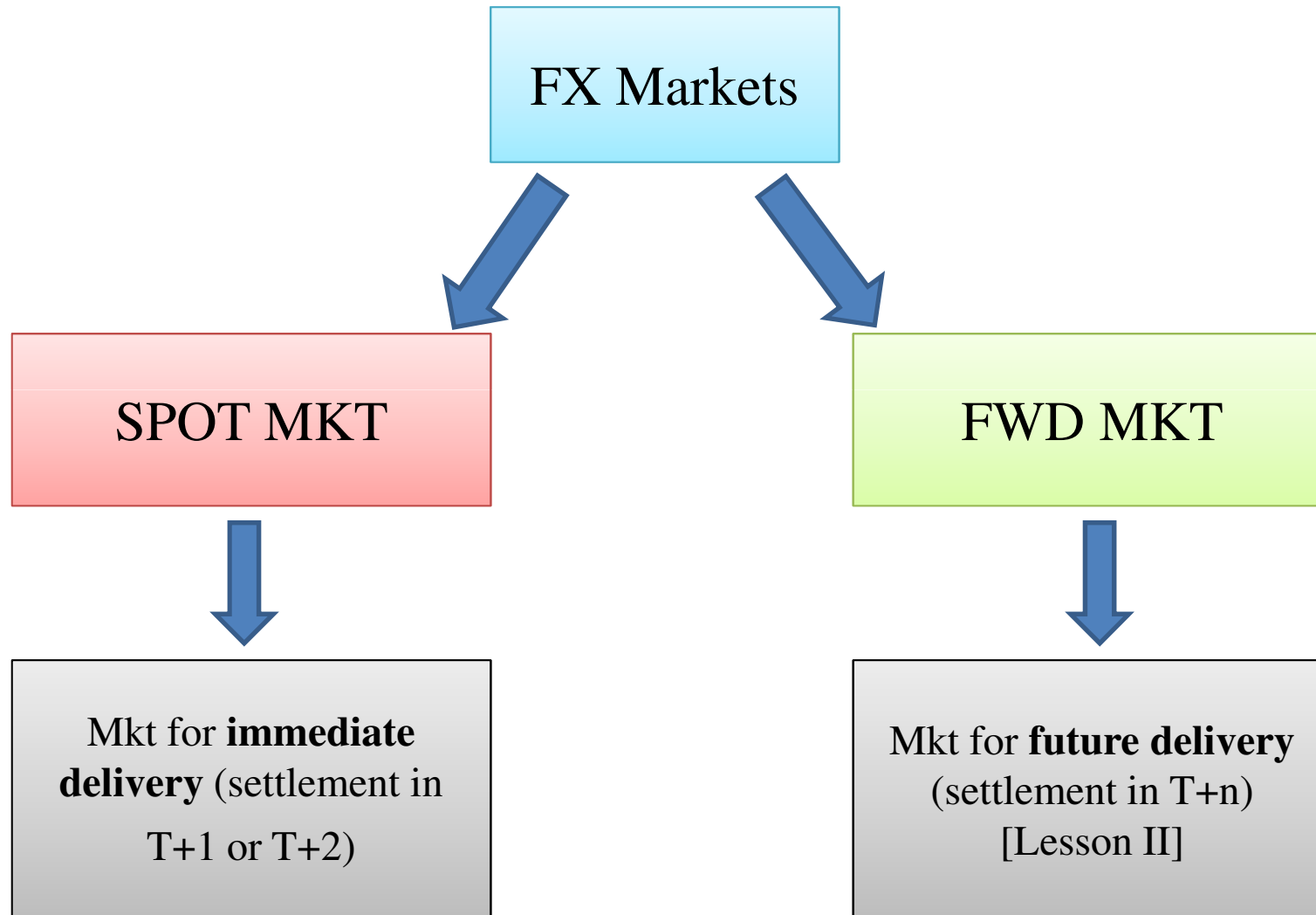# Looking for the *Fil Rouge*

The international flows of goods and capitals are the source of supply and demand for currencies

International Financial Markets

Foreign Exchange Markets

Foreign Exchange markets

Foreign exchange markets

```
                    ┌──────────────┐
                    │  FX Markets  │
                    └──────────────┘
                    ↙              ↘
        ┌──────────────┐      ┌──────────────┐
        │   SPOT MKT   │      │   FWD MKT    │
        └──────────────┘      └──────────────┘
               ↓                     ↓
   ┌──────────────────────┐  ┌──────────────────────┐
   │ Mkt for **immediate**│  │ Mkt for **future**   │
   │ **delivery**         │  │ **delivery**         │
   │ (settlement in       │  │ (settlement in T+n)  │
   │ T+1 or T+2)          │  │ [Lesson II]          │
   └──────────────────────┘  └──────────────────────┘
```

FX Markets

SPOT MKT

FWD MKT

Mkt for **immediate delivery** (settlement in T+1 or T+2)

Mkt for **future delivery** (settlement in T+n) [Lesson II]

Spot foreign exchange markets

- Mainly decentralized → no precise physical location (24h trading)

- The market operates both

| Directly (interbank) | Indirectly (brokers) |

Interbank market I

All **participating banks** act as **Market Makers**

Banks quote buying and selling prices to each other (bank A can call bank B for a quote on a certain currency and bank B, in turn, makes a market by providing bid and ask prices upon demand)

Interbank market II

- **Decentralized** = no central physical location
- **Continuous** = quotations of prices are continuously available all over the trading day
- **Open** = market participants must quote both buying and selling prices (bid/ask quotations), so that the buy or sell intention and the corresponding amount need not to be specified when a bank calls another market maker
- **Double-auction** = market participants on both sides of a transaction can quote buy and selling prices (relatively more or less "aggressively", depending on their trading interest)

