Lecture Two

Foreign Exchange Rates

Fan Xiaoyan

SOE, Fudan University

Outline

Exchange Rate

- An Exchange Rate (E) is the price of some foreign currency expressed in terms of a home (or domestic) currency.
- Two quotations:
  - Direct method(European terms), $E_{D/F}$: 0.89€/\$ means 0.89 Euro per Dollar.
  - Indirect method(American terms), $E_{F/D} = 1/E_{D/F}$: 1.12\$/€ means 1.12 Dollar per Euro.
- Appreciation $E \downarrow$ and depreciation $E \uparrow$ rate under direct quotation:

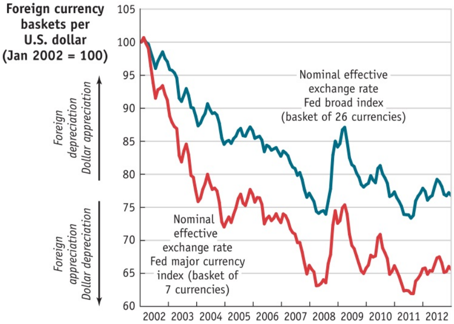
$$\frac{\Delta E}{E} = \frac{E_{t+1} - E_t}{E_t}$$

Effective Exchange Rates

- The effective exchange rate changes for baskets of currencies using trade weights to construct an average of all the bilateral changes for each currency in the basket.

$$\frac{\Delta E}{E} = \sum_{i=1}^{N} \frac{\Delta E_i}{E_i} \frac{Trade_i}{Trade}$$

The Effective Exchange Rates Index are quoted with indirect method. So the increase of the index means appreciation.



Example 1

The NZD is trading at 0.3500USD/NZD and the SEK is trading at 0.3100NZD/SEK. The USD/SEK exchange rate is:

- A. 8.8573 USD/SEK
- B. 9.2166 USD/SEK
- C. 0.1085 USD/SEK

Example 2

Suppose that the quote for GBP in New York is 1.7574-84 USD/GBP. The equivalent quote for U.S. dollars in London would be:

- A. 0.5687-90 GBP/USD
- B. 0.5690-87 GBP/USD
- C. 1.7584-09 GBP/USD

Example 3

Given the following quotes:

- 1.25 CHF/USD
- 1.80 USD/GBP
- 2.30 CHF/GBP

How much arbitrage profit could be made on an initial 1,000 USD position?

Exchange Rate Regimes

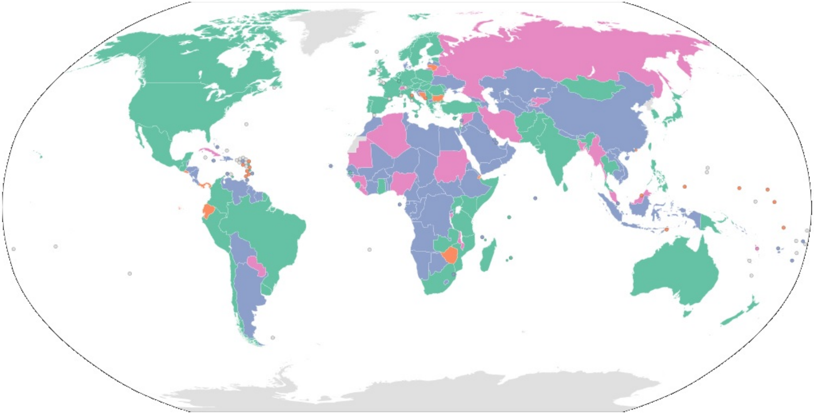
- Fixed (or pegged) exchange rate regimes are those in which a country's exchange rate fluctuates in a narrow range (or not at all) against some base currency over a sustained period, usually a year or longer. A country's exchange rate can remain rigidly fixed for long periods only if the government intervenes in the foreign exchange market in one or both countries.
- Floating (or flexible) exchange rate regimes are those in which a country's exchange rate fluctuates in a wider range, and the government makes no attempt to fix it against any base currency. Appreciations and depreciations may occur from year to year, each month, by the day, or every minute.

Rule of Thumb: Annual Variations within $\pm 2\%$ or $\pm 1\%$.

