Exchange Rates and Exchange Rate Regimes

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Role of exchange rates

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- Exchange rates matter in many different ways to many different constituencies in the world economy
- Much of issues in international finance is directly or indirectly concerned with exchange rates
- Relationship of exchange rates with number of economic fundamentals is documented theoretically as well as empirically
  - International trade
  - International investment
  - Economic growth
  - Inflation
  - Economic competitiveness

Basic types of exchange rates

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- Nominal exchange rate vs. Real exchange rate
  - While the nominal exchange rate expresses the relative price of currencies the real exchange rate incorporates relative price levels and tells about purchasing power of currencies
- Bilateral exchange rate vs. Effective exchange rate
  - While the bilateral exchange rate refers to the relative price of two currencies the effective exchange rates show the currency value against a basket of currencies
- Nominal bilateral exchange rate
- Real bilateral exchange rate
- Nominal effective exchange rate
- Real effective exchange rate

Nominal bilateral exchange rate

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- The most common type of exchange rate
- Exchange rate at which the currency of one country can be swapped for that of another country
- Most frequently quoted as price of one foreign currency unit in units of domestic currency
- Important for international trade, price comparisons, clearing of international transactions
- Change of the exchange rate

$$\%\Delta E = \frac{(E_{t+1} - E_t)}{E_t} \times 100$$

Czech National Bank exchange rate fixing (11/08/2017 and 11/08/2016)

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Country	Currency	Amount	Code	2017	2016
Australia	dollar	1	AUD	17.484	18.686
Brazil	real	1	BRL	6.998	7.687
Bulgaria	lev	1	BGN	13.374	13.813
Canada	dollar	1	CAD	17.489	18.562
China	renminbi	1	CNY	3.337	3.649
Croatia	kuna	1	HRK	3.535	3.604
Denmark	krone	1	DKK	3.517	3.632
EMU	euro	1	EUR	26.155	27.020
Hongkong	dollar	1	HKD	2.843	3.123
Hungary	forint	100	HUF	8.565	8.709
IMF	SDR	1	XDR	31.313	33.794
India	rupee	100	INR	34.646	36.249
Indonesia	rupiah	1000	IDR	1.664	1.847
Israel	shekel	1	ILS	6.202	6.353
Japan	yen	100	JPY	20.369	23.903
Malaysia	ringgit	1	MYR	5.176	6.049
Mexico	peso	1	MXN	1.235	1.314
New Zealand	dollar	1	NZD	16.196	17.559
Norway	krone	1	NOK	2.783	2.927
Philippines	peso	100	PHP	43.566	51.873
Poland	zloty	1	PLN	6.098	6.342
Romania	new leu	1	RON	5.714	6.058
Russia	rouble	100	RUB	37.031	37.339
Singapore	dollar	1	SGD	16.297	18.025
South Africa	rand	1	ZAR	1.648	1.813
South Korea	won	100	KRW	1.943	2.202
Sweden	krona	1	SEK	2.722	2.865
Switzerland	franc	1	CHF	23.106	24.884
Thailand	baht	100	THB	66.884	69.731
Turkey	lira	1	TRY	6.264	8.176
United Kingdom	pound	1	GBP	28.855	31.403
USA	dollar	1	USD	22.232	24.224

Development of selected exchange rates with CZK

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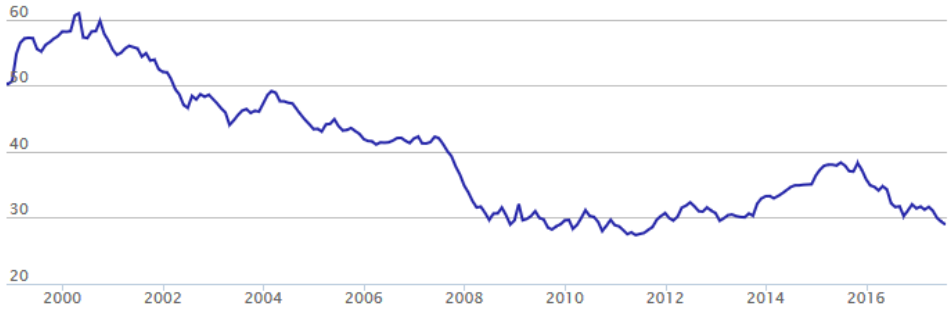
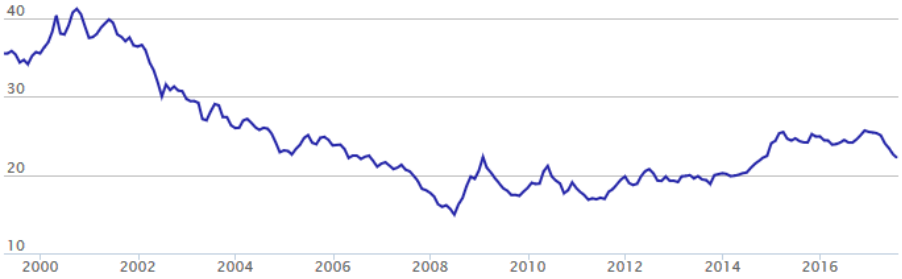
CZK/EUR

