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1 The debate among economists

1.1 China's exports

Exports of Chinese goods and services to the world market have risen dramatically over the last decade.

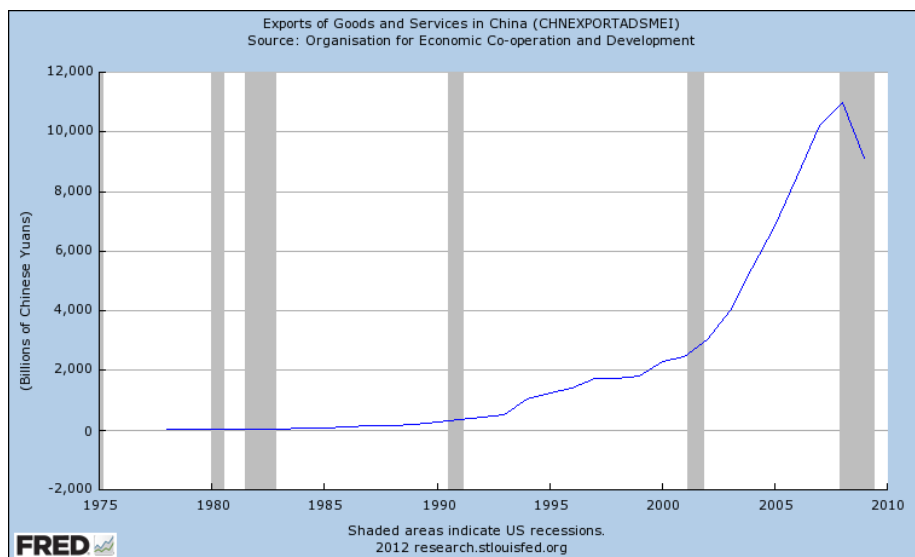
During the same period, imports of foreign goods to China have risen much less. Around the year 2010, China exported much more goods than it imported. In economic terms, China was running a *current account surplus*. In absolute terms, such a current account surplus is unprecedented.

But why are Chinese goods so competitive on the world market? First one might point out the hard work, innovation and creativity of the Chinese working force.¹ Not being convinced by this, economists have brought forward several other, more structural explanations:

One factor is *labor arbitrage*:² Chinese workers are willing to work at lower wages than workers in importing countries. Importantly, accepted wages are not only lower in absolute terms but also in terms of purchasing power: A

¹As (? , p. 18) indirectly does.

²This factor was hinted at by Xu Mingqi of the Institute of World economy of the Shanghai Academy of Social Sciences in a talk to our class on September 4 2012.



typical wage in China allows for a lower standard of living than a typical wage in an industrial country, thereby allowing Chinese firms to produce with much lower (absolute and relative) labor costs.

In addition to cheap labor Chinese producers find other *cheap factors of production*, namely energy and land rents.³ These markets are not liberalized and prices can therefore be strongly influenced by government policy. Since for Chinese officials - as well on the local as on the federal level - GDP growth is a major ambition, energy and land use prices are cheaper on average than in industrial countries and even cheaper than in other emerging economies.

Another factor explaining strong Chinese exports has been introduced in 2005 by Ben Bernanke, shortly before he was named chairman of the US Federal Reserve.⁴ The *saving glut hypothesis*. According to Bernanke a special series of circumstances has led to exceptionally high saving rate, i.e. the percentage of income that is saved. These circumstances include repercussions of the financial crises in emerging economies in the late 90's, but also the unique saving behaviour of Chinese households. Partly due to the lack of social security institutions and to the One-Child-Policy, the saving rate of Chinese households is among the highest in the world - in

³(?, pp. 25).

⁴?

2007 it was 53% as opposed to Switzerland's 17,5%.⁵⁶ These savings drive down interest rates in China and allow the local producers to access very cheap loans, which in turn allows them to expand production.⁷

Besides all these factors, *China's exchange rate policy* is another factor that might possibly explain part of the competitiveness of Chinese goods. In order to illustrate the relevance of the exchange rate of the Chinese Currency, the renminbi (RMB), we introduce a fictional story about two companies in the next section. The story takes place in a hypothesized world where we assume the RMB to be *undervalued*.

1.2 An illustrative story

Based on a very successful prototype, Fluttr, a US mass manufacturer of pop art, has decided to massproduce 250000 miniature christmas trees made in parts with porcelain fixtures and in their search for a supplier they've come across MingFix, a Chinese porcelain producer, who can produce fixtures at a rate much cheaper than american companies producing similar products. A contract is signed and Fluttr owes MingFix the net sum of 23 million RMB. However, Fluttr being an american company will have to exchange their dollars to RMB to fulfil their part of the contract, something they do by selling their dollars to a chinese bank.

