MACROECONOMICS I

Class 9. The Open Economy (Cont.)

April 25th, 2014

Krugman (2006). CSI: Trade Deficit

Where is the puzzle?

Item	Billions of dollars	Percentage of GDP
Current Account	-470.2	-3.2
Trade Balance	-495.7	-3.4
Merchandise Trade Balance	-647.1	-4.4
Services Balance	151.4	1.0
Income Balance	163.0	1.1
Net Investment Income	171.3	1.2
Net International Compensation to Employees	-8.3	-0.1
Net Unilateral Transfers	-137.5	-0.9
Private Remittances	-82.2	-0.6
U.S. Government Transfers	-55.3	-0.4

The U.S. Current Account, 2010

Current Account Deficit: Review

- Difference between exports and imports of goods and services of a country

- Difference between national savings and investment

    Capital-poor countries => low savings => CA deficit is 'natural'

Is current account deficit bad?

(-)Liabilities to the rest of the world => Need to repay (solvency)

(+)Additional source of capital for domestic investment needs => faster GDP growth

- **Sustainability of CA deficit (**USA, Australia, New Zealand, African countries)

Reversal of CA deficit : *sharp reduction in CA deficit (by 3 % of GDP in one year)*

Sudden stop – abrupt and major reduction in capital flows to a country that has been

receiving large volumes of foreign capital

Potential **causes** of the reversal: Overvalued real exchange rate; inadequate foreign exchange reserves; higher interest rates in industrial countries

The sum of current account balances in billions of U.S. dollars, 1980 - 2008
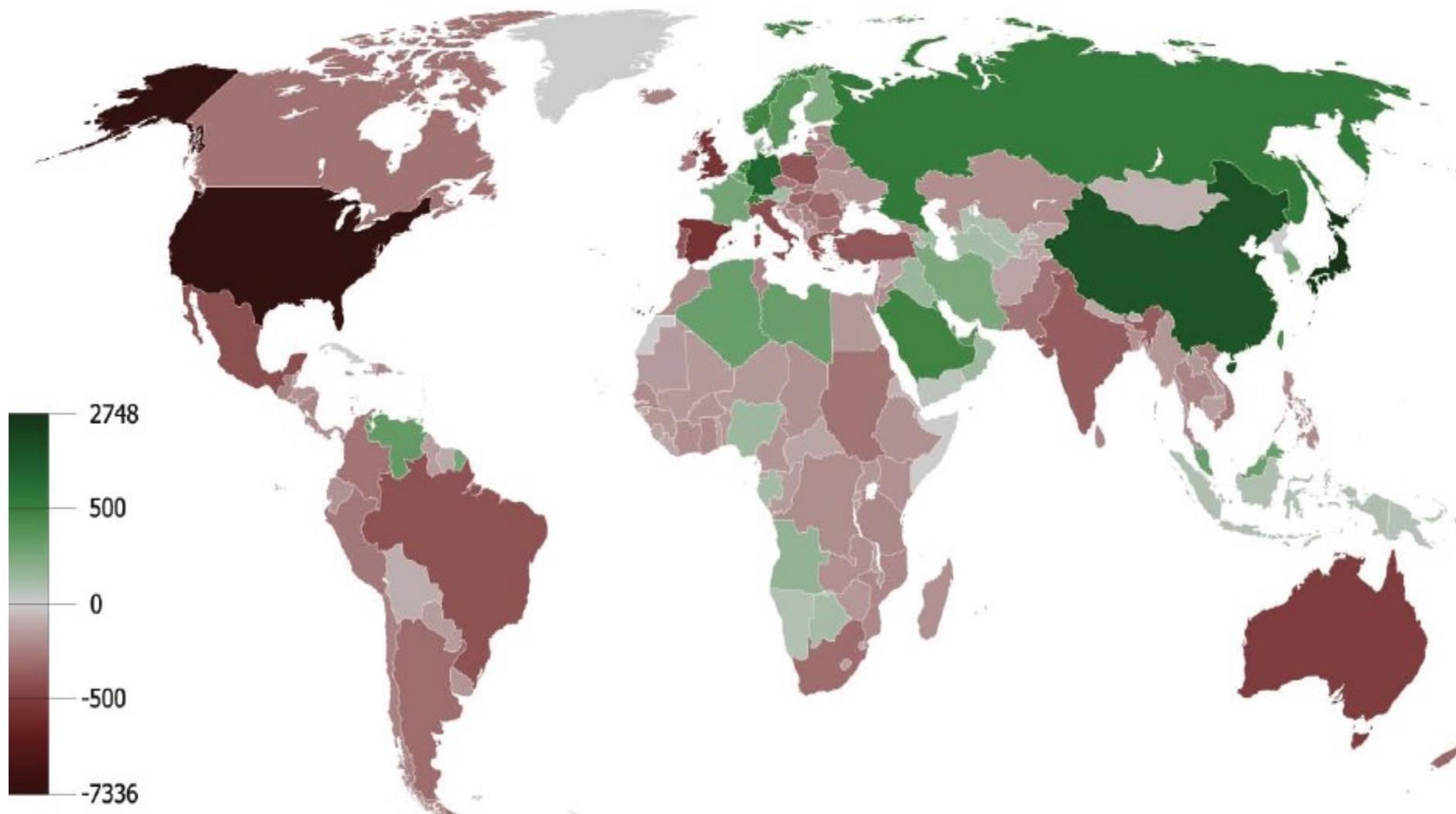
Rating (2011)	Country	CA balance (billions USD)
1	**Saudi Arabia**	252
2	Germany	219
3	Russia	198
4	China	155
5	UAE	80
6	Kuwait	72
7	Qatar	72
187	Australia	-57.1
188	France	-57.2
189	Canada	-62
190	India	-91
191	UK	-93
192	**USA**	-440

Source: WTO, 2012

Rating (2011)	Country	CA balance (% of GDP)
1	Brunei	39
2	Kuwait	38
3	Qatar	29
4	Azerbaijan	20
187	Zimbabwe	-20
188	Burndi	-23
189	Liberia	-31
190	Mowambique	-40

