1 economics

1.1 foreign exchange market

Money is a tradable good and different currencies can be traded against each other in the foreign exchange market. Market participants such as private persons, corporations, commercial banks and national banks can exchange a certain amount of a currency for another amount of another currency. The price of a currency A in terms of currency B is called the exchange rate of A and B. For example, as of october 28 2012, you get $1.29 in exchange for €1. The exchange rate is determined by supply and demand for a currency. If at some point the demand for more US dollar rises, for example because a international corporation invests in the US and pays workers there a wage in US dollars, the price of the dollar on the currency market will be higher, i.e. you will get fewer US dollars for one euro.

In the currency market, national banks play a special role. In principle, each national bank has an unlimited supply of its own currency, because they can - figuratively speaking - print a discretionary amount of money in their own currency.[1] A national bank can therefore influence the exchange rate of its currency against other currencies. If the national bank of the US, the US Federal Reserve decides to print more US Dollars and uses them to buy euros, the price of the dollar in terms of euro depreciates, i.e. you will get more US dollars for one euro. This process is very common: Some national banks even use their money supply to 'peg' their currency to another, so that exchange rates are fixed. For example, the Swiss National Bank (SNB) offers every vendor of an euro CHF 1.20 in exchange. Since the SNB controls the money supply of Switzerland, it will never run out of CHF and the exchange rate of the Swiss franc and the euro will therefore never be lower than 1.20 until the SNB changes its exchange rate policy. As another example, the national bank of Denmark controls the supply of Danish kronor so that the exchange rate of the kronor and the euro constantly remains at 0.134 (with a small bandwith of +/-2.25%).

Such practices seem to be accepted in public discourse and by the relevant multilateral agency, the International Monetary Fund. Meanwhile, China has been accused by prominent US politicians of 'manipulating' its currency and keeping the Chinese currency, the Renminbi[2] 'undervalued'. The next section will analyze how this alleged manipulation takes place and

[1] The process is somewhat more complicated than printing bank notes, but the effect is the same for the purposes of this section.

[2] abbreviated to CNY. The basic unit of the Renminbi is the Yuan.

what it means for a currency to be undervalued.

1.2 nominal undervaluation, currency manipulation

Macroeconomic theory postulates, that for every two currencies at every moment, there is an equilibrium exchange rate. The equilibrium exchange rate ist determined by supply and demand for each currency in the foreign exchange market. The accusation against China of 'manipulating' its currency can therefore be restated: It claims that China is keeping a fixed exchange rate *below* the equilibrium rate. According to textbook economics this can be done in three ways:[3]

1. The government can shift supply and demand for its currency by intervening on the foreign exchange market. Buying foreign exchange and selling the local currency drives the price of foreign exchange up and that of the local currency down.

2. The government can shift supply and demand by means of monetary policy, namely by keeping interest rates low. Lower interest rates mean lower returns for foreign investors. If foreign investors refrain from investing locally, the demand for the local currency decreases, driving the price of the local currency down.

3. The government can impose foreign exchange controls, forbidding foreigners to buy the local currency, therefore again reducing demand and therefore the price of that currency.

Why would a government do such things? Goods produced in a country with a low exchange rate are cheap relative to goods produced in other countries, since production costs are paid in the (low-valued) local currency. A low exchange rate therefore increases competitiveness of the export sector.

1.3 China criticism

But how do we know a currency is indeed undervalued? The postulated equilibrium interest rate is a virtual value not realized in the foreign exchange market and can not be measured. Indeed there is no reliable method to determine the 'right' exchange rate of a currency.[4]

[3] (**?**, pp. 514)

[4] among others: **?**GoldsteinLardy2008

Critics of China therefore base their case on circumstantial evidence rather than on hard empirical methods. According to their claims, China has been doing exactly what textbook economics tell us a government keeping its currency undervalued would do:[5]

1. The Chinese government has intevened on the foreign currency market on a massive scale: It has been buying foreign currencies, mainly US Dollars (in the form of US government debt) in exchange for RMB to the amount of 10% of its GDP, i.e. 10% of the value of all goods and services produced in China.

2. Interest rates in China are relatively low, with real (i.e. adjusted for inflation) interest rates actually being negative for the most part since 2006.

3. China imposes foreign exchange controls that prevent international investors or other governments to buy RMB.

As a result, critics of Chinas exchange rate regime say, China's export sector has become extremely competitive. Indeed, China's exports exceed its imports by far; in absolute terms, such a current account surplus (i.e. the amount by which the value of exports exceed the value of imports) is unprecedented, though not so much in relative terms.

1.4 nominal vs. real exchange rates

If the Chinese government chooses option (1) above and buys foreign currency paying with RMB, it is increasing the amount of money in the economy.[6] According to standard economic models[7] an increase in the money supply raises the price level in the domestic economy, leading to inflation.[8] As a result, goods produced in China would become more expensive on the world market not due to currency appreciation, but because production costs (e.g. wages of Chinese workers) rise with inflation. According to this model, even though the People's Bank of China (PBC) keeps the *nominal* exchange rate fixed, the *real* exchange rate, i.e. the exchange rate would

[5] (**?**, pp. 40)

[6] In economical jargon it is expanding the *monetary base*, what (other things equal) leads to an increase in money supply

[7] (**?**, pp. ?)

[8] Maybe quickly explain the assumed mechanism?

float.[9] Therefore, inflation would in the long run offset the competitive advantage of Chinese goods on the world market gained by the low(er) nominal value of the RMB.

China has indeed seen some inflation during the last ten years. But so did other countries - the real and the nominal exchange rate roughly moved in unison during the last ten years.[10]Critics of China attribute this to China's *sterilization* of the money inflows. Since 2003, China hast prevented about 40% of the money inflows of entering the monetary base by raising reserve requirements of Chinese commercial banks.[11]Raising reserve requirements limits the amount of loans the commercial banks can issue, therefore 'extracting' money out of the economy. This in turn limits inflation and prevents the real value of the RMB to rise. This is another manifestation of China manipulating the RMB exchange rate: Not only does it keep the nominal exchange rate artificially low, it also intervenes on the real exchange rate, preventing the 'natural' offset on nominal currency manipulation.

1.5 China apology

1.6 newest developments; the situation by now (2012)

[9](**?**, p. 509)
[10]source: http://www.clevelandfed.org/research/trends/2010/1110/01intmar.cfm
[11]IMF, via Cleveland Fed, http://www.clevelandfed.org/research/trends/2010/1110/01intmar.cfm