FX brokers I

FX Broker: agent who helps arrange the trading of currencies between market participants by **matching** buying and selling orders.
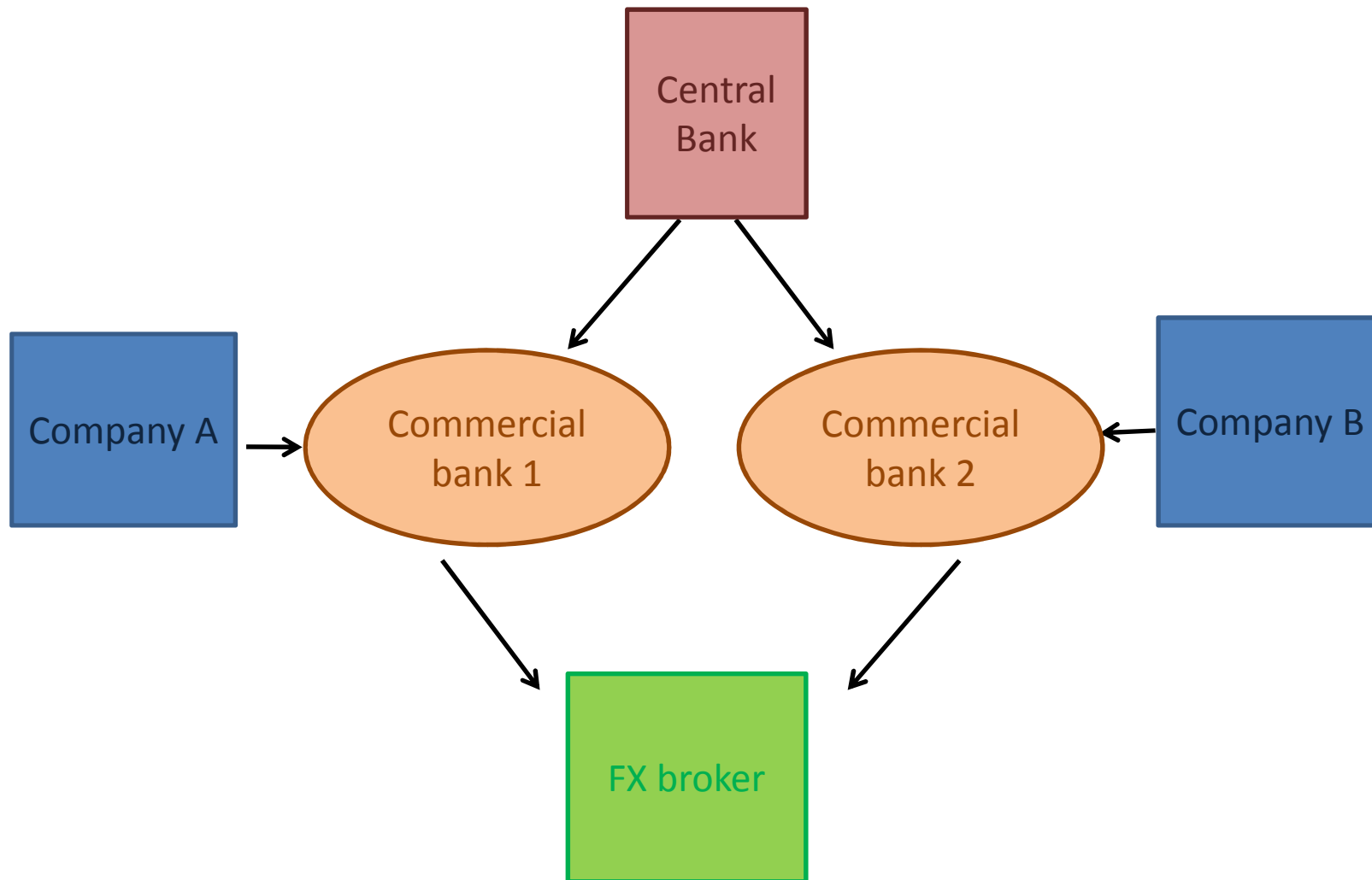
A broker does **not** deal for his own portfolio, but mainly tries to facilitate transactions between third parties.
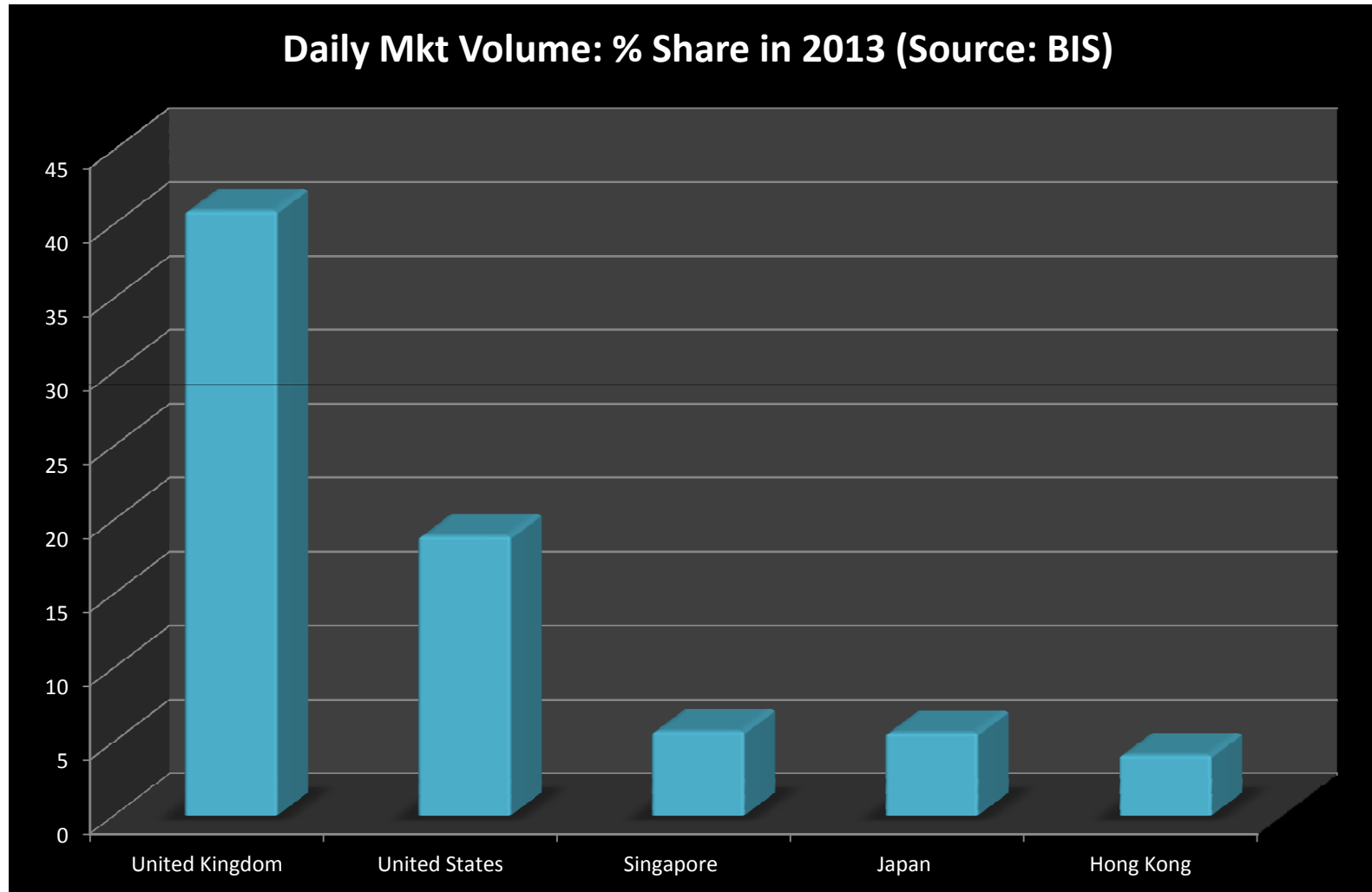
FX brokers II

- **Quasi-centralized =** a broker puts all the orders on his book and tries to match buying and selling proposals: basically, brokers in different locations help facilitate transactions

- **Continuous =** all over the trading day

- **Limit-book =** orders placed with a broker are "limit orders"