Source: WTO, 2012

Exchange Rates: Review

• A **price** of one currency in terms of another

Direct representation: a price of foreign currency in terms of national currency\
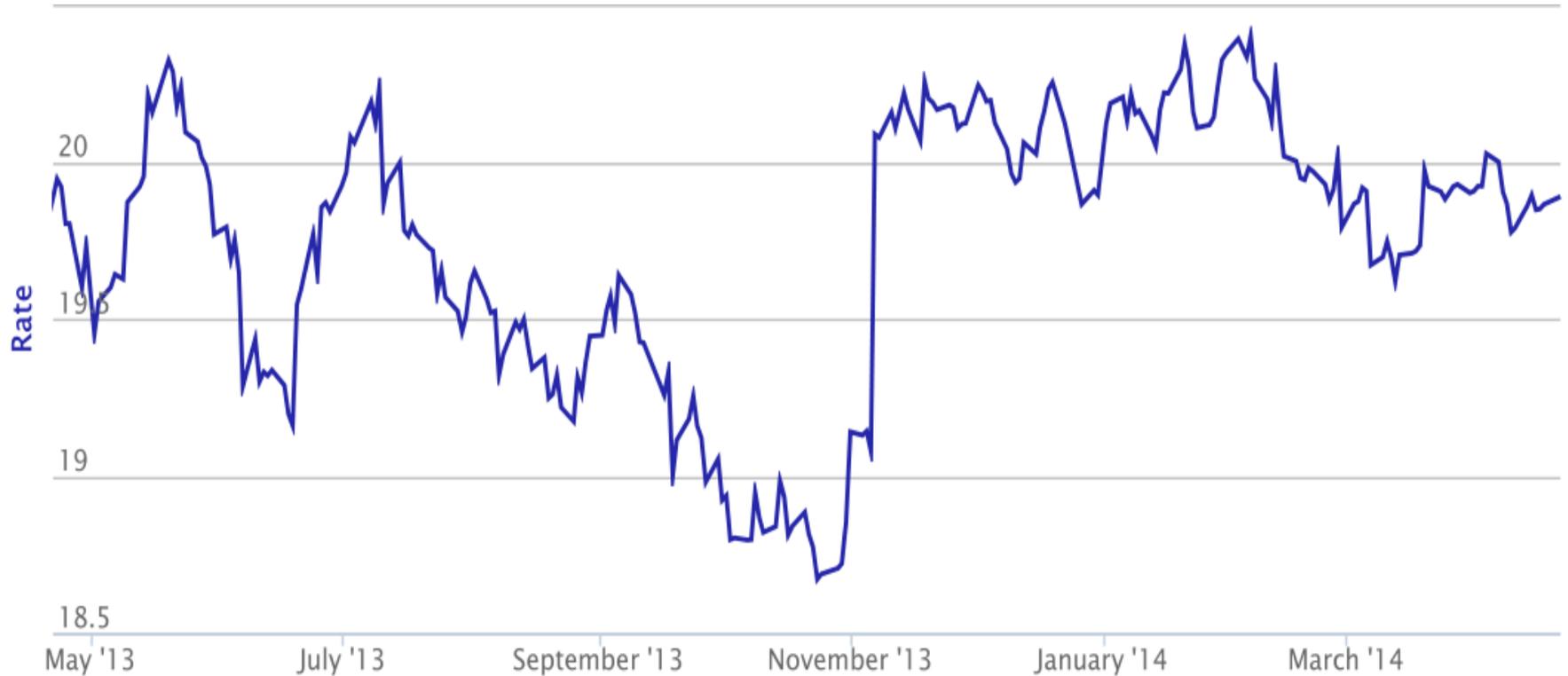
$$E_{CZK/\$} = \frac{CZK}{\$}$$

• Changes in exchange rate

Depreciation/Devaluation of one currency <u>against</u> another currency

Appreciation/Revaluation of one currency <u>against</u> another currency

The gain or loss from the exchange rate movements depend on whether you are a buyer or a seller!

Exchange Rate USD/CZK Dynamics (1 year)

Source: Czech National Bank

Last year…

Is Czech Koruna appreciating/depreciating against the U.S. dollar?

Exchange Rate USD/CZK Dynamics: 10 years

Source: Czech National Bank

Last 10 years…

Is Czech Koruna appreciating/depreciating against the U.S. dollar?

Winners and Losers

- How do the exchange rate movements affect participants of FOREX?

	Strong CZK (appreciation)	Weak CZK (depreciation)
• A Czech tourist abroad	🙂	😐
• An American tourist in Czech Rep.	😐	🙂
• A foreign firm exporting to Czech Rep.	🙂	😐
• A Czech exporting firm	😐	🙂
• A foreign investor in Czech Rep.	🙂	😐
• A Czech investor abroad	😐	🙂

Markets for Foreign Currency

Nominal **exchange rate (23/04/2014)**: 1 € = 1.38 $ or 1$ = 0.72 €

Market for **U.S. Dollars** in Europe   Market for **Euros** in the U.S.
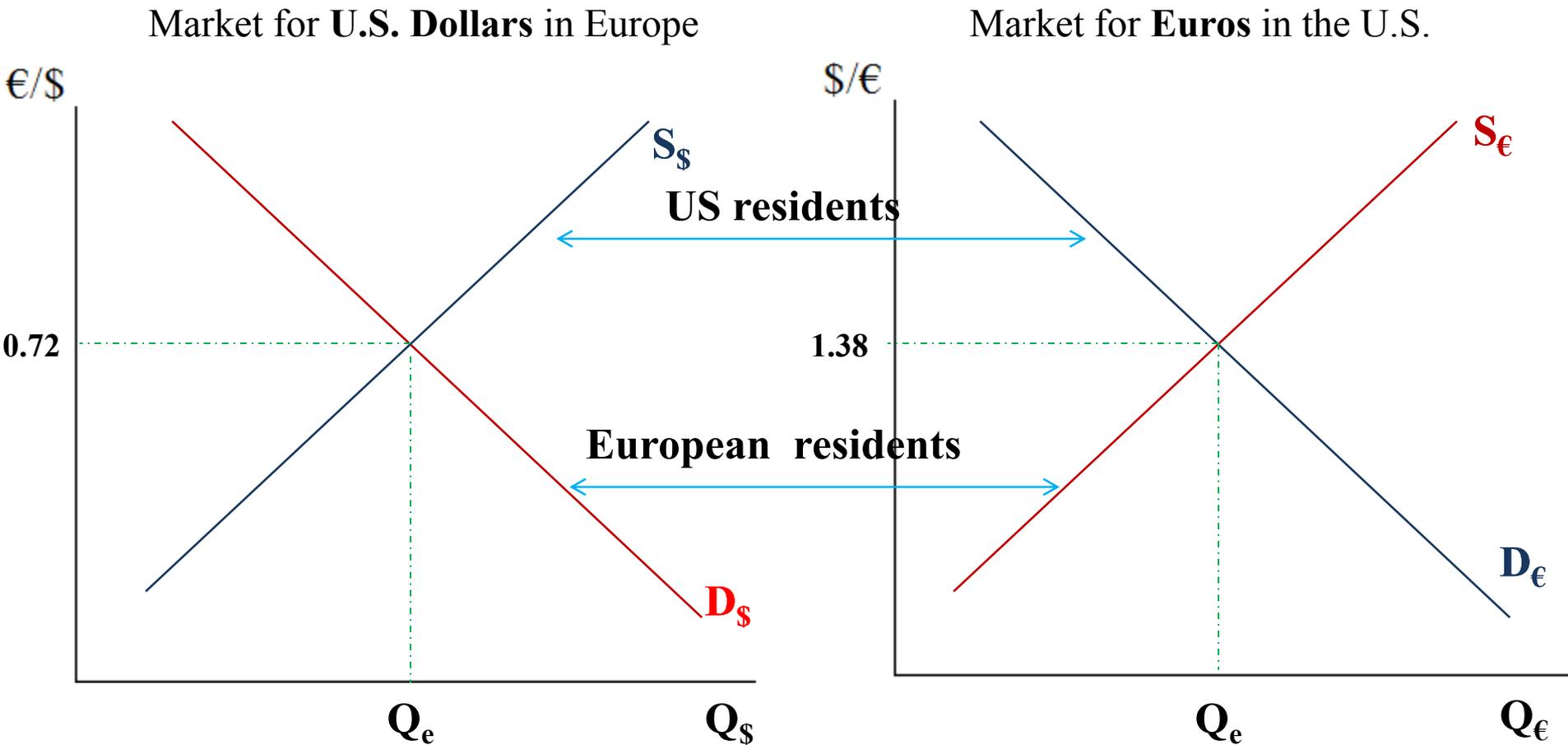
• Exchange rate is driven by **exports, imports**, and **capital flows**

