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Venice

John Ryan

Reforming China's  
Exchange Rate Policy



## Reforming China's Exchange Rate Policy

**John Ryan**

*European Business School London*

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### **Abstract**

This paper is aimed at analysing the decision of the Chinese central bank to reform the exchange rate of the national currency and to gauge the effects of this change in regime on the Chinese economy and the world currency markets. Although many nations have been largely disappointed by the relatively small revaluation of 2%, it will be argued that moving away from the dollar-peg is a step in the right direction in moving to a floating exchange rate, and the reform should be expected to occur in two-stages over a longer time frame. The paper focuses on those studies attempting to estimate the under-valuation of the Renminbi and the effects of the change in policy. To enable the reader to understand the degree of misalignment of the Renminbi this paper will examine various factors that determine whether the currency is undervalued. This will then allow the review of the policy options available to the central bank for facilitating an appreciation and the potential effects of a regime change will be reported. The expected outcomes on the currencies, US treasuries and trade deficit will also be analysed and the study will find that, post-revaluation, the dollar depreciates, the Yen moves in line with the Renminbi and the Euro strengthens, as was expected. The implications for the U.S. treasury market, after a move to a currency basket, is that China will reduce their dollar holdings by selling treasuries, however the region will still remain a net-buyer.

### **Keywords**

Renminbi, China, United States, Dollar, Euro and Yen

### **JEL Codes**

D53,E41, E42,E44, F31

Address for correspondence  
John Ryan  
European Business School  
Regent's College  
Inner Circle, Regents Park  
London NW1 4NS  
Phone (+44) 795 176 5549  
Fax: (+44)207 487 7465  
e-mail: ryanj@regents.ac.uk

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Department of Economics  
Ca' Foscari University of Venice  
Cannaregio 873, Fondamenta San Giobbe  
30121 Venice Italy  
Fax: ++39 041 2349210

# Reforming China's Exchange Rate Policy

## **1. Introduction**

In July 2005, the People's Bank of China (PBoC) announced that, with the authorisation of the State Council, China would be reforming the Renminbi exchange rate regime by moving to a managed float based on market demand and supply with reference to a basket of currencies, effectively signalling the end of the decade old peg to the US dollar. On the 21<sup>st</sup> July 2005, the Renminbi was re-valued by 2.1% against the US dollar and the move was made to an official currency basket, which had not been determined at the time. It is widely believed that the basket includes currencies such as the Euro, Yen, and the US dollar, slowly shifting away from the dollar assets, a growing trend among central banks around the world, already seen in Russia. Other countries such as India and South Africa have also been reducing their dollar securities, with Malaysia recently announcing that they will also move to a system that facilitates a basket of several currencies.

In light of the recent revaluation of the Chinese currency, the paper will begin with a brief overview of the history of China's exchange rate policies. The aim of this paper is to determine whether a reformed exchange rate policy would be in the best interests of China and to gauge the implications of a change in policy on some of the major currencies, namely the Dollar, Yen and Euro. The study will also look into the implications on the U.S. trade deficit and treasury market. There have been extensive sources for literature on China's exchange rate regime. It is not the aim in this paper to generate, through econometric modelling, a numerical value for the extent of the misalignment as has been attempted by many authors on the subject. However it is important to have an understanding as to the extent of the misalignment of the Renminbi both in terms of the real effective exchange rate and in terms of the bilateral rate against the U.S. dollar (USD). This will be assessed by analysing some of the fundamental factors that indicate disequilibrium in the exchange rates and an average range will be produced using a mean average of the estimates reported by various selected authors on the topic. This will then naturally lead to the discussion of the possible policies that the central bank can utilise to facilitate the required appreciation. The expected effects as a result of an appreciation, on both the Chinese economy and other currencies will be assessed (section 3) and compared in section 4 with the actual implications of the revaluation. From these results it will be possible to conclude whether the central bank have adopted a correct policy and determine future exchange rate adjustments.

## **2. History of the Exchange Rate**

Between the period of 1949 and 1972, China had established an official exchange rate with a single peg calculated using the relative price level of the currency, foreign

currencies and the cost of exporting. Since there was only limited activity in the exporting sector in China at the time, this exchange rate system seemed to remain relatively stable. During 1973 to 1985 after the collapse of the Bretton-Woods System, it was becoming evermore difficult to maintain a single currency peg. The People's Bank of China (PBoC) was therefore forced into pegging the Renminbi to a basket of currencies. This system seemed to work well allowing China to move to a more market-orientated economy in 1986, allowing the market to determine the exchange rate level to a certain extent. There was still however strict controls on capital flows and swap centres were created to allow Chinese and foreign companies to engage in foreign exchange transactions. By 1994 the Renminbi was fixed at 8.7 to the USD and the rate was allowed to fluctuate only within a 0.3% band, managed by the central bank. This fixed exchange rate regime reaped benefits to the Chinese economy, between 1994 and 2003 China's trade value had grown almost 4 fold to \$850 billion. This was further helped by their accession to the WTO in late 2001.