Spectrum of Exchange Rate Regimes

	Regime	Countries
Increasingly fixed	**No separate legal tender (51 countries)**	*Another currency as legal tender*: (13): Ecuador, El Salvador, Kiribati, Liechtenstein, Marshall Islands, Micronesia, Monaco, Montenegro, Palau, Panama, San Marino, West Bank & Gaza, Zimbabwe *Eurozone*: (18): Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, Spain *Eastern Caribbean Currency Union*: (6): Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines *West African CFA Franc Zone*: (8): Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo *Central African CFA Franc Zone*: (6): Cameroon, Central African Rep., Chad, Rep. of Congo, Equatorial Guinea, Gabon
	Currency boards (7)	Bosnia and Herzegovina, Brunei, Bulgaria, Djibouti, Hong Kong, Lithuania, Macao
	Other pegs (35)	Anguilla, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belize, Bhutan, Bolivia, China, Comoros, Costa Rica, Denmark, Eritrea, Honduras, Iran, Jordan, Kuwait, Lebanon, Lesotho, Maldives, Morocco, Namibia, Nepal, Netherlands Antilles, Oman, Paraguay, Qatar, Saudi Arabia, Solomon Islands, Suriname, Swaziland, Ukraine, United Arab Emirates, Venezuela
	Bands, crawling pegs, crawling bands (43)	Algeria, Angola, Argentina, Botswana, Burundi, Cambodia, Cape Verde, Croatia, Dominican Republic, Egypt, Gambia, Georgia, Ghana, Guatemala, Guinea, Guyana, India, Iraq, Jamaica, Kazakhstan, Kyrgyz Republic, Malawi, Mauritius, Moldova, Mongolia, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Peru, Rwanda, São Tomé and Príncipe, Sierra Leone, Sri Lanka, Sudan, Tajikistan, Tanzania, Tonga, Trinidad And Tobago, Tunisia, Uganda, Vietnam, Yemen
Increasingly floating	**Wide bands, managed floating, free floating (46)**	Afghanistan, Albania, Armenia, Australia, Belarus, Brazil, Canada, Chile, Colombia, Czech Republic, Haiti, Hungary, Iceland, Indonesia, Israel, Japan, Kenya, Korea, Liberia, Macedonia FYR, Madagascar, Malaysia, Mauritania, Mexico, Mozambique, New Zealand, Norway, Philippines, Poland, Romania, Russia, Samoa, Serbia, Seychelles, Singapore, South Africa, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Zambia

De facto exchange-rate arrangements in 2013(IMF)

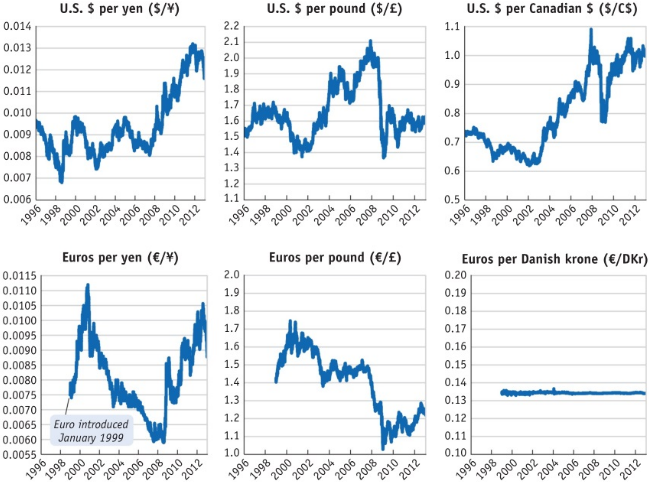


Floating (*floating* and *free floating*) Hard pegs (*no separate legal tender*, *currency board*) Residual (*other managed arrangement*)