CZK/USD



CZK/GBP



CZK/CHF

Development of selected exchange rates with USD

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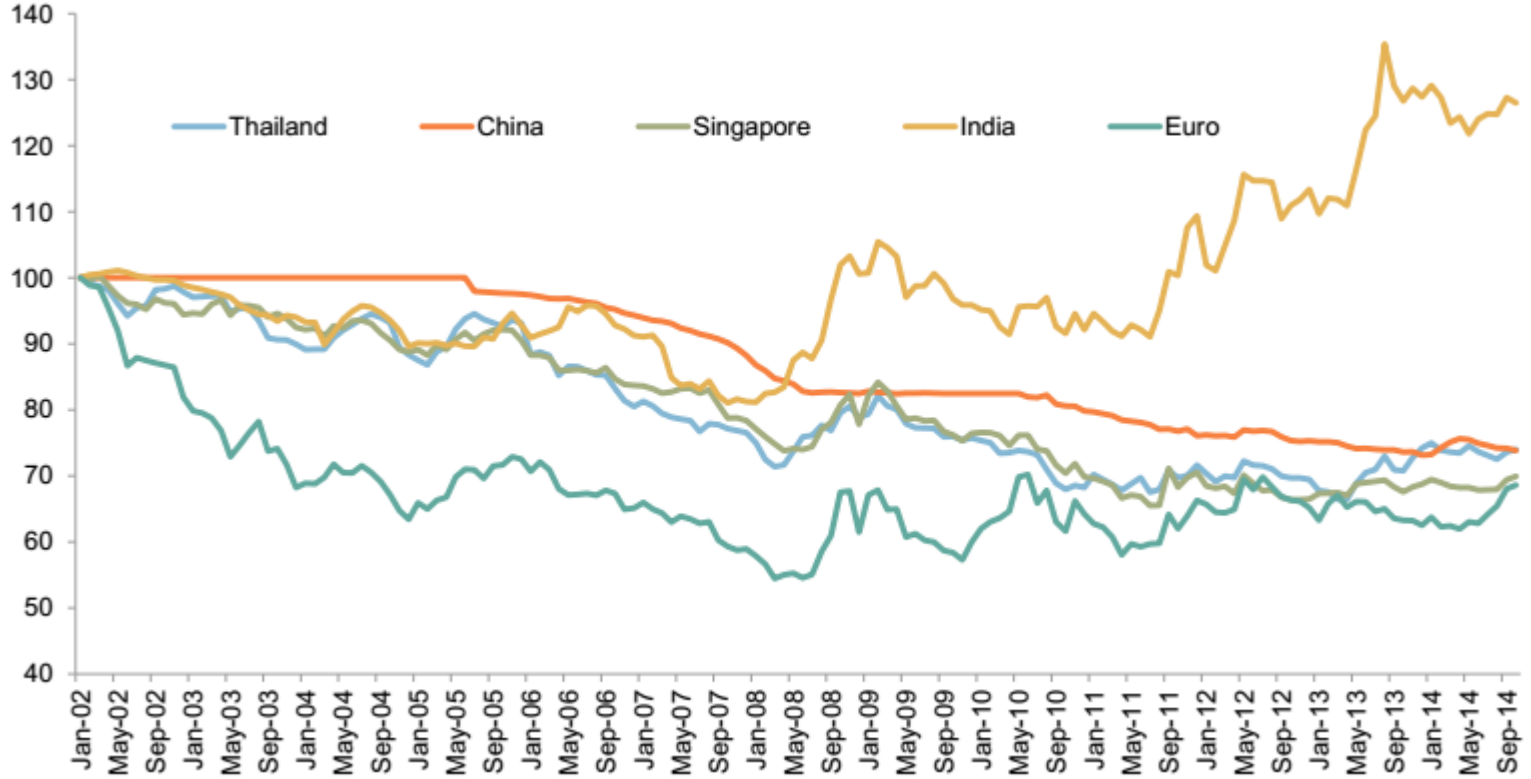

Real bilateral exchange rate

- Nominal bilateral exchange rate multiplied by the ratio of price levels in foreign and domestic country
- Information about purchasing power of the currency
- Price of currency expressed in goods
- Measured and reported as index
  - Ratio of prices of foreign and domestic goods expressed in domestic currency units

$$RE_t = E_t \times \frac{P_t^*}{P_t}$$

- Increase of the index means real depreciation of the home currency

Changes in the real exchange rate

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Change	Intuition	Effect in „RE“ equation
P_t^* (price level in the foreign country) increases	Foreign goods increase in price. Therefore, it takes more domestic goods to buy a unit of foreign goods. The real value of the home currency has fallen.	Because it is in the numerator, the increase of P_t^* increases the value of RE_t
P_t (price level in the home country) increases	Domestic goods increases in price. Therefore, it takes fewer domestic goods to buy a unit of foreign goods. The real value of the home currency has risen.	Because it is in the denominator, the increase of P_t decreases the value of RE_t
E_t increases	It takes more domestic currency units to buy a unit of the foreign currency. The real value of the home currency has fallen.	The increase in E_t increases the value of RE_t

Interpretation and meaning of the real appreciation

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- Real appreciation of the home currency is caused by either nominal appreciation or higher inflation in the domestic economy than abroad
- Real appreciation can occur even in times of nominal depreciation if the differential exceeds the rate of nominal depreciation
- Real appreciation means higher purchasing power of the home currency relative to the foreign currency
- With real appreciation the same quantity of domestic goods can be traded for more foreign goods
- Real appreciation of the home currency means that the domestic goods have become more expensive compared to foreign goods, so that domestic export may fall