- **Single-auction** = the agent being approached, but not the person making the approach, quotes buying and selling prices
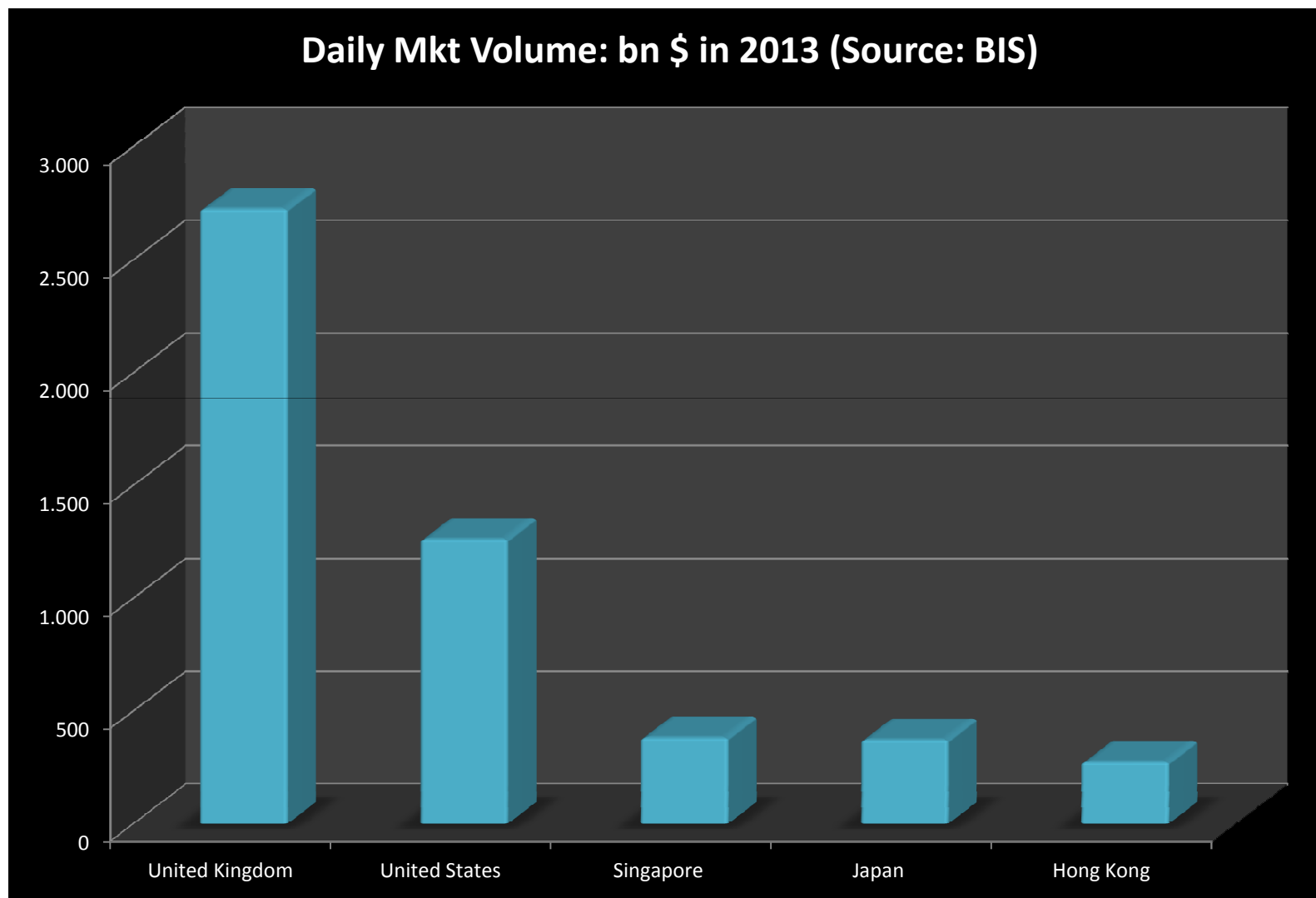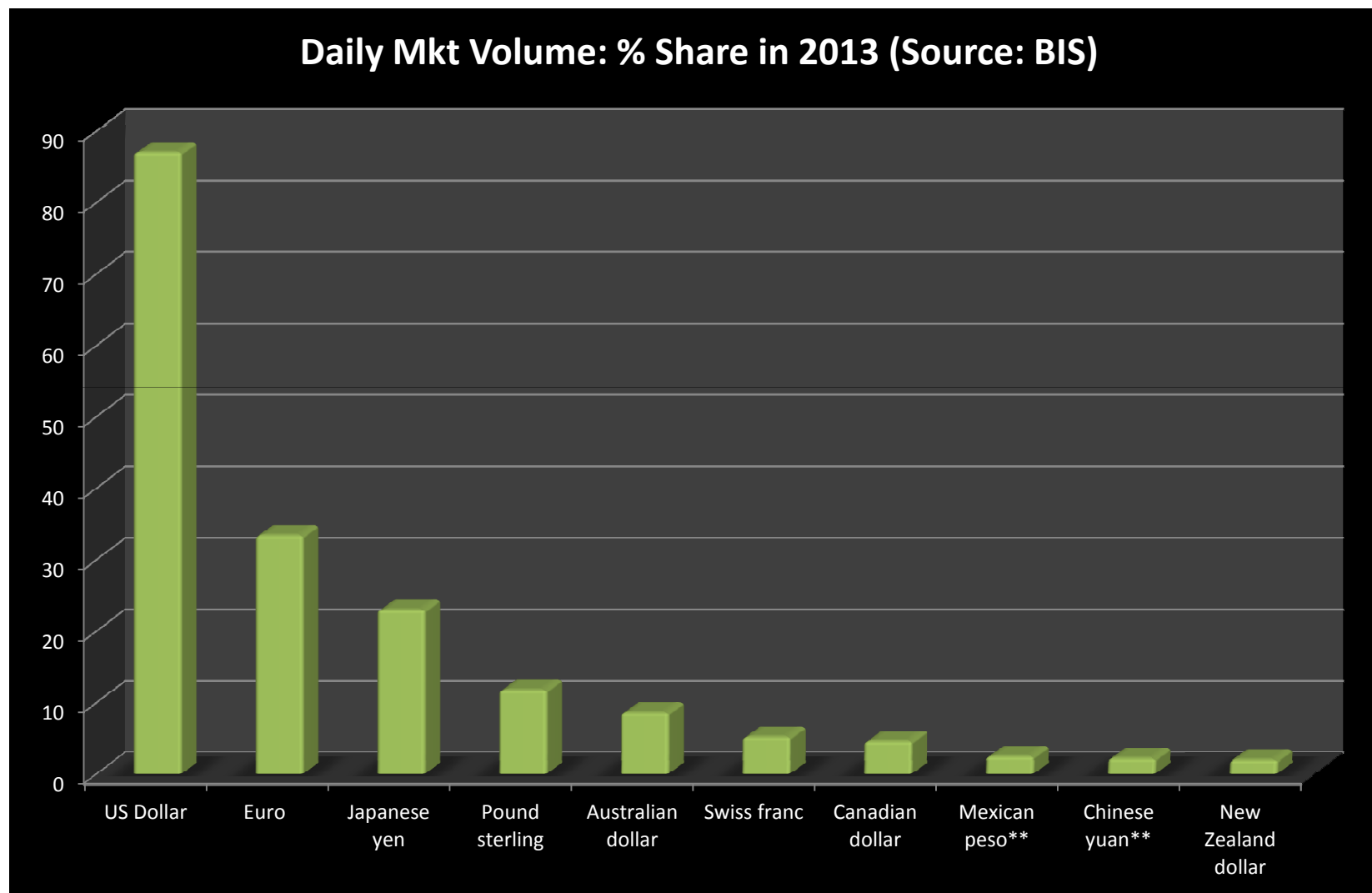
Organization of FX mkt

FX trading by location I

Daily Mkt Volume: % Share in 2013 (Source: BIS)

FX trading by location II

Daily Mkt Volume: bn $ in 2013 (Source: BIS)

FX trading by currency

Daily Mkt Volume: % Share in 2013 (Source: BIS)

FX mkt vs Regulated mkts (R. Levich)

FX mkt	Regulated Mkts
Geographically dispersed	Centralized
Broker/Dealer	Electronic Trading/ Open Outcry
24h	Well-defined trading hours
Customized	Standardized
Price dispersion	Price concentration

Settlement I

Spot transactions carried out today are to be **regulated** (**settled**) in 1 or 2 business days, when the buyer that has purchased foreign currency will have to pay the seller.