Exchange Rate in the Short Run

▪ Changes in **demand**

• Increase in the US household **income** => Increasing demand for imports

• Increases in the European **interest rate** => Increasing demand for European assets

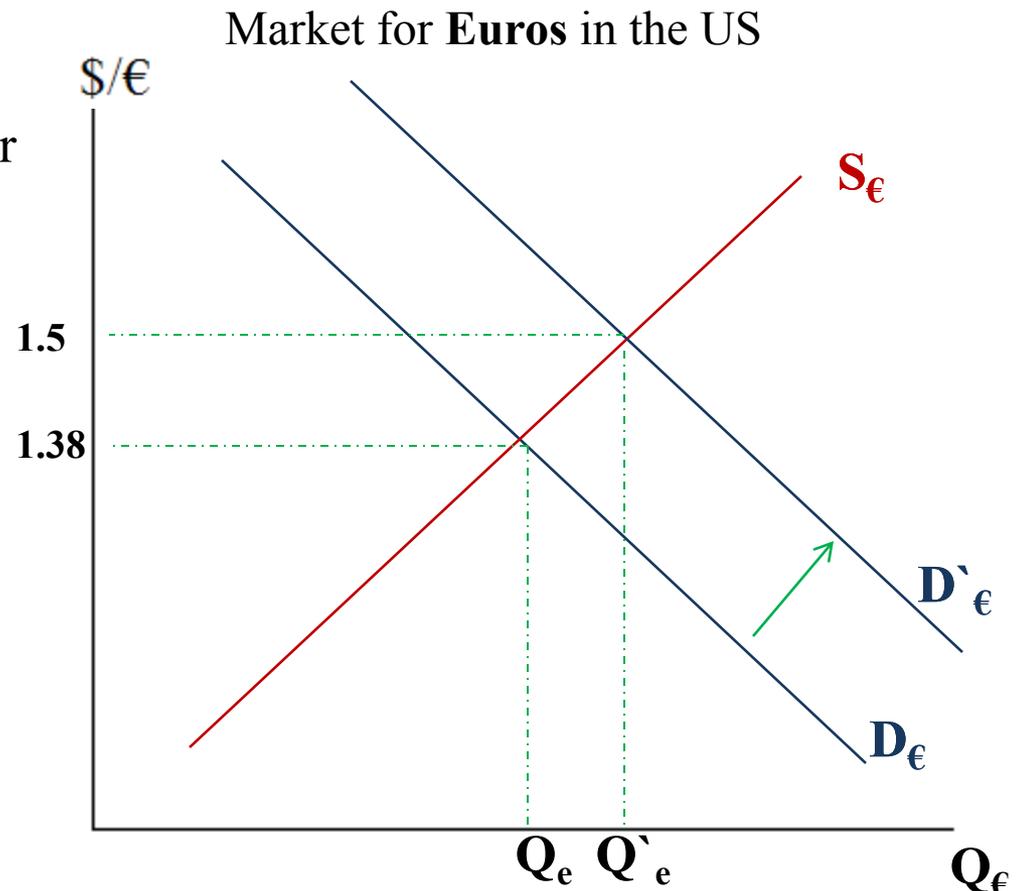• **Inflation** in the US =>

European goods are relatively cheaper

• **Speculations** among US investors

about increase in the value of €

⬇

Outcome: Appreciation of €

      or

Depreciation of dollar

Market for **Euros** in the US

$/€

1.5

1.38

$S_€$

$D`_€$

$D_€$

Q_e $Q`_e$

$Q_€$

Exchange Rate in the Short Run(Cont.)