Since the RMB is undervaluated in our hypothetic scenario both Fluttr and MingFix benefits from trading in RMB. For Fluttr it's advantageous because a good exchange rate makes the porcelain fixtures cheaper for them to buy, and MingFix benefits because it increases their ability to compete on an international market as long as they aren't reliant on importing products from the US.

The christmas trees were a great succes and Fluttr are looking into out sourcing the production and decides to invest in Chinese factory facilities in partnership with MingFix. To start production they invest 42 mllion RMB in China in the form of wages, land rent, buildings machinery and lawyers typing up contracts. This money is based on Dollars as before, and again the People's bank of China steps in to sell RMB to Fluttr for their Dollars. Both Fluttr and MingFix benefit from a cheap exchange rate once again, since this gives them more value for their money on Chinese soil.

Half a year down the road Fluttr starts to see their market shares in porcelain christmas trees diminishing due to a new Chinese competitor calling

⁵(?, pp. 20).

⁶Swiss Federal Statistics Office, <http://www.bfs.admin.ch/bfs/portal/en/index/themen/00/09/blank/ind42.indicator.4>

⁷This explanation is also favoured by (?, pp. 41).

themselves Flittle and selling similar products much cheaper. While the Dollar RMB exchange rate original benefitted Fluttr, they are now at a disadvantage by having large part of their design and administration working in the US. This makes their profit margins for each product sold much smaller than Flittle who benefits from a cheap exchange rate when they export their goods because the dollars their consumers pay are exchanged to RMB's at a beneficial rate.

Fluttr are forced to lay off a large part of their staff in the US as a response and since none of the executives are willing to relocate to China and start a new life there under better circumstances for their company, they instead spend their evenings writing angry letters to their senators pushing them to put pressure on China to increase the value of the RMB. They might have benefitted from the exchange rate for a while, they readily admit, but there is no way they can compete with an entirely Chinese company and they would much rather give up their collaboration with chinese suppliers than competing against chinese companies.

1.3 Impact of the exchange rate

The above example illustrates that the exchange rate between the RMB and the US Dollar has a very direct impact on american and chinese companies. If the value of the RMB drops by 10%, the porcelain fixtures of Mingfix and the miniature christmas trees of Flittle for a price 10% lower than before on the world market and become much more competitive.⁸ A low-valued RMB might therefore also explain part of the competitiveness of Chinese export goods.

There is yet another function of the currency exchange rate. Let's look at what happens when Fluttr buys goods from MingFix: they buy RMB from a Chinese commercial bank, paying with US Dollars. They do the same again when they invest in China. But they are not the only ones doing so - if Chinese products, for whichever of the above-mentioned possible reasons, are very competitive, *many* US firms will buy RMB, paying with US Dollars. This drives the demand for RMB on the world market of currencies up. Other things equal, according to very basic supply-demand models of economics, this should drive the price of the RMB up. At the same time,

⁸The issue becomes somewhat more complicated when Chinese producers buy components of their products outside of China. The lower value of the RMB makes imports more expensive and offsets part of the price gain. This analysis therefore applies only to products where more than half of the value is added in China, certainly a large part of Chinese exports.

the US Dollars being sold on the market raise the supply of US Dollars and should thereby lower their price. If the currency market was a completely competitive and open market, the exchange rate would always be balanced at a point where demand and supply for RMB are stable - the same for US Dollars. Macroeconomic theory postulates, that for every two currencies at every moment, there is such a balanced exchange rate, called the *equilibrium exchange rate*.⁹ If a currency is below this hypothetical rate, it is undervalued. If it is above it, it is overvalued.

If the market for currencies was completely competitive with firms, banks and private persons being able to buy and produce money at will, all exchange rates would always be at their equilibrium rate. But of course money cannot be produced by anyone. It is National Banks that issue money. They and only they can - figuratively speaking - print a discretionary amount of money in their own currency.¹⁰ Doing this they follow a monetary policy.

1.4 Exchange rate policy

The standard monetary policy of western countries is to define a target for inflation, normally around 2%. The National Banks are mandated to control the supply of money such that this target is met. Currencies of these countries are then traded freely against each other and their exchange rate fluctuates with varying demand.

But nations can also chose to exercise a tighter control of the value of their exchange rate. This 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. As a consequence the euro will 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 bandwidth of $\pm 2.25\%$).

In these cases monetary policy becomes exchange rate policy: It does not focus mainly on inflation or other measures but on the exchange rate.

Since manipulating the exchange rate can be beneficial for a nation's exports and foreign investments, National Banks might feel tempted to promote their

⁹(?, p. ?)