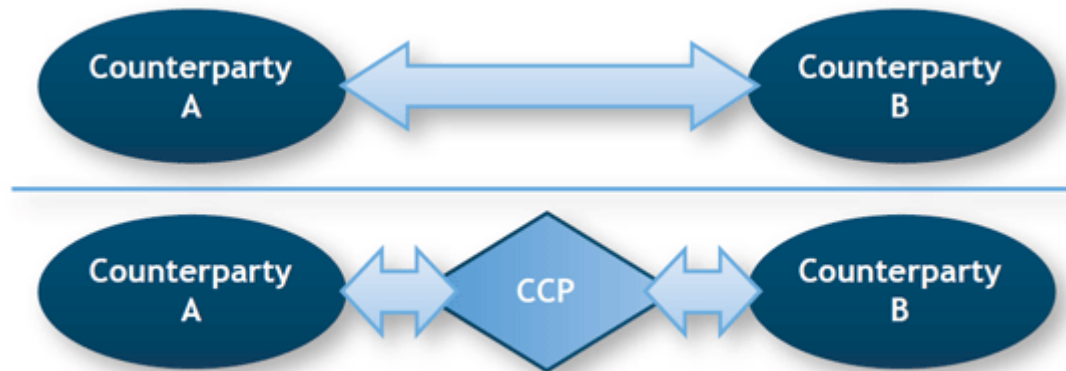| t		t+2
TRANSACTION		DELIVERY

Settlement II

The settlement generally takes place via a Clearing House

Clearing House: institution at which banks keep funds which can be moved from one bank's account to another to settle interbank transactions.
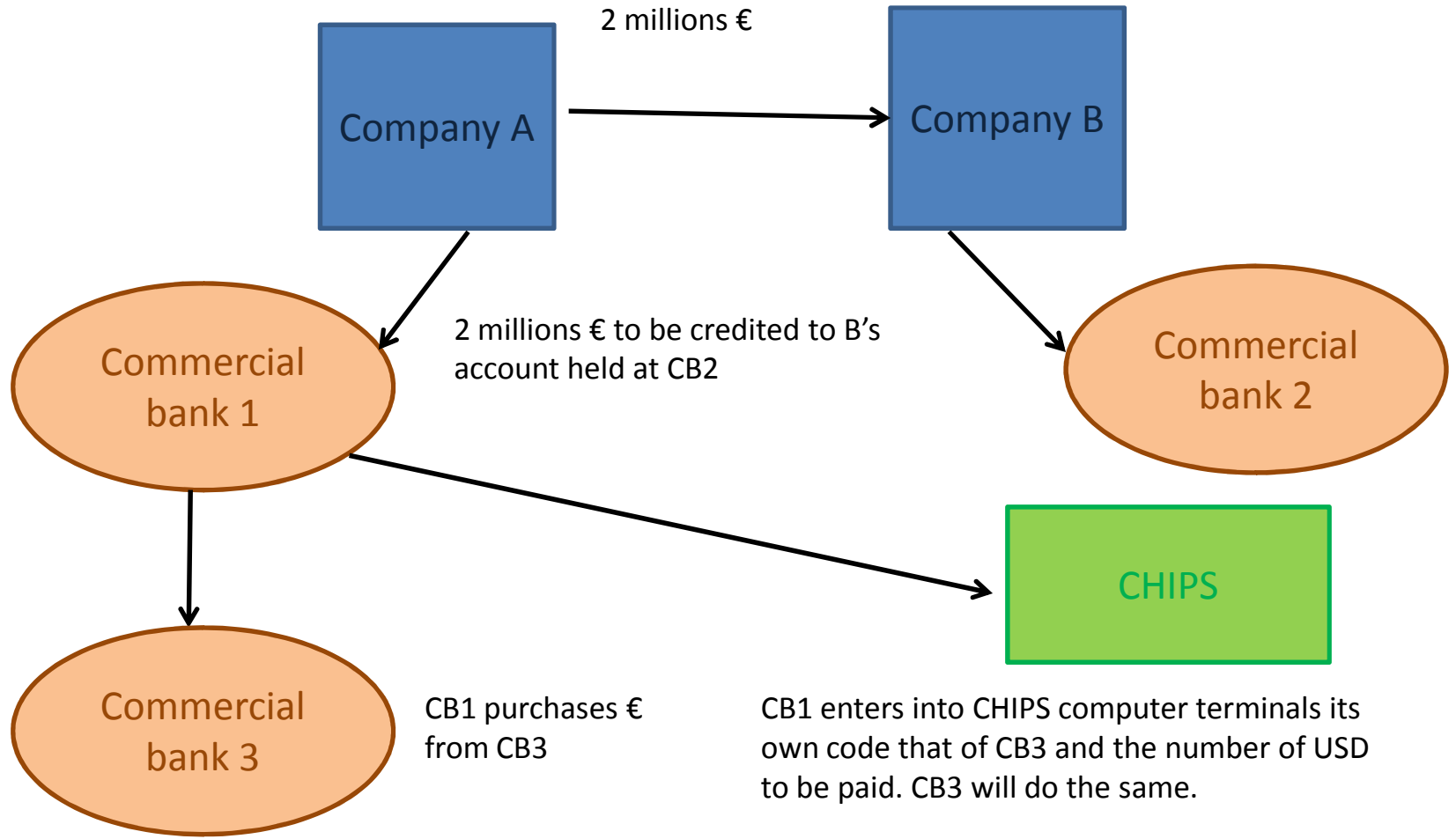
Settlement III