Simplified „beer“ example of real appreciation

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1995

E = 18 CZK/DEM
35.20 CZK/EUR

P = 7 CZK

P* = 2.5 DEM = 1.28 EUR

RE = 35.20 * (1.28 / 7)
RE = 6.4277

1 beer in DE = 6.4 beers in CZ
1 beer in CZ = 0.15 beer in DE

ΔE = (26.10 – 35.20) / 35.20 = **-25.85 %**

ΔP = (25 – 7) / 7 = **257.14 %**

ΔP* = (3.50 – 1.28) / 1.28 = **173.44 %**

ΔRE = (3.654 – 6.427) / 6.427 = **-43.15 %**

2017

E = 26.10 CZK/EUR

P = 25 CZK

P* = 3.50 EUR

RE = 26.10 * (3.50 / 25)
RE = 3.654

1 beer in DE = 3.65 beers in CZ
1 beer in CZ = 0.27 beer in DE

Real appreciation of CZK through nominal appreciation as well as higher inflation

Nominal effective exchange rate (NEER)

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- Any currency may rise against one currency but depreciate against another over any particular period – what is the total change?
- Nominal effective exchange rate measures development of domestic currency against basket of the most important foreign currencies
- Each currency included has its own weight according to its significance for foreign trade and investment in the particular country
- Expressed in index for since many currencies included in the basket

$$NEER = \prod_{i=1}^{n} \left(\frac{S_i}{S_i^*} \right)^{w_i}$$

- n is number of currencies in the basket
- s_i is exchange rate of the national currency against the currency of the country i
- s^*_i is exchange rate of the national currency against the currency of the country i during the base period
- w_i is country's weight (of the currency)

NEER in leading economic centers

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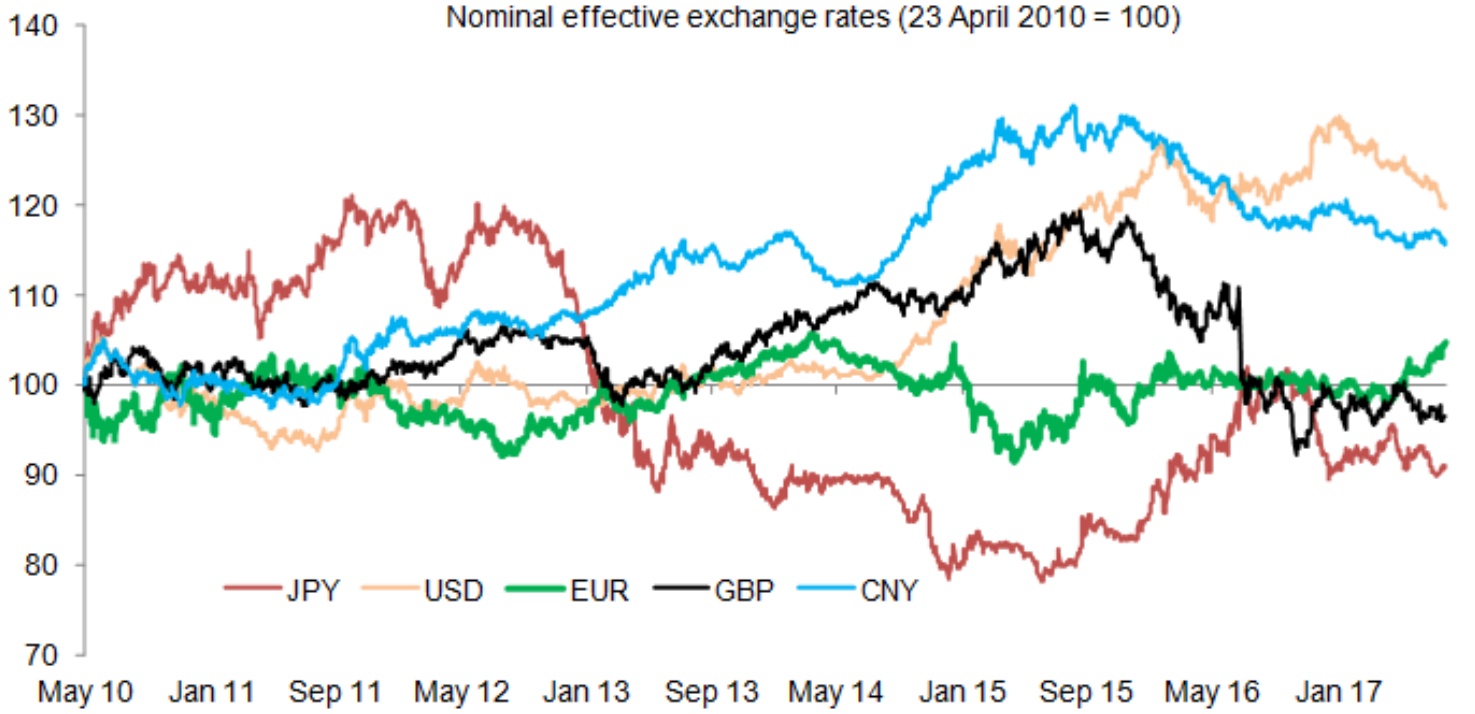