¹⁰The process is somewhat more complicated than printing bank notes, but the effect is the same for the purposes of this section.

country's exports by holding the exchange rate low. However this behaviour forces trading competitors to take similar steps in order to protect their own exports, which easily leads to a situation where countries are competing to devaluating their currencies in order to compete, a policy known as 'beggar thy neighbour'. After such an episode during the Great Depression, such behaviour was internationally recognized as nonbeneficial for all partners involved and international institutions were instantiated to create a set of rules for all countries and observe if National Banks abide by these rules. The most prominent of these today are the IMF (International Monetary Fund), the WTO (World Trade Organization) and the EU (European Union).

1.5 The case against China's exchange rate policy

China has been accused by prominent US politicians of 'manipulating' its currency and keeping the Chinese currency, the Renminbi¹¹ 'undervalued'. This accusation against China can be restated in terms introduced in the previous sections: It claims that China is using monetary policy to keep a fixed exchange rate *below* the equilibrium rate.

1.5.1 Deviation from the equilibrium exchange rate

There exists various different theoretical methods for estimating an equilibrium exchange rate in the literature. However, to understand them it's necessary to introduce the notion net foreign asset (NFA) as well as the concepts of current and foreign account (CA and FA)¹².

The net foreign asset is the value of the assets that a country owns minus the value of assets from that country which is owned abroad. Assets in this sense is usually state bonds but can also be stocks and goods.

The current and financial account are measures for how the NFA changes. The current account constitutes the balance of trade and money transfers while the financial account constitutes the balance of financial assets, that is the debt or amount of money lent to other countries.

The two accounts are related by the current account plus the financial account being equal to zero. This makes sense intuitively since if a nation buys more goods than it can finance with exports it needs to finance this by selling state bonds instead. In this case, the negative trade balance translates to a current account deficit, while the influx of money coming from the sale of state bonds translates to a finance account surplus.

¹¹abbreviated to CNY. The basic unit of the Renminbi is the Yuan.

¹²For a more in depth explanation ?KrugmanTextbook provides a good introduction

When it comes to estimating the equilibrium exchange rate these three measures are heavily used because they give us an idea of how stable an economy is, judging from how assets and goods are flowing in and out of the economy. In particular a report was released in 2008 by the International Monetary Fund outlining three methods that can be used to estimate the disparity between the real and equilibrated exchange rate¹³:

1. The macroeconomic balance approach looks at projections of a country's current account and tries to estimate how much the exchange rate would need to be adjusted for it to stabilize within a certain level
2. The reduced-form equilibrium real exchange rate approach tries to estimate the equilibrium directly as a function of the NFA as well as a number of trade indicators
3. The external sustainability approach tries to find the exchange rate that would stabilize the NFA of a country to within a certain level

In practice these techniques have been used by Cline and Williamson in their yearly policy brief on equilibrium exchange rates¹⁴. Their estimates are based largely on the first and third methods proposed by the IMF, designating debt and trade surplus above 3% of GDP as abnormal and calculating how much the exchange rate would have to change to bring the current account within a normal threshold. In 2009 their results showed that the Chinese RMB was undervalued by 21.4%, a number which has been much quoted since then. Especially in relation to the fact that they found the US dollar 17.4% percent overvalued, further contrasting the value gap between the two currencies.

Instead of trying to find the equilibrium exchange rate, a different approach is to do the exact opposite. If we pick a comparative point in time or statistical measures based on other countries, we can measure how much the current exchange rate deviates from a factor that remains constant.

If we pick the unit price of labour as our constant and 1998 as our point of reference it is straightforward to show that the RMB is 25 percent undervalued when compared to at least the American Dollar¹⁵. Similarly we can focus on the purchasing power parity (PPP)¹⁶. Based on the behaviour of

¹³The Report: ?Lee08

¹⁴??

¹⁵?

¹⁶The PPP is a measure for how the price for similar goods and services in two countries differ

poor countries in growth based on the PPP, it is estimated that the RMB is undervalued between 12% and 47%¹⁷.

1.5.2 Circumstantial evidence

Estimating the equilibrium exchange rate is hard and different methods lead to different results. Critics of China's monetary policy therefore often supplement their model-based estimates with a more theory-based circumstantial case. The structure of this argument is to ask what a National Bank would do according to textbook economics if it were trying to manipulate its currency and then to point out that China is doing exactly (or roughly) this.

So how would a National Bank keep a rate below its equilibrium rate? According to textbook economics this can be done in three ways:¹⁸

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.

According to Goldstein and Lardy¹⁹ this is what the People's Bank of China has been doing for a decade:

1. The Chinese government has intervened 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.

¹⁷?