▪ Changes in **supply**

• Increase in European household **income** => Increasing demand for imports

• Increases in the US **interest rate** => Increasing demand for American assets

• **Inflation** in Europe=>

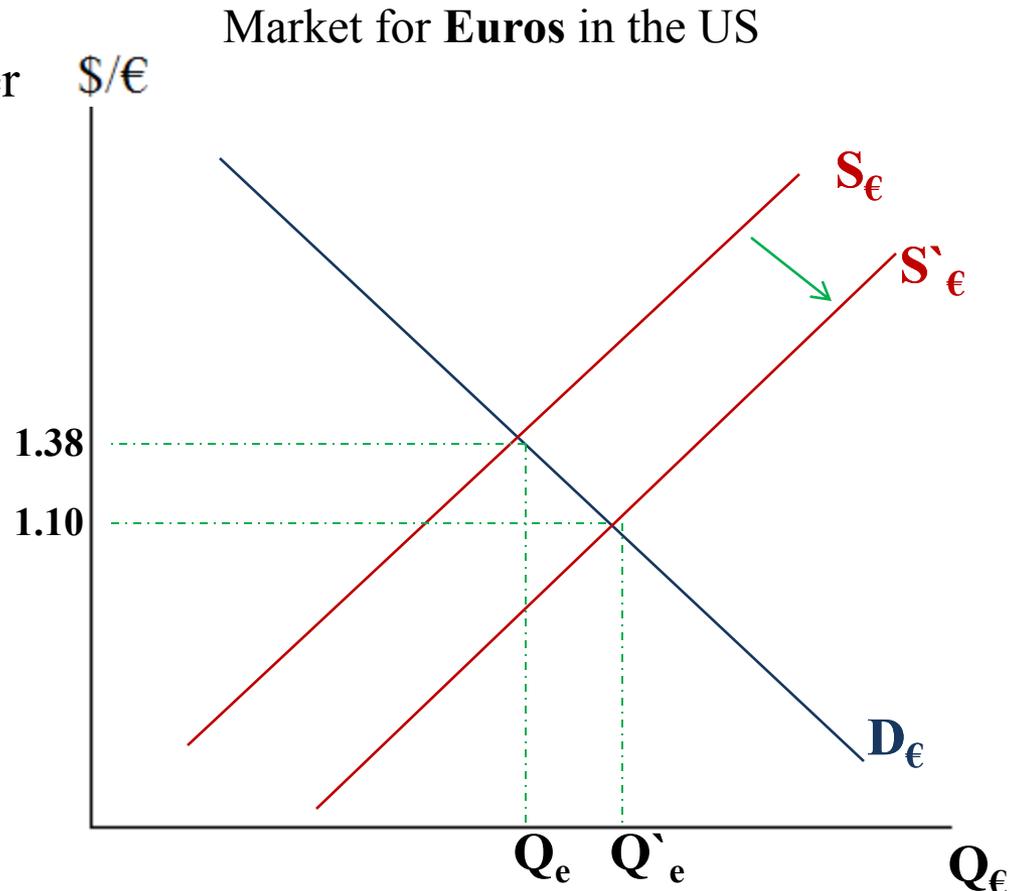American goods are relatively cheaper

• **Speculations** among European

investors about increase in the value
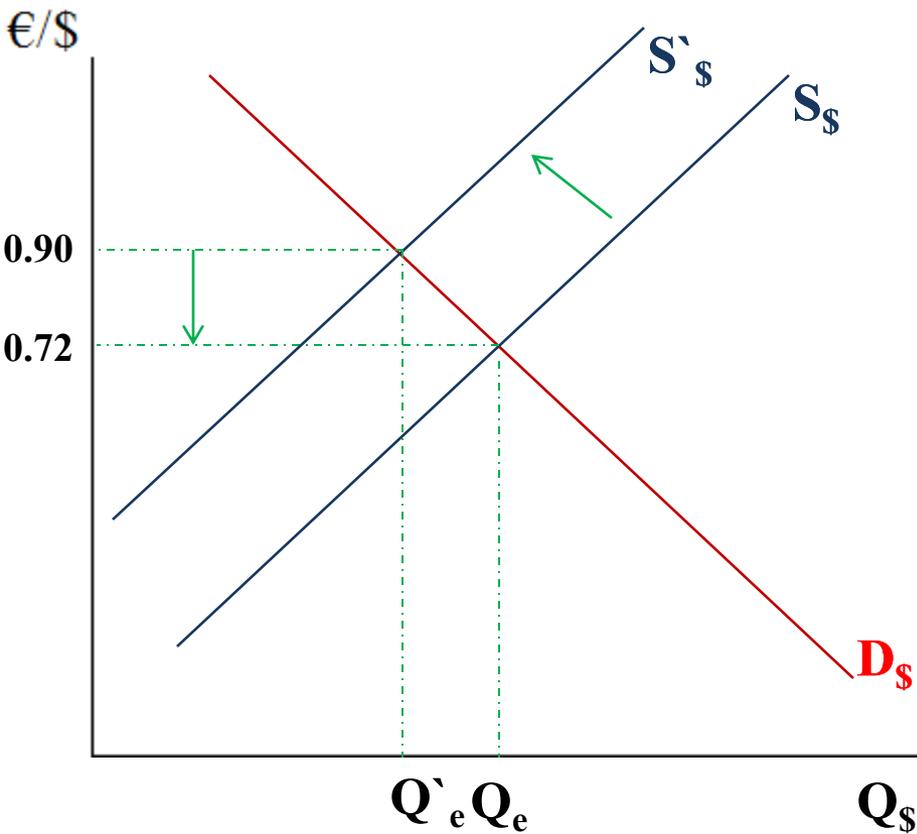
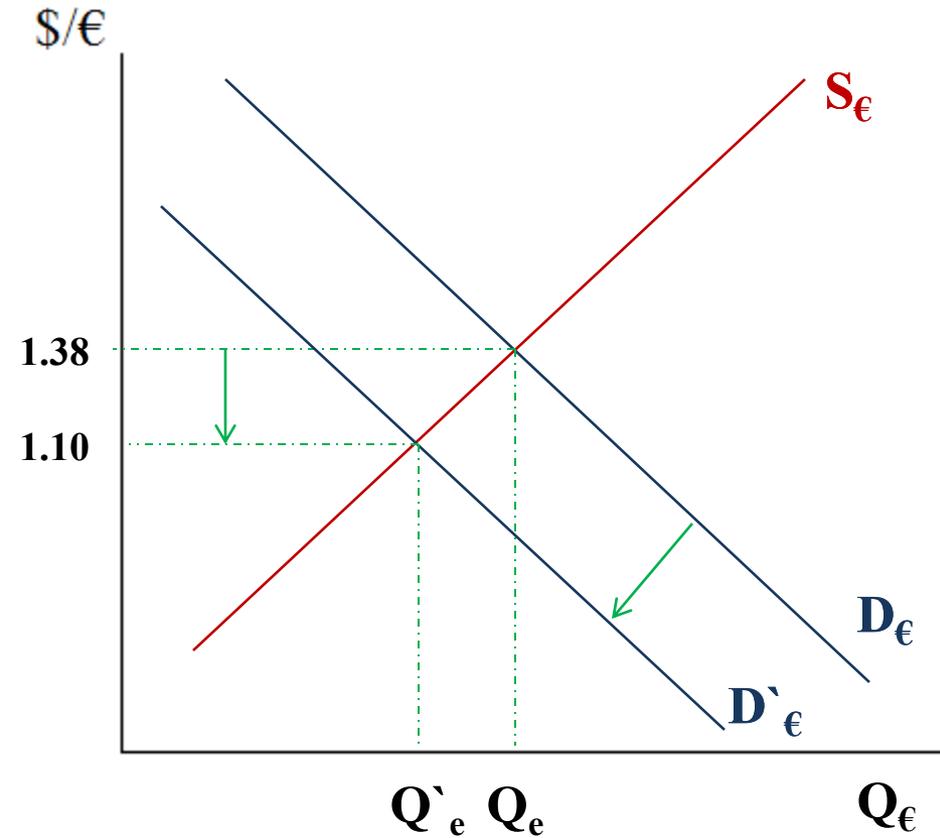of $