Bilateral and effective exchange rates in the euro area

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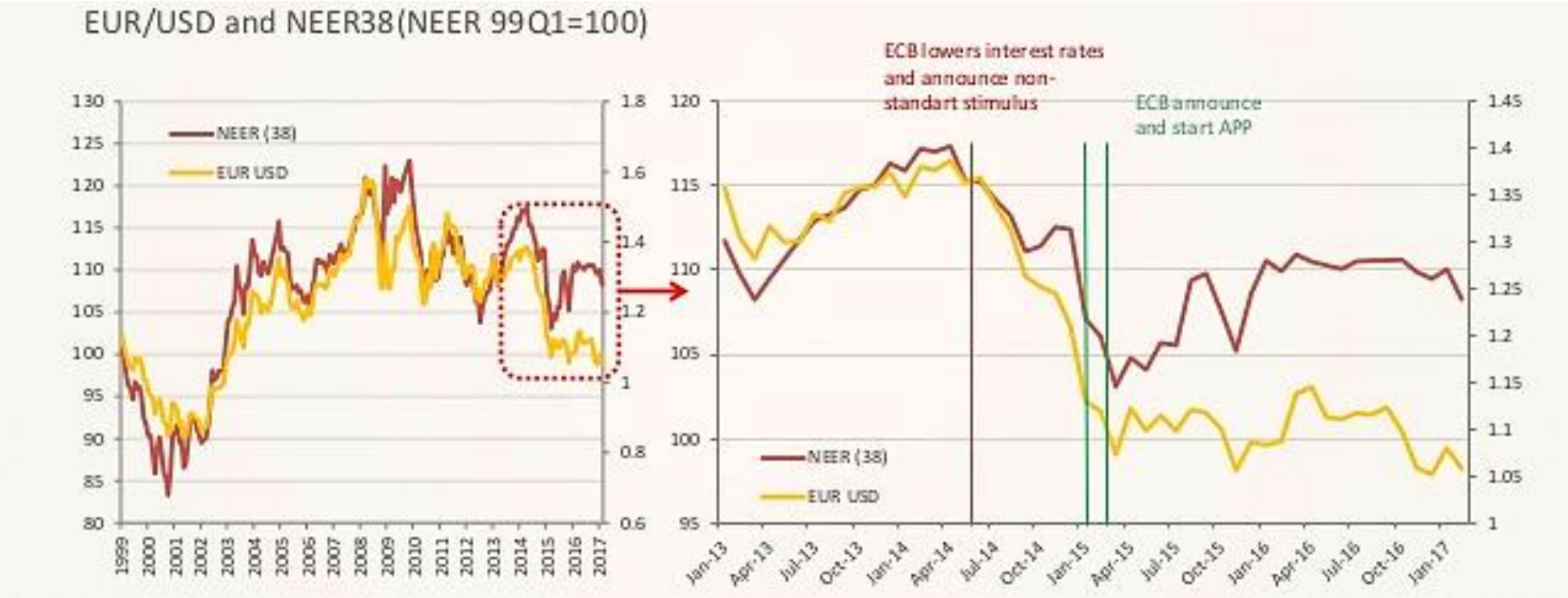

Real effective exchange rate (REER)

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- Real effective exchange rate is a weighted average of a country's currency against a basket of other major currencies adjusted to the effects of inflation
- Widely used indicator of international competitiveness of the country
  - Real appreciation (depreciation) means loosing (gaining) the competitiveness
- Reported as index in several versions differing in number of currencies included in the basket

$$REER = \prod_{i=1}^{n} \left(\frac{s_i}{s_i^*} \times \frac{p_i}{p} \right)^{w_i}$$

- n is number of currencies in the basket
- s_i is exchange rate of the national currency against the currency of the country i
- s^*_i is exchange rate of the national currency against the currency of the country i during the base period
- w_i is country's weight (of the currency)
- p_i is inflation rate in country i
- p is inflation in the home country

Long-run REER developments

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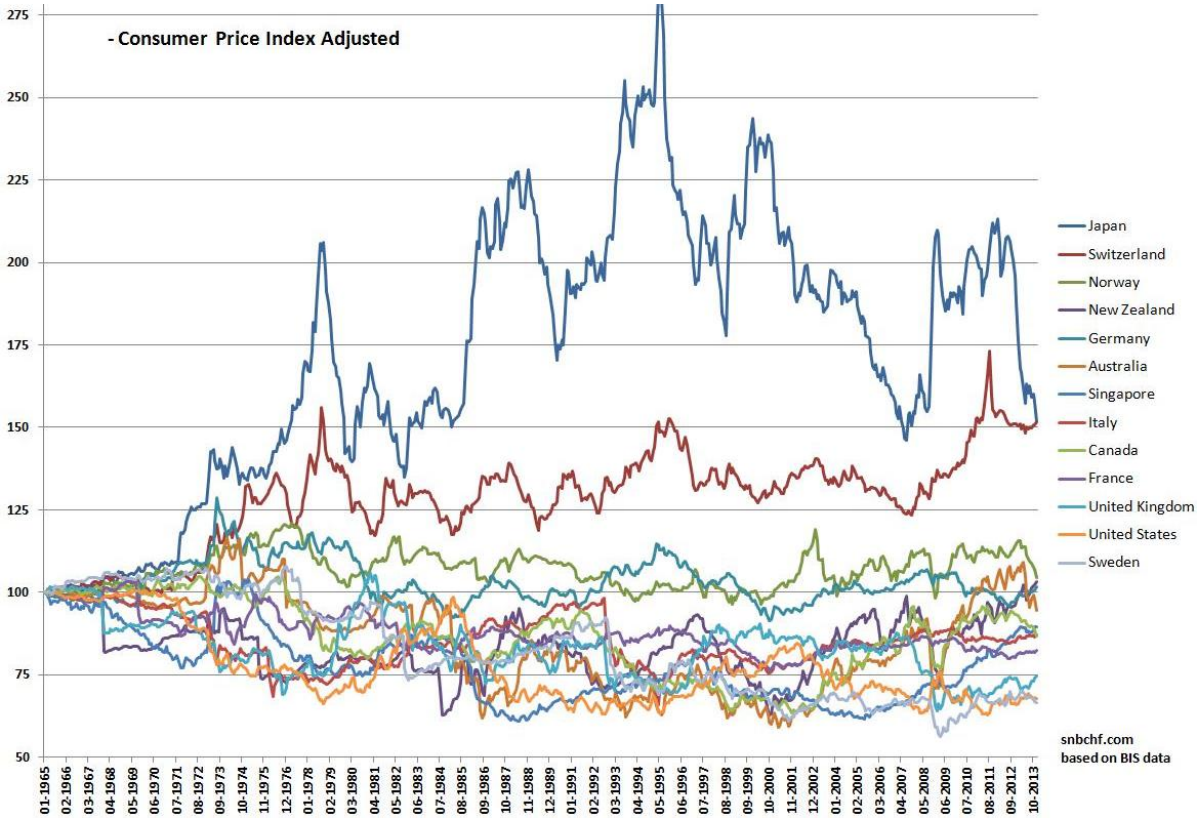