In 1997, in wake of the Asian financial crisis, China safeguarded themselves by pegging the Renminbi against the US dollar thus allowing the dollar to take the force of the foreign exchange fluctuations. This was coupled by the action of the central bank to narrow the exchange rate band thus not allowing the further depreciation of the currency. This is actually what had happened in the Asian, Russian and South American crises, whereby the currencies had depreciated and the exchange rate band had not been tightened, resulting in dollar-denominated loans becoming un-serviceable, ultimately leading to the collapse of the financial systems.

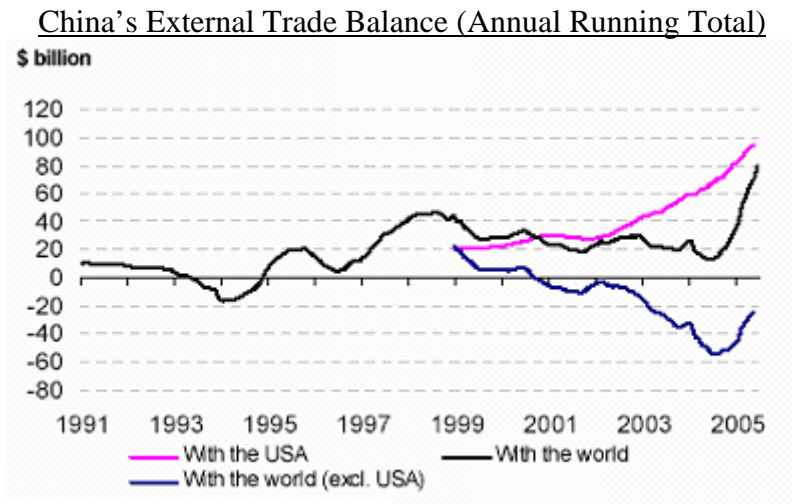
Rogoff et al (2003), findings are that while developing countries may find it beneficial to peg their currencies as did China to the US dollar, emerging market countries tend to benefit from more flexible exchange rate, and floating the exchange rate could prove to be a better option since they have greater access to international capital markets. However China would first have to free up its capital markets before a move to a full free float can be considered. Over the years China has made this transition from a developing country to that of an emerging market country, due to an over-heated economy with excessive GDP growth of around 9-12%, with China accounting for 25% of global growth over the past five years, and a high rate of investment growth and inflation on the up. Bank loans account for a high percentage of GDP, with non-performing loans (NPLs) on the increase, all these factors are reminiscent of the 1997 financial crises. The diagram below indicates the size of the Chinese economy in terms of its dominance in the global market for goods.

### Trade in Goods and Services as % of GDP, 2005



(Source: www.economist.com)

Over recent years there has been much criticism of the exchange rate and currency regime of China, and there has been heavy pressure for them to revalue the currency. The U.S. is the main proponent to this revaluation since they are operating with a very large bilateral trade deficit with China. Every year, since the Asian financial crises, China has run a surplus on its capital account and since trade with China accounts for around 25% of the total U.S. trade deficit, the peg of the Renminbi to the U.S. dollar has been viewed as the problem in correcting the U.S. trade deficit, since no exchange rate adjustments can be made in increasing U.S. competitiveness with respect to the Chinese. The figure below shows how China's budget surplus has been steadily increasing during the period of 1991-2005, due to an undervalued currency.



(Source: Treasury Report (NZ): The Renminbi: The Possibility of Change, and its Likely Effects, 2005)

The pressure for a revaluation and overhaul of the exchange rate policies has also been put forward by Europe and Japan, the two other large trading partners with China. These two regions have recently been experiencing below average economic growth, in the case of Japan a recession, and these factors have only added further pressure for a revaluation of the Renminbi.

The point being made here is that there needs to be more flexibility in the Renminbi exchange rate since any financial crisis in China would have extremely harmful

repercussions around the world. The Chinese authorities must therefore be careful in their reformation process, and should attempt to achieve a relatively soft landing in moving towards a market based system.