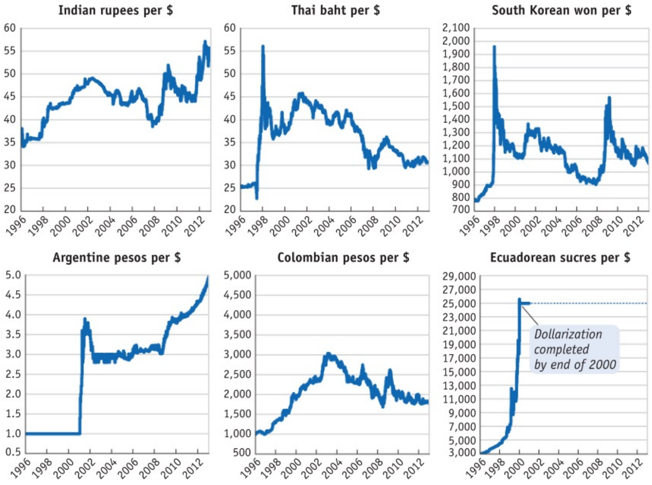
Soft pegs (*conventional peg*, *stabilized* arrangement, *crawling peg*, *crawl-like* arrangement, *pegged exchange rate within horizontal bands*)

Source: Exchange-rate Regime on Wikiwand.

Selected developed countries(1996-2012)



Selected developing countries(1996-2012)



Foreign exchange market

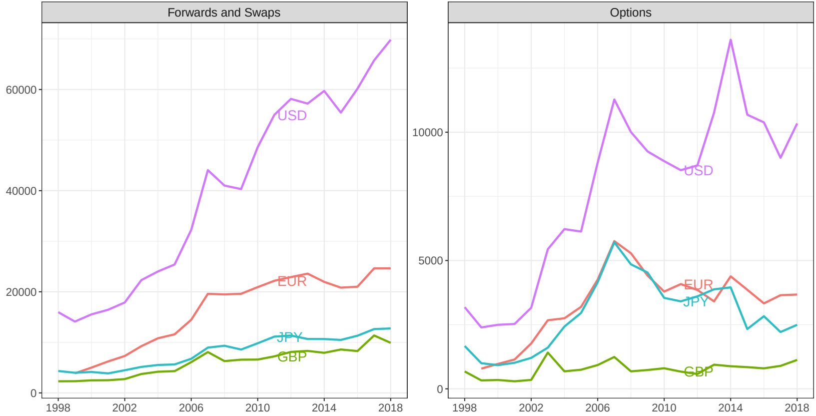
- The foreign exchange market (or forex or FX market), which, like any market, is a collection of private individuals, corporations, and some public institutions that buy and sell.
- Two types:
  - Retail market: The counter market with trading between commercial banks and households/firms.
  - Wholesale market: The interbank market, which is an Over-The-Counter(OTC) market with trading between commercial banks, financial institutions, etc.

Exercise

Please find the Spot Exchange Rates on Real-Time-CNY.com and finish the following exercise by groupr:

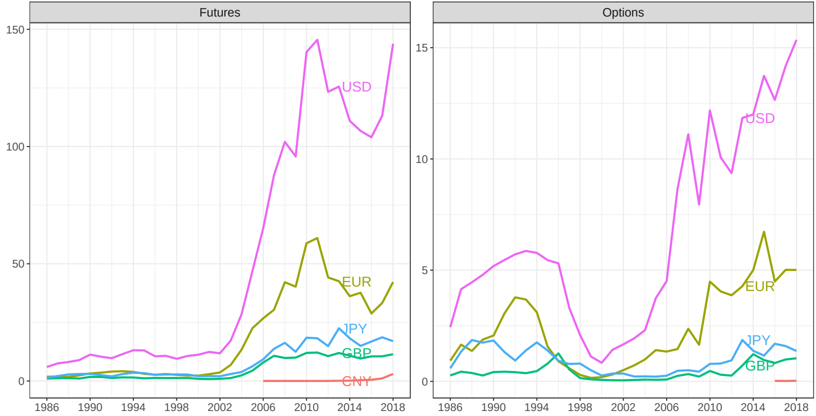
- If you have \$1000 at hand, which bank will you choose to exchange it to RMB? And how much will you get? And if you what to exchange ¥1000 to Euro in cash, which bank will you choose and get how much?
- If your company received €100 million and what to exchange it to Dollars, which bank will you choose and get how much?
- Take $E_{¥/\$}$ in cash as example, which bank has the smallest spread? Do you think it's reasonable and why?

OTC Derivatives: Forwards, Swaps, and Options



Note: Notional amounts outstanding in billions of US dollars, from BIS "OTC derivatives outstanding".

Exchange-traded: Futures and Options



Note: Annually notional amounts (daily average) in billions of US dollars, from BIS "Exchange-traded derivatives statistics".