appreciation

depreciation

REER adjustments around the globe

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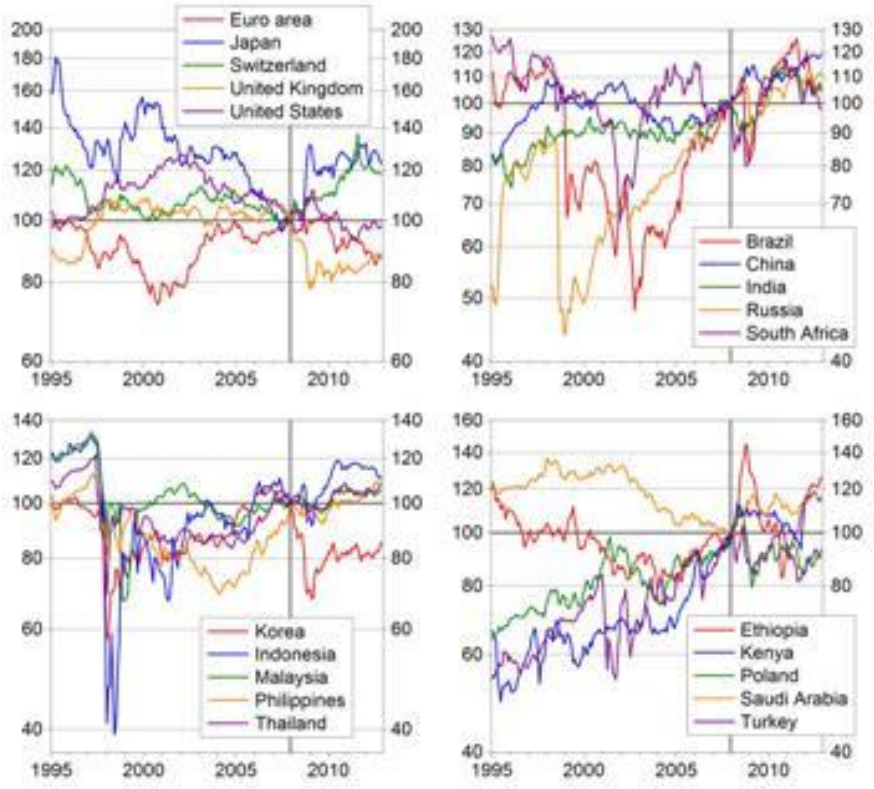

appreciation

depreciation

NEER vs. REER development during transition

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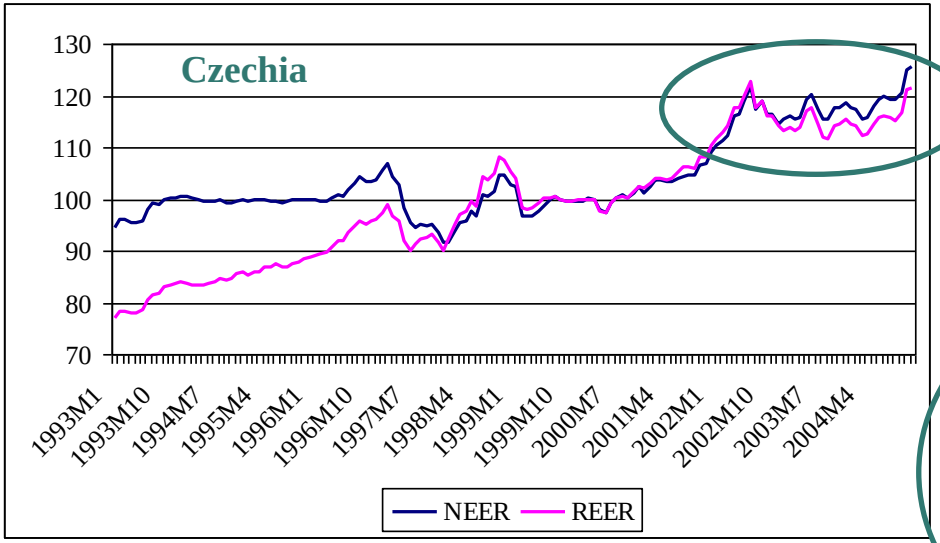
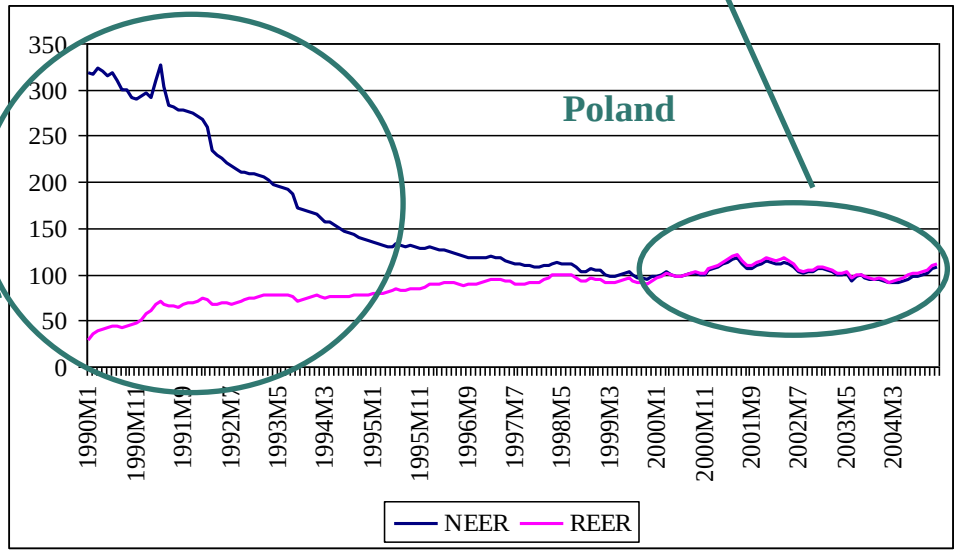