When FX transactions involve settlement in USD, the longer established clearing house is the so-called "CHIPS" (Clearing House Interbank Payments System)
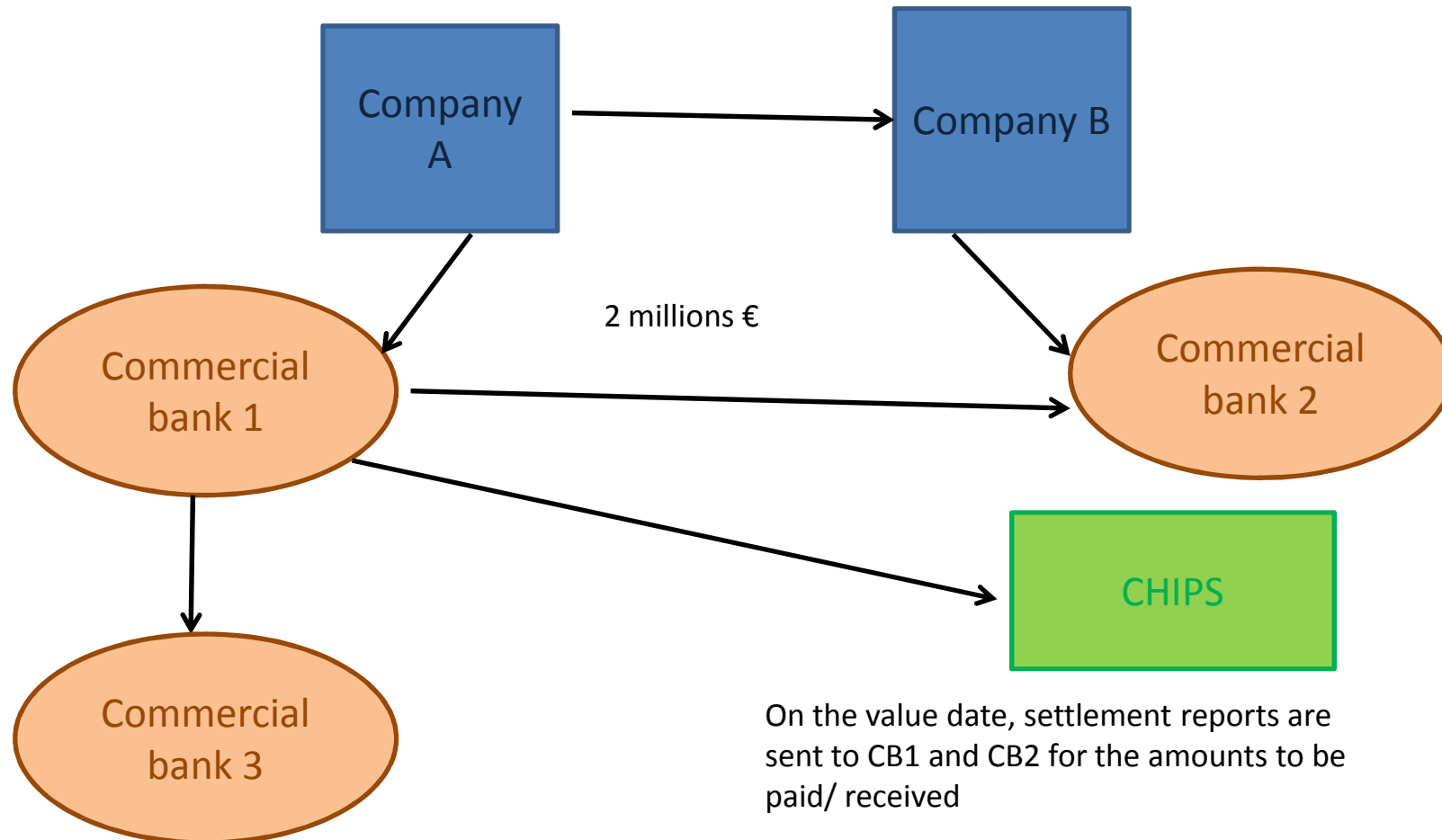
CHIPS is a computerized mechanism through which member banks hold USD accounts to pay each other when buying or selling FX

Settlement IV

2 millions €

Company A → Company B

2 millions € to be credited to B's account held at CB2

Commercial bank 1

Commercial bank 2

Commercial bank 3

CHIPS

CB1 purchases € from CB3

CB1 enters into CHIPS computer terminals its own code that of CB3 and the number of USD to be paid. CB3 will do the same.
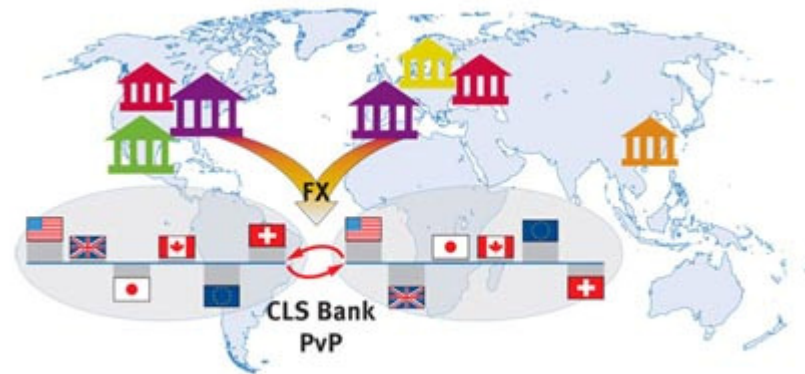
Settlement V

Settlement VI

An alternative system has been available since 2002: the CLS (Continuous Linked Settlement)

CLS was created to reduce **settlement risk** through a **continuous payment-vs-payment system**, specifically conceived to prevent all situations where a bank pays for a currency before receiving it.
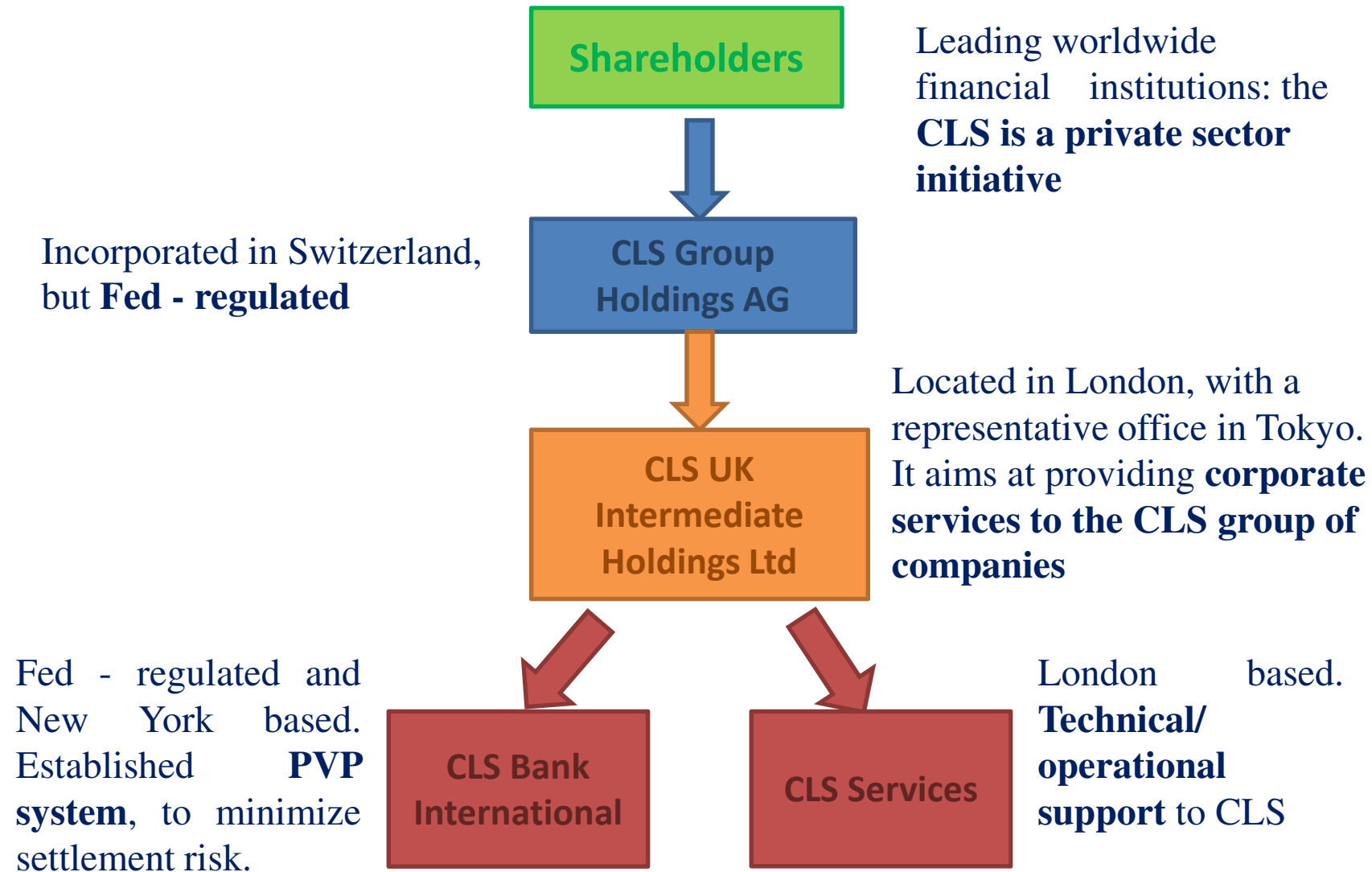
Terminology