Outcome: Depreciation of €

or

Appreciation of USD

Market for **Euros** in the US

$\$/€$

$S_€$

$S`_€$

1.38

1.10

$D_€$

Q_e $Q`_e$

$Q_€$

Macroeconomic Consequences

- Expansionary monetary policy of the **ECB** => the EU interest rate **?** ↓

Market for **US Dollars** in Europe

$€/\$$

S`$_\$$
S$_\$$

0.90
0.72

D$_\$$

Q`$_e$ Q$_e$ Q$_\$$

Market for **Euros** in the US

$\$/€$

S$_€$

1.38
1.10

D$_€$

D`$_€$

Q`$_e$ Q$_e$ Q$_€$

↓ IR$_{Europe}$ => ↓ D$_€$ => ↓ S$_\$$ => **$ appreciates** and **€ depreciates**

Changes in Interest Rates (Cont.)

- The effect of the expansionary monetary policy on the aggregate demand in EU?

M^S ⬆ => i ⬇ => C & I ⬆ => Y ⬆

=> i ⬇ => Euro depreciates => Exports ⬆ & Imports ⬇ => NE ⬆ => Y ⬆

Effect for the US?

Currency Speculations (EU speculators)

- **Expectation** that the value of a currency would increase/decrease in the future

Market for **US Dollars** in Europe
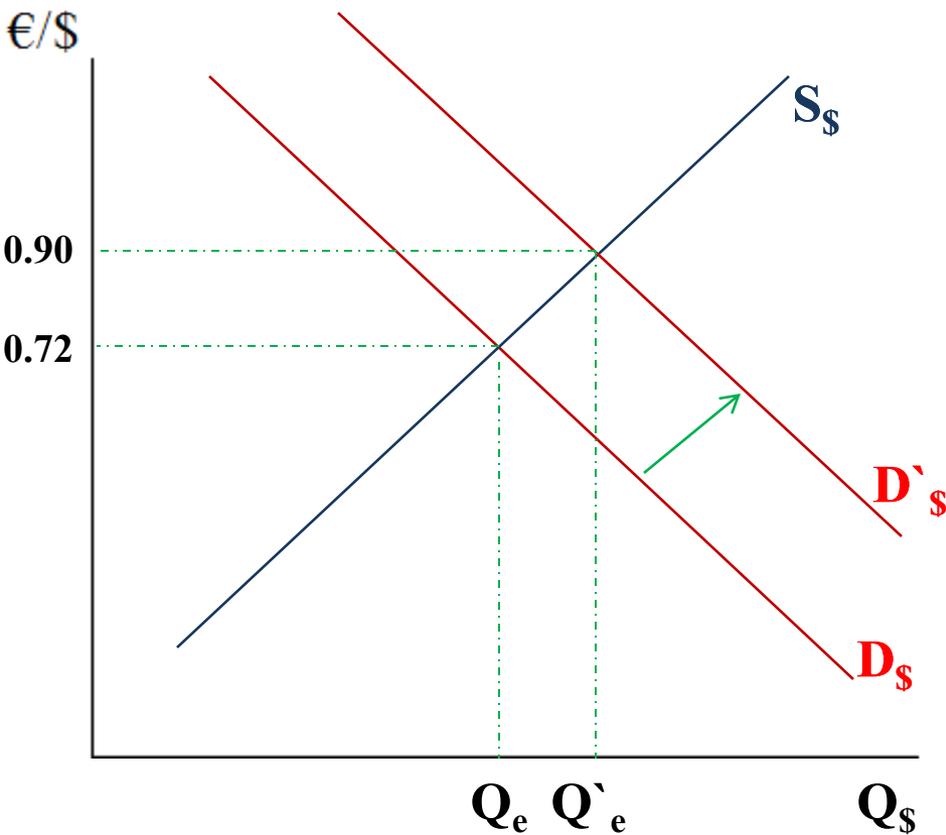
Market for **Euros** in the US
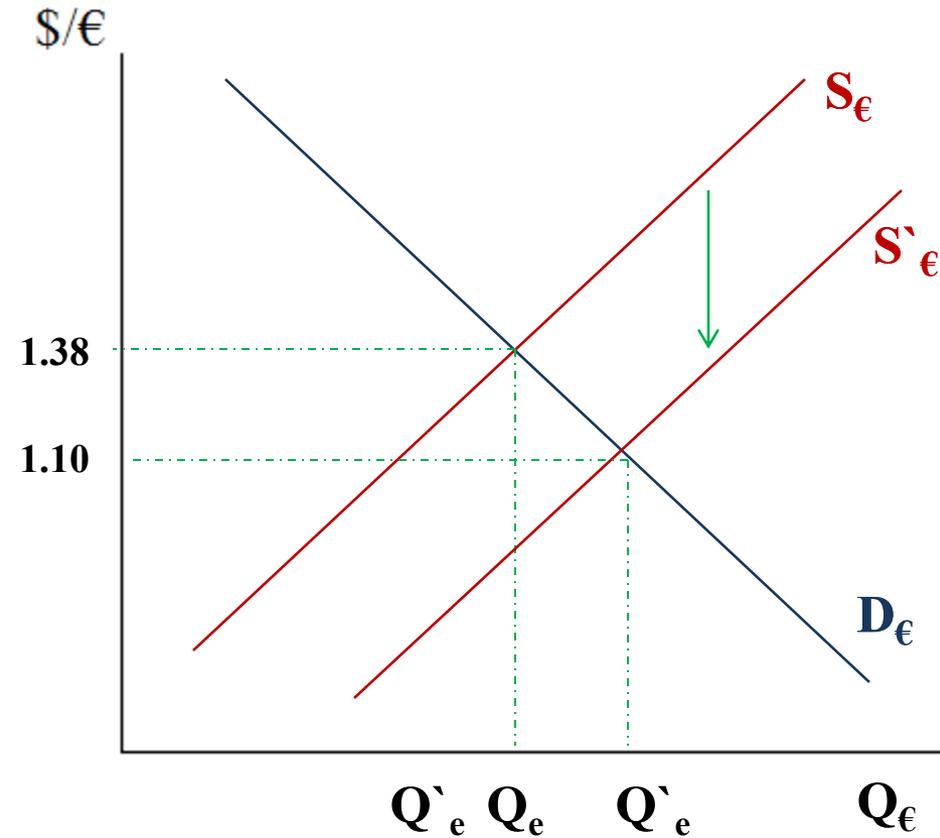
Expectation of ↑ **value of \$** => ↑ $D_\$$ => **\$ appreciates** => $S_€$ ↑ => **€ depreciates**

Currency Speculations: Consequences

- The effect of speculations on the aggregate demand in the US?