very similar development of NEER and REER in the late stage of transition process



effect of high inflation in early stage of transition in Poland: REER is increasing (real appreciation) in spite of decreasing NEER (nominal depreciation)

Decomposition of real exchange rate development

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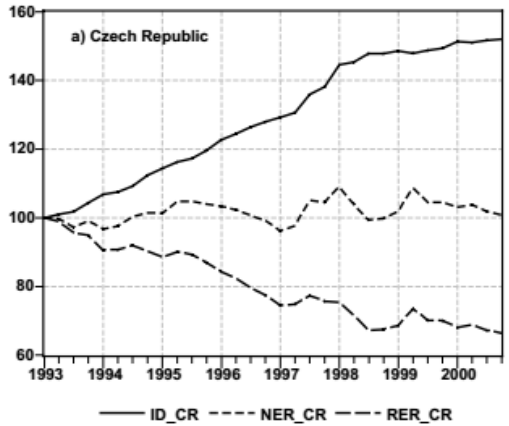

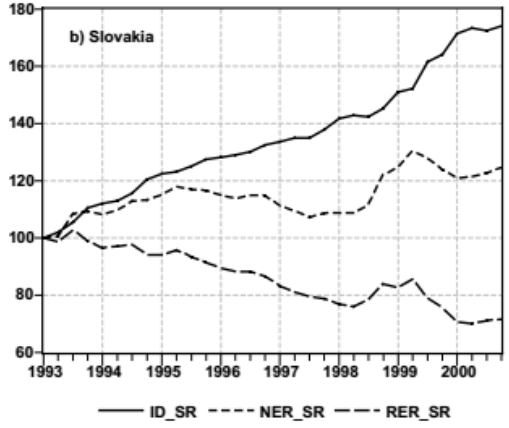

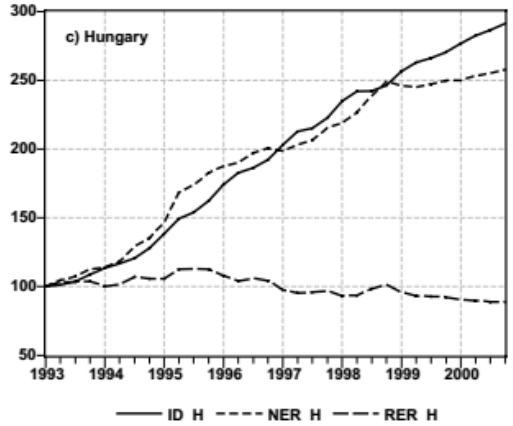

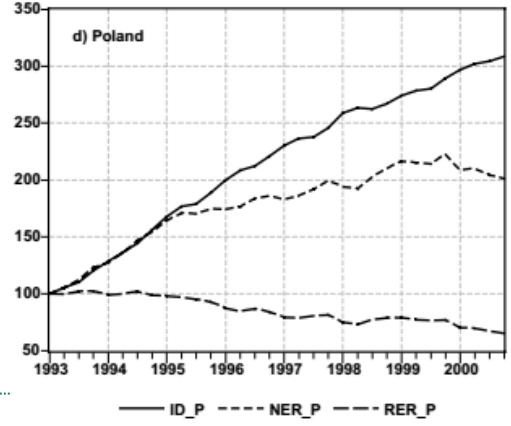

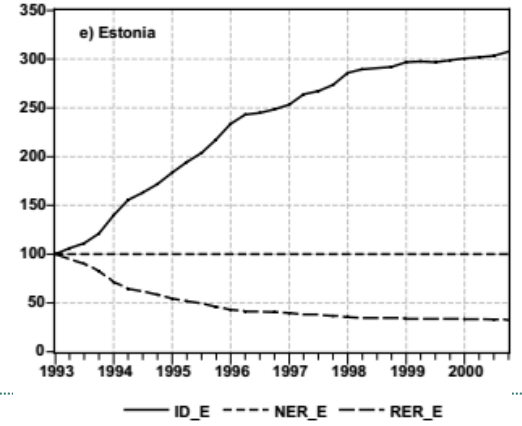

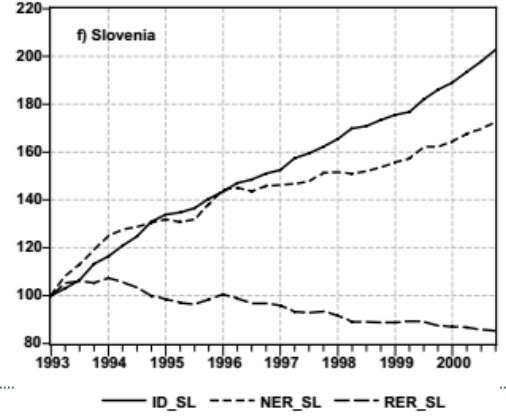

depreciation

appreciation

Classification of exchange rate regimes

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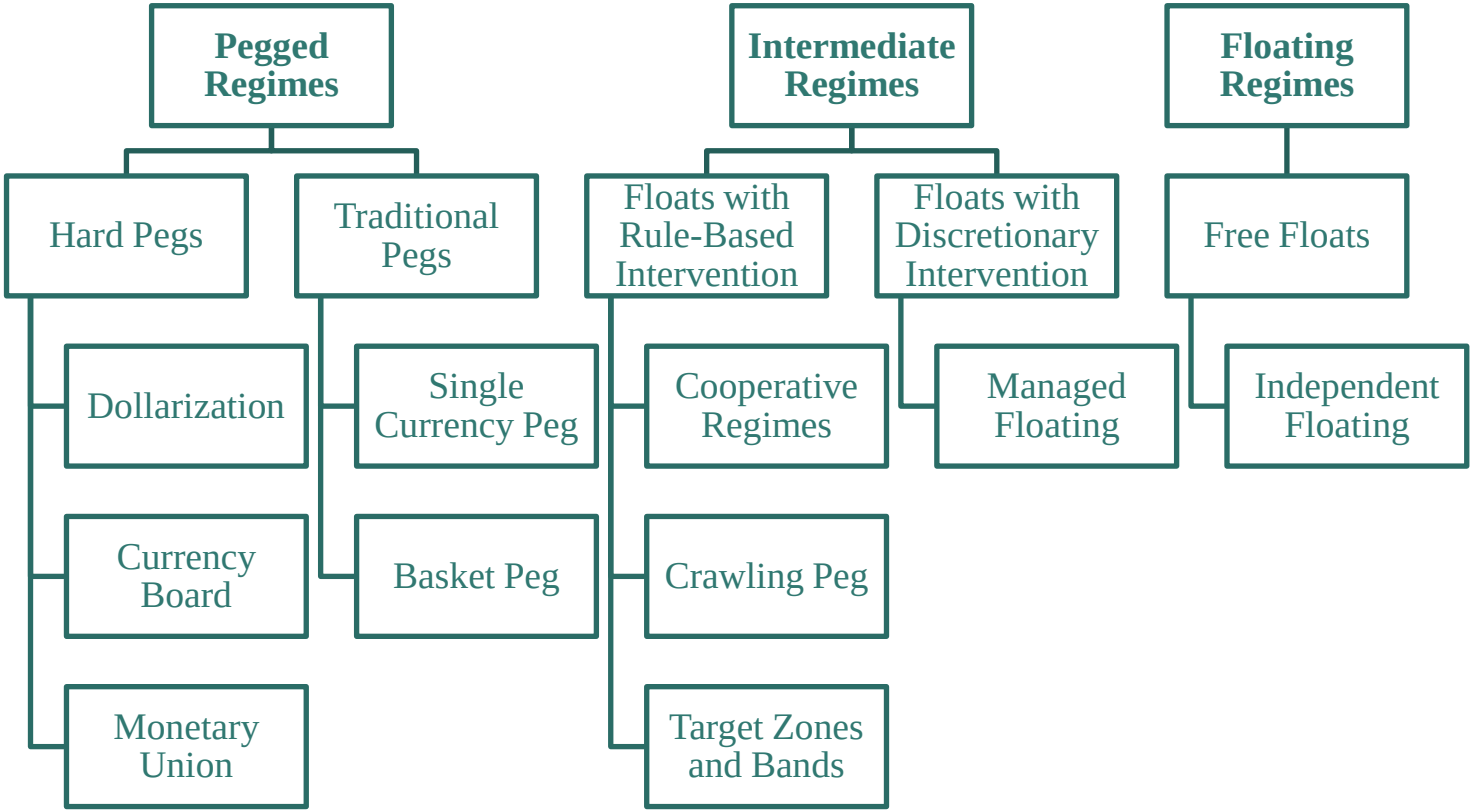

Description of exchange rate regimes

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- Hard pegs
  - Exchange rate is pegged in a manner that makes a change in parity or an exit from the regime extremely difficult and costly
- Traditional pegs
  - Currency is linked to a single foreign currency or to a basket of currencies. Cost of adjusting the parity or of abandoning the regime is lower than in case of hard pegs
- Floats with rule-based intervention
  - Exchange rate is not pegged at a specific rate, but the central bank intervenes in a predetermined manner to limit exchange rate movements
- Floats with discretionary intervention
  - Exchange rate floats but is influenced by signifficant official intervention
- Free floats
  - Exchange rate is allowed to float freely and the central bank does not intervene in the foreign exchange market

Hard-peg regimes

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- Dollarization
  - A foreign currency is used as a legal tender. Monetary policy is delegated to the anchor country. Seigniorage accures to the issuing country.
- Currency board
  - The exchange rate is pegged to a foreign (anchor) currency, with the régime and the parity enshrined in law. The law would also specify a minimum amount of international reserves to be held by the central bank to back a certain percentage of a pre-specified monetary aggregate. The main difference from dollarization is that the seigniorage accrues to the home country.
- Monetary union
  - A group of countries uses a common currency issued by a common central bank. Monetary policy is determined at union level. No option to adjust par-values internally or externally. The common central bank can pursue any exchange rate policy.