Settlement Risk: "risk that one party of a FX transaction will deliver the currency it sold, but not receive the bought currency, [thus] resulting in the loss of principal"

Source: www.cls-group.com

CLS I

Shareholders

Leading worldwide financial institutions: the **CLS is a private sector initiative**

Incorporated in Switzerland, but **Fed - regulated**

CLS Group Holdings AG

CLS UK Intermediate Holdings Ltd

Located in London, with a representative office in Tokyo. It aims at providing **corporate services to the CLS group of companies**

Fed - regulated and New York based. Established **PVP system**, to minimize settlement risk.

CLS Bank International

CLS Services

London based. **Technical/ operational support** to CLS

CLS II

Settlement Members: "Membership in CLS Bank is generally limited to shareholders and their affiliates. Central banks are eligible to become CLS Members without owning shares".

[…] "Each Settlement Member has a single multi-currency account with CLS Bank. Settlement Members may submit payment instructions relating to their own FX transactions as well as the FX transactions of their customers directly to CLS".

Source: www.cls-group.com
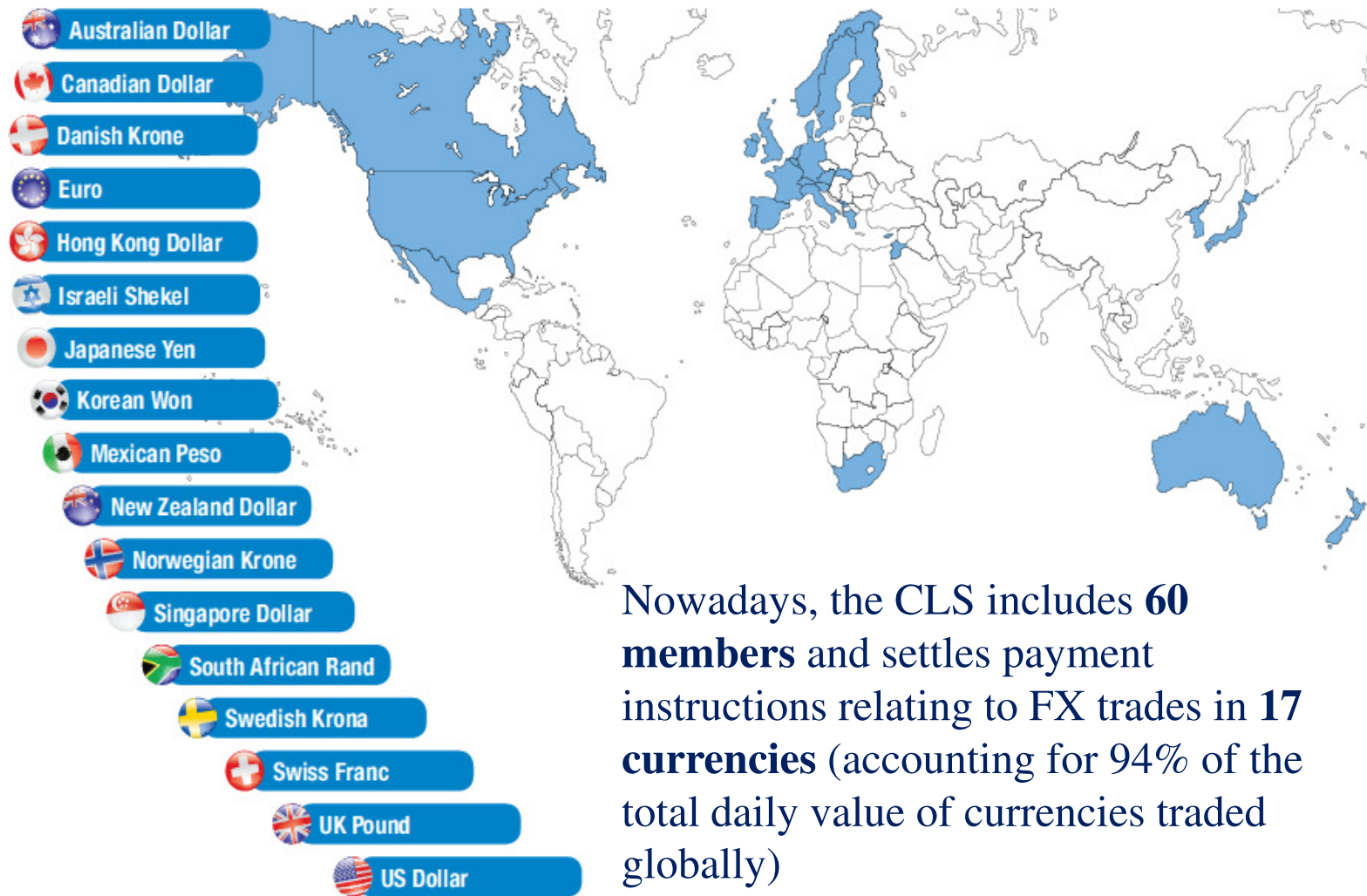
How the CLS settlement works I
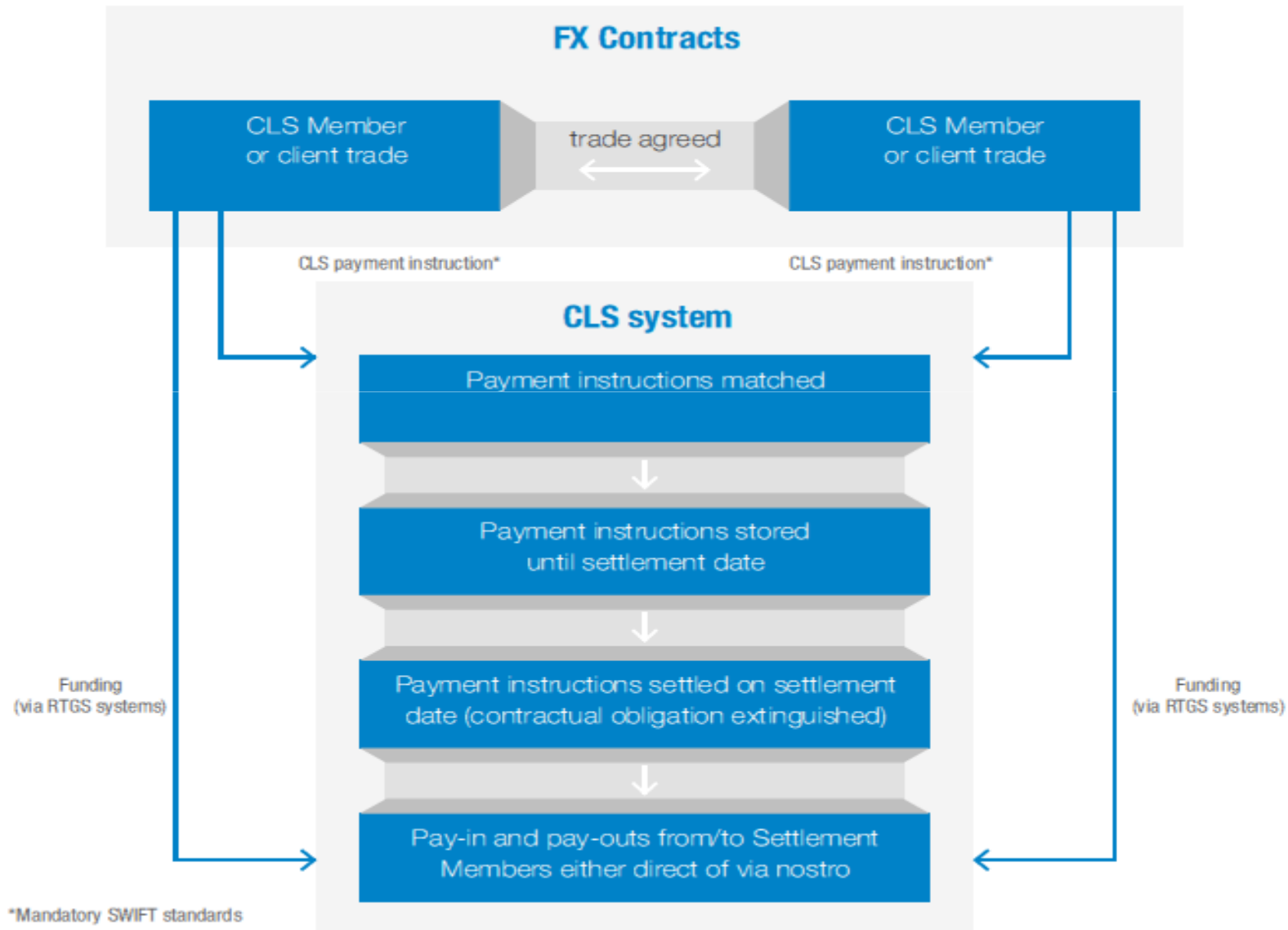
How the CLS settlement works II