USD appreciates => Exports ↓ & Imports ↑ => NE ↓ => Y ↓

- **Effect for the EU economy**?

Exchange Rate and the Government

- Monetary policy tool

Foreign exchange interventions: the purchase and sale of currencies in FOREX by a country's monetary authority (central bank)

Fixed (pegged)	⟶ The ER target level
Crawling peg	⟶ The ER target level is changed frequently
Managed float (dirty float)	⟶ The ER in horizontal bands (hybrid)
Flexible (floating)	⟶ The ER is determined by the market

Flexible Exchange Rate Regime

▪ **Free float**: a **market-determined exchange** rate with no attempt of the government to influence its value

• No explicit direct macroeconomic policy exchange rate target level

• No institutional commitment to influence the path

• The policy targets output and inflation

TE the US and the Euro area

Fixed Exchange Rate Regime

- **Fixed ER**: Central bank is committed to *maintain a particular exchange rate* value and *pegs this rate* by means of **interventions** in the foreign exchange market

- Central bank *willingly* trades currencies at a fixed exchange rate

- **Sources**: Foreign exchange reserves

Fixed Exchange Rate Regime(Cont.)

Market for **Euros** in the US

Currency **devaluation** (depreciation)/ revaluation (appreciation)

Fixed Exchange Rate Regime(Cont.)

▪ **Potential Danger**

The regime **collapses** when the central bank runs our of the foreign exchange

reserve

▪ **Macroeconomic consequences**: changes in money supply => **?**

Changes in interest rate and prices

Sterilization (neutralization) of the negative impact of the foreign exchange

interventions by **open market** interventions

Fixed Exchange Rate Regime(Cont.)

Sterilized vs. Non-sterilized foreign exchange interventions

TE Government intervention: Buying € out or circulation

Non-sterilized: M^S ⬆ => i ⬇ => Y

Prices ⬆

Sterilized: *purchase or sale (?)* of government bonds

Speculative Attacks on Currencies

• A speculator is expecting the depreciation of the currency in the future

• Possible under the fixed exchange rate regime

TE Thai baht

• A fixed exchange rate between USD and Thai Baht maintained in Thailand

• A speculator borrows 100 Thai baht

The exchange rate: 1 USD = 10 Thai baht

Speculators borrow baht and start selling them in exchange of USD

=> Pressure on Baht to depreciate

Thai government runs out of foreign reserves and allows baht to float => depreciation

New exchange rate: 1 USD = 20 Thai baht

•Profit of speculators: $5

•Possible when the interest rates on borrowing in Thailand are low

•Immediate reaction to attack– increase in interest rates

Types of Fixed Regime

Currency board: **all currency** in circulation **is backed** by the government's holding of **foreign currency reserves**

• Anchor currency (stability and international acceptability)

TE Hong Kong: a fixed exchange rate 1 USD= 7.75 Hong Kong Dollars

• Currency board as the monetary institution: printing money backed by USD

• Central bank loses its monetary policy instrument

• The money supply is determined by the balance of payment position

• **Interest rate** and **inflation** in a currency board country are roughly the same as in anchor currency country

Objectives: fight inflation, stable macroeconomic environment without exchange rate risks.

 Argentina 1991-2001 (USD) ; Estonia (1992-2011); Latvia since 1994 (basket); Bulgaria (since 1997)

Currency Board: Argentina

TE Argentina maintained the currency board during 1991-2002 keeping fixed exchange rate between peso and the USD

✓ Starting from 1995, the USD sharply appreciated against other major currencies. What effect did the appreciation of the US dollar have on Argentina economy and on the market of Argentina export agricultural products (wheat and meet)?

✓Argentina abandoned the currency board in 2001 and made adjustment of its exchange rate. What type of adjustment (devaluation or revaluation of peso) in a situation of the US dollar appreciation you would recommend for Argentina after the end of the currency board regime?

Types of Fixed Regimes (Cont.)

Dollarization

A choice of a country to circulate the currency of another country as its sole legal tender, without a separate national currency

Reasons: hyperinflation or lack of credible institutions

TE Hyperinflation in Zimbabwe in 2007-2008

Monthly inflation rate 79,600,000,000 %

• Withdrawal of the national currency from circulation and replacement by anchor currency from official reserves

Advantages:

Disadvantages:
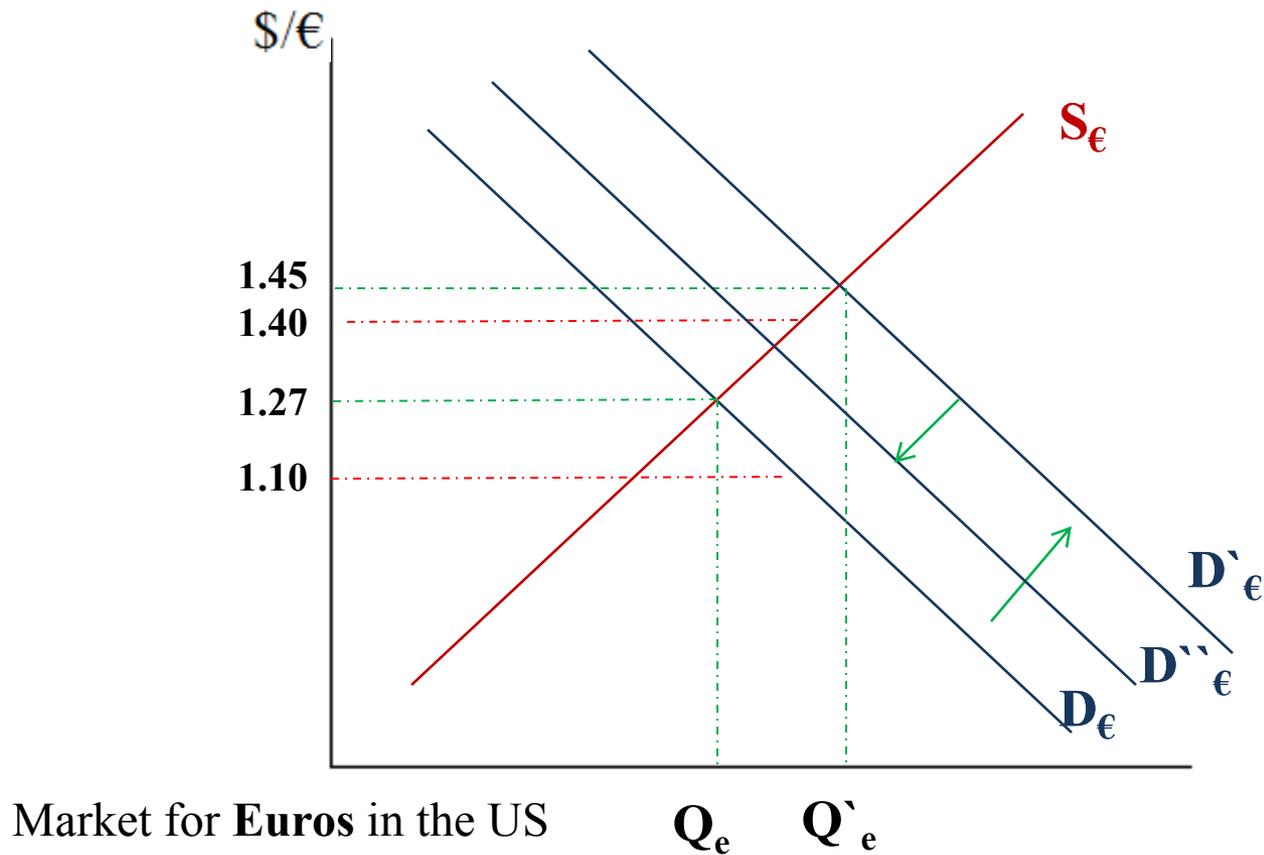
Informal dollarization (currency substitution): a foreign currency is circulating in a country long with its domestic currency.

Hyperinflation in Zimbabwe in 2007

Managed Float (Dirty Pegg)

▪ECB wants to maintain a stable euro exchange rate in a range

Market for **Euros** in the US

▪Independent float with **active** interventions: Majority of developing countries

CA Balance and Exchange Rate

Case study: China vs. USA

• **Currencies:** Chinese Yuan and the US dollar

• **FOREX**: a market for US dollar in China; a market for Yuan in the US.

• The U.S. produce and export **airplanes**

• China produces and exports **smartphones.**

• US consumers buy Chinese smartphones and pay for them in dollars. Chinese

enterprises or government buy American airplanes and pay for them in Yuan.

CA Balance and Exchange Rate (Cont.)

- A **U.S. consumer** buys a Chinese smartphone for 200 dollars.

✓ Illustrate graphically the effect of this purchase on FOREX.

✓ What effect this purchase would have on the value of both currencies (appreciation /depreciation)?

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- **Chinese Airlines** purchase an airplane from the US at the price of 1.000.000 Yuan.

✓ Illustrate graphically the effect of this purchase on FOREX.

✓ What effect this purchase would have on the value of both currencies (appreciation/depreciation)?

CA Balance and Exchange Rate (Cont.)

✓ Using the table, provide evidence for the existence of trade imbalances in the US with China.

✓ What effect such high and long-lasting demand for the Chinese imports from the US consumers should have on the FOREX and the values of the US dollar and Chinese Yuan? **Is it really the case?**

Table 1: China's Trade with the United States, 2001-11 ($ billion)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
US exports	19.2	22.1	28.4	34.7	41.8	55.2	65.2	71.5	69.6	91.9	103.9
US imports	102.3	125.2	152.4	196.7	243.5	287.8	321.5	337.8	296.4	364.9	399.3
US balance	-83.0	-103.1	-124.0	-162.0	-201.6	-232.5	-256.3	-266.3	-226.8	-273.1	-295.5

CA Balance and Exchange Rate (Cont.)

✓ Explain what type of the **foreign exchange market intervention** by the Chinese government may contribute to sustaining a large trade deficit between China and the US. Hint: China is the largest foreign owner of the US government bonds.

✓ If the exchange rate regime in the US and China was a free float (no government interventions), what would happened to the US trade deficit?

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US balance	-83.0	-103.1	-124.0	-162.0	-201.6	-232.5	-256.3	-266.3	-226.8	-273.1	-295.5

CA Balance and Exchange Rate (Cont.)

- During 1994-2005, the exchange rate of the US dollar in China was fixed

  1 USD =8.6 Yuan

- During 2005-2007:   1 USD =6.2 Yuan.

- Since that, the exchange rate remains unchanged

- Economists claim that the Chinese currency must appreciate by 40 % in order to

reflect real economic conditions.

Real Exchange Rate

• **Nominal ER:** an amount of national currency you pay to get a unit of foreign currency

• **Real ER:** unit of foreign item for the units of domestic item (competitiveness)

A rate at which we can trade goods and services of one country for that of another

• Measuring RER by a simple representative good:

TE Price of **French** car is equal 10.000 Euros

Price of equivalent **Japanese** car is 2.800.000 yen

• Comparing prices of two cars: converting into *common currency*

Nominal exchange rate: 1 euro = 140 yen

Price of French car = 1.400.000 yen

Price of Japanese car = 2.800.000 yen

=> One Japanese car = Two French cars

Real Exchange Rate (Cont.)

• Measuring RER using a basket of representative goods

The overall price levels: P (home country) and P* (foreign country)

$$\text{Real ER} = \text{Nominal ER} \ (P^*/P)$$

▪ **Three determinants**: P, P* and nominal ER

▪ **Aggregation** to a national price level:

$$e_{CZK/\$} = \frac{CZK}{\$} \cdot \frac{P}{} = \frac{P}{} \cdot \frac{}{}$$

P_{CZK} - a price level in Czech Rep (in CZK)

$P_{\$}$ - a price level in the US (in $)

• How many **Czech baskets** are needed to buy **one US basket** of goods

A real exchange rate **appreciation** E'_{CZK} ↓   and **depreciation** E'_{CZK} ↑

The Exchange Rate in a Long Run

The Purchasing Power Parity (PPP) exchange rate

• Equalizes the prices of traded goods across countries

• A unit of any currency should buy the same amount of goods in all countries

▪**The Law of One Price**

*In competitive markets, **identical** goods sold in different countries **must** sell for the same price expressed in terms of the same currency*

• No transportation costs and trade barriers (tariffs)

TE US dollar exchange rate w/r to CZK: 1 USD = 20 CZK

Levi's jeans sold in the US for $ 45 *should* be sold in Czech Republic for 900 CZK

N!B! PPP is a hypothesis

The Exchange Rate in a Long Run (Cont.)