### **3. Reviewing the Literature**

China's exchange rate regime, which has been pegged to the U.S. dollar for a decade, has come under major international scrutiny over recent years, with an ever growing amount of literature into this subject area. Many authors have identified that the Renminbi is currently undervalued, which has arisen mainly due to the dollar depreciation seen in 2003/2004, and have attempted to calculate the extent of the exchange rate misalignment. There are a number of approaches available for estimating equilibrium exchange rates which have been utilised in these research papers, generally tending to produce a wide range of results. The aim of this literature review is to critically assess some of the techniques and their corresponding results and to illustrate why authors produce varying results when trying to estimate the degree of the under-valuation. This will lead to a further review of literature on the choice of exchange rate regimes and their possible effects on China and the U.S.

A common approach of estimating exchange rate misalignments, as used by the IMF, is the underlying balance approach. This method states that the exchange rate is in equilibrium when the country's balance of payments is also in equilibrium. Goldstein (2004) uses this method to show that the Renminbi is undervalued in the region of 15-30%. This estimate is derived using the average of China's capital account surplus from the period 1999-2002, to calculate the normal net capital flows. The 2003 data is not used in this approach since the capital account surplus was much larger in that year. This has the effect of reducing the estimate of the under-valuation, and is the reason why the estimate has been recorded as a range. Another potential problem with this estimate is in determining the underlying current account surplus. This is almost certainly higher than the actual recorded figure for 2003 due to the overheating state of the economy and the positive effects on the trade balance due to the dollar depreciation in 2002 which only occur after a lag. This essentially results in a further inaccuracy in the estimate since the author is reduced to producing a conservative estimate for the 2003 current account surplus. A similar analysis is undertaken by Anderson (2004) which ultimately concludes that a 25% revaluation is needed to return to equilibrium in the real effective rate. The approach is similar to that of Goldstein and Lardy only the paper by Anderson takes into account the foreign direct investment (FDI) movements as a proxy for normal capital flows.

These measures have focused primarily from China's balance of payments position, however it is also possible to produce an estimate of the misalignment by analysing the bilateral trade deficit with the U.S. Goldstein (2004) uses this approach and establishes that in response to the dollar fall in 2002 of around 15%, countries should share the problem of the U.S. current account deficit and appreciate their currencies by 10-15%. The problem in doing so, as acknowledged by the author, is that it does not take into account the position of countries already in deficit. Also it is not a politically simple task to persuade countries to allow an appreciation of their currencies. A better option would be to establish an agreement with surplus countries that they should invoke measures such that these surpluses are reduced to zero. Williamson (2003a) adopts a similar line of reasoning however he proposes that

deficit countries should also work towards pre-set targets set by the IMF, in collaboration with countries reducing their bilateral surpluses to zero. This suggestion should have the effect of reducing the U.S. current account deficit without also reducing global demand, which could be disastrous for export-dependent countries such as China. Using this approach the Renminbi appears to be undervalued in the region of 15-25%, although the working assumption is that there is no change in China's capital outflow restrictions, and China continues to run surpluses in both capital and current accounts, could produce another value for the under-valuation.

These methods of evaluating the degree of exchange rate misalignment stem from approaches based on the fundamental equilibrium exchange rate (FEER), as proposed by Williamson (1985). Coudert and Couharde (2005) use the FEER approach and also address the issue of the "Balassa" effect using a behavioural equilibrium exchange rate approach (BEER) to obtain estimations of the misalignment. They show that China does not follow the rule of the Balassa effect which predicts that the real exchange rate should appreciate for emerging countries. They use a regression of 21 emerging countries ultimately concluding that using a BEER approach the yuan was undervalued by approximately 18% in 2002, on a bilateral basis with the USD. A similar study undertaken by Benassy-Quere (2004) indicates an undervaluation of the Renminbi at around 44%. These two approaches yield different results since the latter study uses a panel of G20 countries in their regressions, whereas Coudert and Couharde use emerging countries and do not include net foreign assets as a variable. Funke and Rahn (2005) also use a BEER model; however, they find in the study that there is no significant undervaluation, similar to the findings of Wang (2004). Both of these studies produce results with regressions made on a smaller sample size than that used by other authors, and given that there has been no appreciation of the real exchange rate in China, there is essentially bound to be a zero misalignment in these studies.