¹⁸(?, pp. 514)

¹⁹(?, pp. 40)

2. Interest rates in China are relatively low: When the interest rate is adjusted for inflation, the so called *real* interest rate, interest rates have 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.

1.5.3 Sterilisation

But the circumstantial evidence goes further than this. If the Chinese government buys foreign currency paying with RMB, it is increasing the amount of money in the economy.²⁰ Again according to standard economic models²¹ an increase in the money supply raises the price level in the domestic economy, leading to inflation.²² 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 float.²³ 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 it was only moderatly higher than in other countries - the real and the nominal exchange rate roughly moved in unison during the last ten years.²⁴ Critics of China attribute this to China's *sterilization* of the money inflows. Since 2003, China has prevented about 40% of the money inflows of entering the monetary base by raising reserve requirements of Chinese commercial banks.²⁵ 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

²⁰In economical jargon it is expanding the *monetary base*, what (other things equal) leads to an increase in money supply

²¹(?, pp. ?)

²²Maybe quickly explain the assumed mechanism?

²³(?, p. 509)

²⁴source: <http://www.clevelandfed.org/research/trends/2010/1110/01intmar.cfm>

²⁵IMF, via Cleveland Fed, <http://www.clevelandfed.org/research/trends/2010/1110/01intmar.cfm>

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.

1.5.4 In the name of the Chinese people

Critics of China sometimes supplement their case with the assertion, that a higher-valued RMB would actually be in the interest of the Chinese people, if not its export sector.

First, for an ordinary Chinese factory worker, having a cheap RMB might on one hand mean that their factory is doing great on foreign markets, but at the same time buying foreign products like European cars or American gadgets becomes very expensive.

Second, artificially low interest rates, in combination with inflation, deprive Chinese citizens of attractive saving options on their bank accounts. Due to capital controls they cannot place their money in foreign banks where interest rates are higher. In absence of a comprehensive social welfare state, retirement provisions become a major concern for many citizens.

Third, lacking other saving opportunities, many Chinese invest their money in real estate as a saving asset, driving real estate prices up. This not only has macroeconomic risks of overheating in the construction sector, but primarily confronts less affluent citizens with serious difficulties to find habitation in urban areas. Infamously high housing prices, e.g. in Shanghai, have become a major social issue, also reflected in popular culture.

1.6 Replies in favor of China's exchange rate policy

Many economists are more sceptical if the RMB is indeed undervalued. The following section presents a range of economic arguments that have been brought forward against the accusations presented above.

1.6.1 RMB is not part of the story

As pointed out in the first section of this chapter, China's export success can be explained with a variety of factors. Different authors point to different reasons: Huang Yiping focuses on factor cost distortions.²⁶ Charles Wyplosz's and Helmut Reisen's focus is on the high saving rate in China.²⁷

²⁶Huang2010, <http://www.voxeu.org/article/china-us-and-renminbi-rejoinder-krugman>

²⁷(?, pp. 40) and ?Reisen2010

What they have in common is the insistence that there is no need to invoke the alleged RMB undervaluation to explain China's success on the export market.

1.6.2 Symmetry: US is not in equilibrium either

Another rejoinder against China's critics is to point out the symmetry of the world market.²⁸ While China is running a current account surplus, the US in turn runs a current account deficit. According to Wyplosz, this deficit is caused by the low saving rate of US households and the budgeted deficit of the US government. Instead of trying to explain China's export success with the alleged undervaluation of the RMB, one could with equal justification explain the US deficit with the *overvaluation* of the US Dollar.

1.6.3 Difficulties in estimating the equilibrium exchange rate

The equilibrium exchange rate is an elusive concept.²⁹ Different methods of measuring result in different estimates of the RMB's deviation.

1.6.4 Legitimate purposes of China's exchange rate policy

Yet each of these practices have legitimate purposes making it difficult to argue that the mere use of these techniques necessarily indicates a manipulative monetary policy. For example Switzerland has since the onset of the great recession applied the first technique to 'peg' the Swiss franc to the euro. In essence the Swiss National Bank (SNB) offers every vendor CHF 1.20 in exchange for an euro. Since the SNB controls the money supply of Switzerland, it will never run out of CHF and the exchange rate of the Swiss franc. As a consequence the euro will 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 kroner so that the exchange rate of the kroner and the euro constantly remains at 0.134 (with a small bandwidth of +/-2.25%). Neither of these techniques have provoked action from any of the international bodies governing currency manipulation.

1.6.5 it is over

1.7 Wrap up: Up to 15% or more

²⁸(?, pp. 39-40).

²⁹(?, p. 16).