1. **Following a FX trade**, **Settlement Members submit payment instructions to CLS.** These payment instructions are then authenticated and **matched by CLS and stored** in the system **until the settlement date**.

2. The CLS **daily settlement cycle operates with settlement occurring** during a five-hour window (7:00am CET to 12:00am CET), **when RTGS systems** in the CLS settlement currency jurisdictions **are open and able to make and receive payments**. This enables **simultaneous settlement** of the payments on **both sides of a FX transaction.**

3. On each settlement date, **CLS simultaneously settles each pair of matched payment instructions** by making the corresponding debit and credit entries across Settlement Members' accounts.

Source: www.cls-group.com

Some facts about CLS

- Australian Dollar
- Canadian Dollar
- Danish Krone
- Euro
- Hong Kong Dollar
- Israeli Shekel
- Japanese Yen
- Korean Won
- Mexican Peso
- New Zealand Dollar
- Norwegian Krone
- Singapore Dollar
- South African Rand
- Swedish Krona
- Swiss Franc
- UK Pound
- US Dollar

Nowadays, the CLS includes **60 members** and settles payment instructions relating to FX trades in **17 currencies** (accounting for 94% of the total daily value of currencies traded globally)

Delving with exchange rates I

The *Exchange rate (FX)* is the price of one currency in terms of another. More generally, **S(i/j) is the number of units of currency i per unit of currency j** (watch out: the international convention generally adopts the opposite notation, so that S(i/j) is the number of units of currency j per unit of currency i)

Two major quoting conventions:

✓**Direct quotation**= number of domestic currency per foreign currency unit➔ D/F currency

✓**Indirect quotation**= number of units of foreign currency per domestic currency➔ F/D currency

Delving with exchange rates II

Taking the USD as the home currency:

✓ **Direct quotation**: number of USD per foreign currency unit→$/foreign currency

US$ equivalent terms (€ and £)

✓ **Indirect quotation**: number of units of foreign currency per USD→ foreign currency/$

European terms

Delving with exchange rates III

To a close approximation,

$$FX_{USDequivalent} = \frac{1}{FX_{Europeanterms}}$$

- USD 1.3797/EUR means that 1 EUR is quoted as 1.3797 USD

- EUR .7248/USD means that 1 USD is quoted as .7248 EUR

- Notice that $1.3797 \approx \dfrac{1}{.7248}$

Delving with exchange rates IV

- USD 2.0275/GBP means that you will receive 2.0275 USD per unit of GBP, stated in other terms, GBP is quoted as 2.0275 USD

- GBP .4932/USD means that you will receive .4932 GBP per USD, or, equivalently, USD is quoted as .4932 GBP

- Notice that $2.0275 \approx \dfrac{1}{.4932}$

More generally,

$$S_{Currency1 \, / \, Curency2} \cong \frac{1}{S_{Currency2 \, / \, Currency1}}$$

Reciprocal rates
(the foregoing relationship would hold exactly,
if there were no transaction costs)

Cross Rates I

Cross rate: exchange rate between two currencies, neither of which is the USD

Suppose you want to exchange € for GBP

Direct transaction   **Indirect transaction**

€ ⟹ £   € ⟹ $ ⟹ £

Cross Rates II

In the absence of transaction costs, it must be that the direct exchange rate (between EUR and GBP) is equal to the exchange rate implicit in indirect exchange via the USD.

$$S_{£/€}=S_{\$/€}*S_{£/\$}$$

Cross Rates III

$$S_{£/€}=S_{\$/€}*S_{£/\$}$$

- $S_{£/€}$= number of GBP received per EUR
- $S_{\$/€}$= number of USD received per EUR
- $S_{£/\$}$= number of GBP received per USD

TRIANGULAR PARITY

(equilibrium relation among any 3 currencies)

Cross Rates IV

	USD	EUR	JPY	GBP	CHF	CAD	AUD	NZD	HKD	NOK	SEK
10) Spot			**11) Forward**		**12) Fixing**			■ Heat Map			
SEK	6.4604	8.8498	.06344	10.793	7.2397	5.8913	5.8340	5.4060	.83301	1.0591	–
NOK	6.0996	8.3556	.05989	10.190	6.8354	5.5623	5.5082	5.1041	.78649	–	.94416
HKD	7.7555	10.624	.07615	12.957	8.6911	7.0723	7.0036	6.4897	–	1.2715	1.2005
NZD	1.1951	1.6370	.01173	1.9965	1.3392	1.0898	1.0792	–	.15409	.19592	.18498
AUD	1.1074	1.5169	.01087	1.8500	1.2409	1.0098	–	.92662	.14278	.18155	.17141
CAD	1.0966	1.5022	.01077	1.8320	1.2289	–	.99028	.91762	.14140	.17978	.16974
CHF	.89236	1.2224	.00876	1.4908	–	.81375	.80584	.74671	.11506	.14630	.13813
GBP	.59857	.81995	.00588	–	.67077	.54584	.54053	.50087	.07718	.09813	.09265
JPY	101.84	139.51	–	170.14	114.12	92.869	91.966	85.218	13.131	16.696	15.764
EUR	.73001	–	.00717	1.2196	.81807	.66570	.65923	.61086	.09413	.11968	.11300
USD	–	1.3699	.00982	1.6707	1.1206	.91191	.90304	.83678	.12894	.16394	.15479