Traditional-peg regimes

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- Single currency peg
  - The exchange is pegged to a fixed par-value to a single foreign currency
  - The central bank is expected to trade at the announced par-value
  - The rate is generally adjustable (through discrete devaluations or revaluations) in case of fundamental disequilibria
  - Credibility is greater the higher the level of central bank reserves
- Basket peg
  - Currency is pegged to a basket consisting of two or more currencies
  - Basket can be country-specific or be a composite currency such as SDR
  - For country-specific baskets, basket weights may be publicly known or be secret, and may be fixed or variable

Floating regimes with rule-based intervention

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- Cooperative regimes
  - Cooperating central banks agree to keep the bilateral exchange rates of their currencies within a pre-set range of each other
  - Central banks use all monetary instruments as well as joint coordinated interventions
- Crawling peg
  - Exchange rate is typically adjusting at a predetermined rate in predetermined interval
  - Crawling peg may be combined with bands
  - Specific design features determine whether the system resembles more a fixed or a flexible regime
- Target zones and bands
  - Exchange rate is allowed to fluctuate within a pre-set range
  - Endpoints of the range are defended through intervention
  - Intra-band interventions may occur to avoid excess pressure at the margin
  - Degree of exchange rate flexibility is determined by the width of the band or target zone

Other floating regimes

- Managed floating
  - Exchange rates are free to float according to supply and demand
  - Authorities have a view on the desired level and path of the exchange rate
  - Intervention may take place occasionally
  - Often combined with inflation targeting monetary policy
- Independent floating
  - Exchange rate is completely determined in the foreign exchange market based on daily supply and demand
  - No official interventions takes place
  - Requires little or no official reserves
  - This regime place no restrictions on monetary policy

Fixed vs. flexible exchange rates

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- Fixed rates provide stability in international prices for the conduct of trade
- Fixed exchange rates eliminates exchange rate risk
- Fixed exchange rates are inherently anti-inflationary, requiring the country to follow restrictive monetary and fiscal policies
- Fixed exchange rates regimes necessitate that central banks maintain large quantities of international reserves for use in occasional defense of fixed rate
- Fixed exchange rates bind the central bank in pursuing monetary policy
- Fixed rates, once in place, may be maintained at rates that are inconsistent with economic fundamentals

Questions and Applications

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???What is the current exchange rate regime in the Czech Republic???

Attributes of the „ideal“ currency

- Exchange rate stability
  - The value of the currency would be fixed in relationship to other currencies so traders and investors could be relatively certain of the foreign exchange value of each currency in the present and near future
- Full financial integration
  - Complete freedom of monetary flows would be allowed, so traders and investors could willingly and easily move funds from one country to another in response to perceived economic opportunities or risk
- Monetary independence
  - Domestic monetary and interest rate policies would be set by each individual country to pursue desired national economic policies, especially as they might relate to limiting inflation, combating recessions and fostering prosperity and full employment

Attributes of the „ideal“ currency

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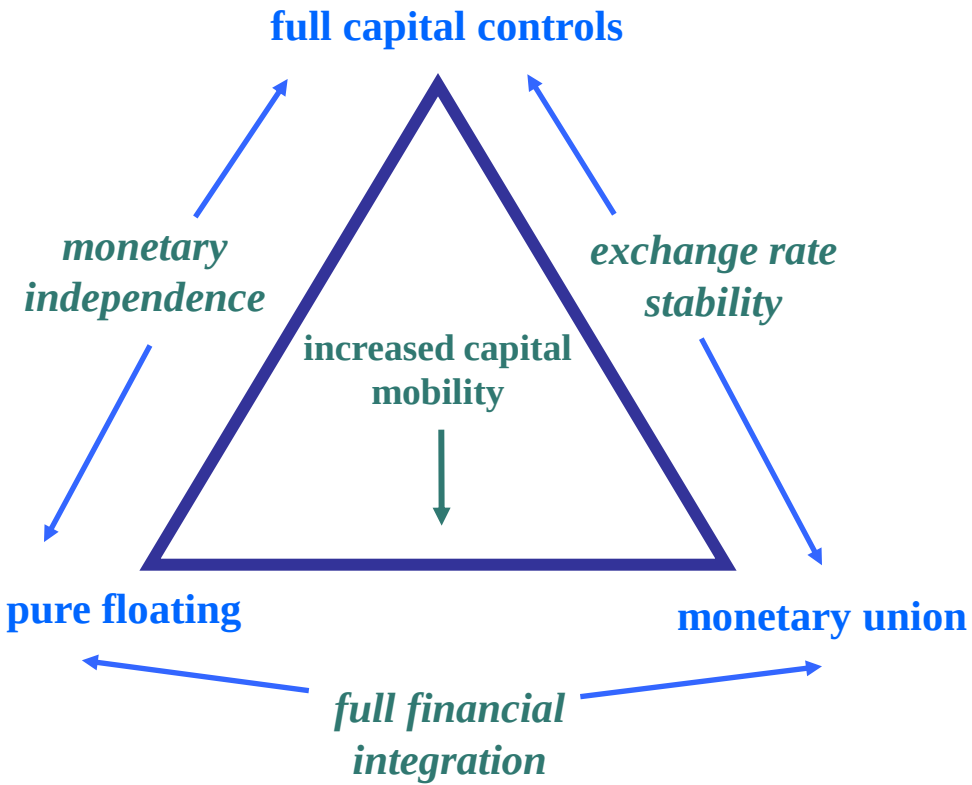
A country cannot be on all three sides of the triangle at once. It must give up one of the three ‘attributes’ if it is to achieve one of the states described by the corners of the triangle.



THANK YOU FOR YOUR ATTENTION