Forwards

- A forward contract differs from a spot contract in that the two parties make the contract today, but the settlement date for the delivery of the currencies is in the future, or forward. The time to delivery, or maturity, varies — 30 days, 90 days, six months, a year, or even longer — depending on the contract.
- The difference between the forward rate and the spot rate at any given time is measured by the premium($p > 0$) or discount($p < 0$) rate:

$$F = E(1+p) \Leftrightarrow p = \frac{F}{E} - 1$$

Example of Forwards for Hedging

Suppose you are a manager of a company in Shanghai and want to imports 10,000 computers from USA for \$1000 each and pays 30 days later. Based on the current spot exchange rate of $E = 6.5$, there is a profit of ¥50 per unit. Please answer the following questions:

- If the exchange rate becomes $E = 6$ after 30 days, how will the company's profit change?
- If the exchange rate becomes $E = 7$ after 30 days, how will the company's profit change?
- If you think the exchange rate may equal to $E = 6$ and $E = 7$ with the same chance after 30 days, and the current 30-day forward exchange rate is $E = 6.5$, regardless of the transaction cost, will you do such hedging?

Example of Forwards for Speculation

The market currently prices one-year euro futures at \$1.30 per euro, but you think the euro will strengthen (the dollar will weaken) to \$1.43 per euro in the next 12 months. If you wish to make a bet, you would sign a forwards contract with the bank to sell your €1 million at \$1.43 per euro.

- If you are proved right, you will realize a 10% profit.
- If the spot rate is at or below \$1.30 per euro a year from now, however, your investment in futures will generate a loss.

Swaps

- A swap contract combines a spot sale of foreign currency with a forward repurchase of the same currency. This is a common contract for counterparties dealing in the same currency pair over and over again.
- Combining two transactions reduces transactions costs because the broker’s fees and commissions are lower than on a spot and forward purchased separately.
- Wikiwand: These are not standardized contracts and are not traded through an exchange. A deposit is often required in order to hold the position open until the transaction is completed.

Example of Swaps

- Toyota has just received €1 million from export payments and will pay the same amount for import after three months. Today Toyota can sign a €1 million swap contract with the bank, that is selling €1 million to the bank and using the yen received for investment, and buying €1 million from the bank for import payments after three months.
- Mudula(2015): Soho, Inc., needs to invest 1 million Chilean pesos in its Chilean subsidiary for the production of additional products. It wants the subsidiary to repay the pesos in one year. What should Soho do now?

Futures

- A futures contract is a promise that the two parties holding the contract will deliver currencies to each other at some future date at a prespecified exchange rate, just like a forward contract. Unlike the forward contract, however, futures contracts are standardized, mature at certain regular dates, and can be traded on an organized futures exchange. Hence, the futures contract does not require that the parties involved at the delivery date be the same two parties that originally made the deal.
- Wikiwand: The futures are commonly used by the multinational corporations(MNCS) to hedge their currency positions, or traded by speculators who hope to capitalize on their expectations of exchange rate movements.

Options

- An option contract provides one party, the buyer, with the right to buy (call) or sell (put) a currency in exchange for another at a prespecified exchange rate at a future date. The other party, the seller, must perform the trade if asked to do so by the buyer, but a buyer is under no obligation to trade and, in particular, will not exercise the option if the spot price on the expiration date turns out to be more favorable.
- Wikiwand: The FX options market is the deepest, largest and most liquid market for options of any kind in the world.

Examples of Hedging and Speculation with Options

- Hedging: As chief financial officer of a U.S. firm, you expect to receive payment of €1 million in 90 days for exports to France. The current spot rate is \$1.20 per euro. Your firm will incur losses on the deal if the euro weakens (dollar strengthens) to less than \$1.10 per euro. You advise the firm to buy €1 million in call options on dollars at a rate of \$1.15 per euro, ensuring that the firm's euro receipts will sell for at least this rate. This locks in a minimal profit even if the spot exchange rate falls below \$1.15 per euro.
- Speculation using options: The market currently prices one-year euro futures at \$1.30 per euro, but you think the euro will strengthen (the dollar will weaken) to \$1.43 per euro in the next 12 months. Suppose you will have €1 million by then, could you make profit using options?