Color

Increased   Unchanged   Decreased

Source: Bloomberg, 14th February 2013

Cross Rates V

⚠️ **Assuming no transaction costs**

If JPY 101.84/USD and USD 1.3699/EUR, what should be $S_{JPY/EUR}$ to prevent all arbitrage opportunities?

$$S_{JPY/EUR} = 101.84*1.3699 = 139.51$$

Cross Rates VI

Assuming no transaction costs

If USD 1.3699/EUR and USD 1.6707/GBP, what should be $S_{GBP/EUR}$ to avoid all arbitrage opportunities?

$$S_{GBP/EUR} = 1.3699/1.6707 = .81995$$

Cross Rates VII

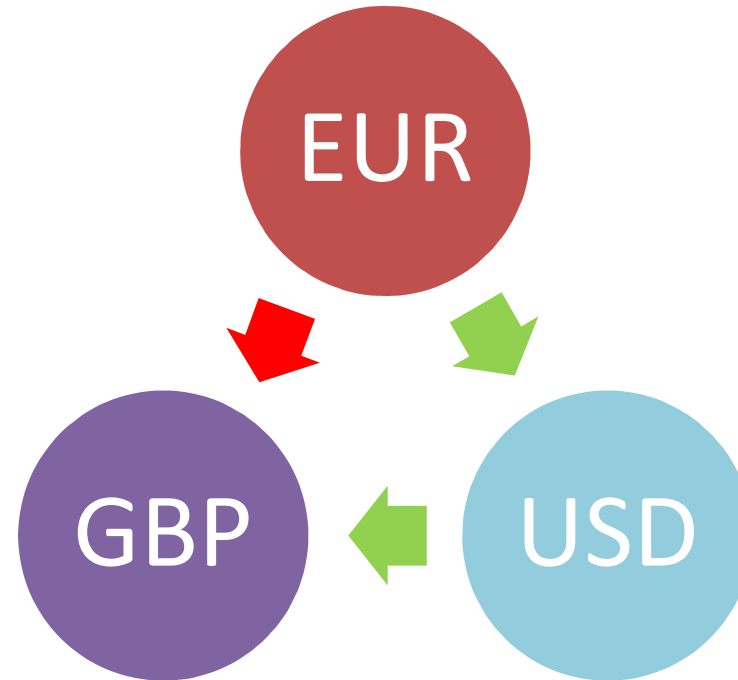Deviations from triangular parity may give rise to arbitrage opportunities:

TRIANGULAR ARBITRAGES

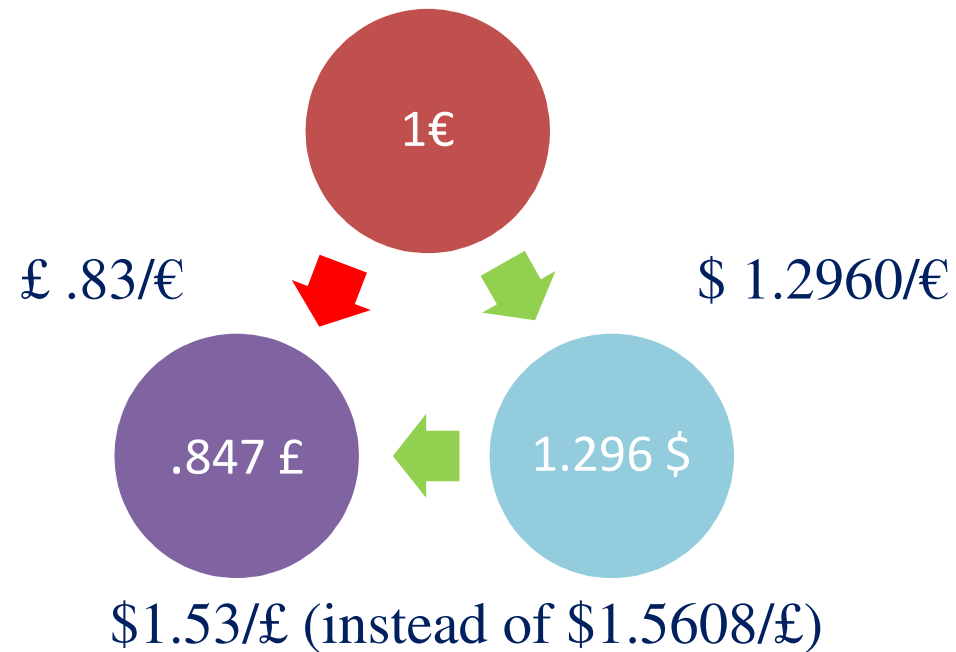In an arbitrage, you buy low, you sell high and you earn a **risk-free** profit

Cross Rates VIII

The red and the green arrows **must** yield the same (i.e. you must get the same amount of £), otherwise there would be **riskless profit opportunities**.

Cross Rates IX

1€

£ .83/€

$ 1.2960/€

.847 £

1.296 $

$1.53/£ (instead of $1.5608/£)

If you chose the indirect transaction, you would end up with .847£ instead of .83£ (resulting from the direct transaction), thus cashing in a risk-free profit equal to .847-.83= .017£

Terminology I

- **Arbitrageur:** market player that buys or sells something in order to exploit a price differential so as to make a **riskless profit**;

- **Speculator:** market player that holds (sells) goods or securities in the hope of profiting from a future rise (fall) in their price (**risky profit**)

Terminology II

One-way arbitrage: the process of choosing the best way to exchange one currency for another

you start with a certain currency and you end up with a different one (e.g. you exchange EUR to USD);

Terminology III

Round-trip arbitrage: Borrowing in one currency, lending in another, and then selling the second currency back into the first so as to end up back in the first currency→ you start with a certain currency and you end up with the very same one (e.g. from EUR to EUR)

Triangular arbitrages are round-trip transactions

Terminology IV

Suppose that there is a sudden change in the $/£:

- Change from $ 1.75/£ to $ 1.50/£

Appreciation of $ against **£/ Depreciation of £** against $

- Change from $ 1.75/£ to $ 1.95/£

Appreciation of £ against **$/ Depreciation of $** against £

Terminology V

- **Appreciation/ Depreciation**: increase/ decrease in the foreign exchange value of a currency when exchange rates are free to move (flexible) → mkt driven

- **Revaluation/ Devaluation** : increase/decline in the foreign exchange value of a currency on fixed exchange rates. It occurs when the parity rate is set at a higher/lower level→ CB driven

To put it into practice I

Fill in the blanks by finding the appropriate cross-rates

	Currency5	Currency4	Currency3	Currency2	Currency1
Currency1	1.53			.08	---
Currency2			27.47	---	
Currency3			---		
Currency4		---			
Currency5	---	.154			

To put it into practice II

Assume Poland's currency (the zloty) is worth $.17 and the Japanese yen is worth $.008. What should be the cross rate of the zloty with respect to yen to prevent arbitrage opportunities?