Arbitrage: buying goods in a cheap country and selling in expensive

TE   A price of **gold** in **New York** is 100 USD per ounce

A price of gold in **London** is 100 EUROs per ounce

Existing **exchange rate**: 1 EURO = 1.3 USD

• A person is buying gold in New York and sells it in London

100 EURO x **1.3** USD/EURO = **130** USD

Profit: 30 USD

In the long run: the prices of gold would adjust (be equalized in two locations)

The Purchasing Power Parity (PPP) ER

- **The World Bank International Comparison Program**

- A **basket** of internationally traded goods (oil, rice, TV sets, etc.)

- The **PPP ER**: buying the **same basket** of goods with the **same costs**

If PPP holds, what is the real exchange rate?

$$e_{CZK/\$} = \frac{E_{CZK/\$} \cdot P_{\$}}{P_{CZK}} =$$

$$E^{PP}_{CZK/\$} =$$

- The price levels are measured by CPI or GDP Deflator

The Big Mac Index: Testing the Law of One Price

- Constructed by *The Economist* since 1986

- The Big Mac PPP

- The ER that makes burgers cost the same everywhere

TE A Big Mac price in China: 10.5 Yuan /burger

   A Big Mac price in the US: 3.1 USD/burger

The **implied PPP**:

$$P_{BM}^{China} = \cdot$$

$$E_{Yuan/USD} = \quad = \quad = \quad USD$$

- **The market exchange rate** $E'_{Yuan/USD} = \quad USD$

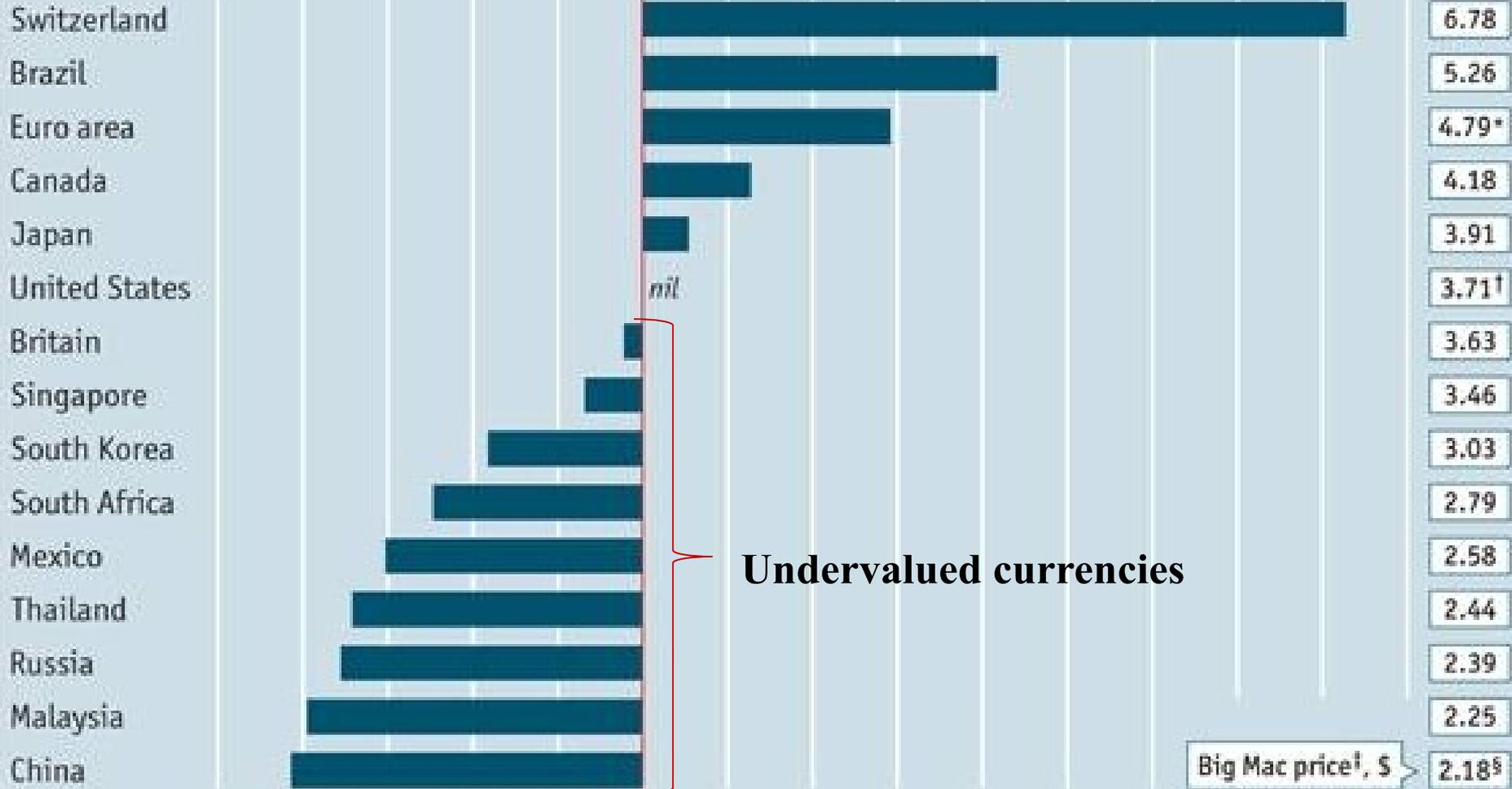$$\frac{H+}{E} = \quad = -$$

Conclusion: The Yuan is 58 % **"undervalued"** against the dollar

Big Mac index

Local-currency under(−)/over(+) valuation against the dollar, %

Overvalued currencies

Undervalued currencies

Country	Big Mac price†, $
Switzerland	6.78
Brazil	5.26
Euro area	4.79*
Canada	4.18
Japan	3.91
United States	3.71†
Britain	3.63
Singapore	3.46
South Korea	3.03
South Africa	2.79
Mexico	2.58
Thailand	2.44
Russia	2.39
Malaysia	2.25
China	2.18§

Source: The Economist, 2010

Next class: Financial crises

N!B! Reading Assignment: Textbook + Handout

Watch for the Homework #3!