The fundamental approach however tends to indicate that the Renminbi is undervalued by a large figure. This is a common feature in many research papers, Coudert and Couharde find that in 2000 the China's current account was higher than normal and given that this is one parameter in the model, then the undervaluation using this method will tend to be overstated. This approach again yields different results in different papers since the authors differ on their views as to the size of China's projected current account targets. Some authors have used the figure of -1.5% of GDP for the current account target, emanating from the work of Jeong and Mazier (2002, 2003) which find that the Renminbi was undervalued by 33% when analysing the real effective exchange rate, and by 60 % against the USD for the year 2000. Comparing this to the result obtained by Coudert and Couharde for the 2003 period, they find that the real effective exchange rate is undervalued by 23% and against the USD the yuan is undervalued by 44%. This is close to the estimate by Goldstein using a simpler version of this approach with a current account surplus of 1%, which produced a range for the misalignment at 15-30%. Coudert and Couharde cross-check their estimate with another estimate produced by changing the current account target from -1.5% to -2.8% of GDP (suggested by Williamson and Mahar, 1998). This implies that in 2003 the real effective exchange rate was undervalued by 30% and 54% against the USD.

A number of authors also use standard models, namely PPP (purchasing power parity) models, to evaluate and cross-check the degree of misalignment. Frankel reports the degree of misalignment using a modified PPP model, indicating that the yuan was undervalued by 45% in logarithmic terms, and by 36% in absolute terms in 2000. This figure has however increased since that time according to Frankel due to the Balassa-Samuelson effect. This however is contradictory to the findings of Wang who finds that China does not follow the Balassa equation. Frankel then predicts that by 2010, the yuan should undergo an expected appreciation of 22.4%, derived from the Balassa-Samuelson calculation which suggests a real appreciation of 4% per annum.

The problem with the PPP method is that it can only be used as a quick calculated check against other approaches, since it does not calculate the real effective equilibrium exchange rate; rather it tends to focus on the momentary market equilibrium. It is even more difficult to use this tool for industrial countries due to distortions in the PPP when comparing a basket of goods, as shown by Bradford and Lawrence (2004). They show that there are large variances from the law of one price when attempting to calculate absolute PPP for a country such as China, and in calculating relative PPP it is difficult to select a base period for comparison.

It can be seen that there has been extensive research into determining the size of the misalignment of the Renminbi, which have generally produced varying results. The next stage is to now review some of the literature on policy options and the corresponding potential effects that a sizeable appreciation may induce on China and her direct trading partners. Scholars and market analysts have attempted to provide the rationale for choosing an exchange rate regime showing the positive and negative effects of this on China. Other papers have also looked into the revaluation implications for other currencies and treasuries which will be analysed in greater detail as part of the research.

Frankel (2004) first assesses the advantages and disadvantages of fixed and flexible exchange rates, and emphasizes the role of China's current macroeconomic situation in determining the choice of policy. This paper identifies the possible reasons as to why China should change their policies citing such objectives as external and internal trade equilibrium and the overall balance of payments objective. The need to avoid a currency crisis as seen in the 1990's is also accounted for, a common feature in research papers. Like many authors, he also argues that there is a need for flexibility in the exchange rate and, similar to Goldstein and Lardy, concludes that there ought to be an initial appreciation followed by a move to a currency basket. This follows from the two-stage approach as suggested by Goldstein for reforming the exchange rate mechanism, Funke and Rahn are also advocates of this reform, suggesting an immediate revaluation of 8-12%, even though they conclude that the Renminbi is not significantly undervalued.

Goldstein (2004) assesses the impact of a 15-25% revaluation with a move to a currency basket and later move to a managed float. The paper argues that the need for banking reform, price stability, sustained economic growth and export growth should be the main reasons for a revaluation, and that external and political pressures should come second after China has achieved their own objectives. Goldstein suggests that



the two-stage approach is the best way of achieving equilibrium. The paper does however take the view of mainly the Chinese and does not account for the effect this choice of currency regime has on other currencies and the dollar deposits. These factors will be addressed during the paper. The case for a basket, band and crawl (BBC) was put forward by Williamson (2001) and from this work it becomes apparent that the Chinese authorities should adopt a currency basket and remove the dollar peg, a view shared by most authors and by Jeong and Mazier (2002), whom establish that a currency basket would remove the volatility seen in China's effective exchange rate. This assertion is derived from their calculations which show the real effective rate to be more stable than the bilateral rate. Funke and Rahn suggest that the exchange rate should not determine the competitiveness in an economy with a flexible labour market and factor mobility. However, it will be argued that the dollar peg essentially reduces the price of Chinese exports to the U.S. thereby the exchange rate should also affect competitiveness.

A number of analysts have also commented on the Renminbi under-valuation attempting to identify possible policy options and their effects on China's economy as well as its effect on the U.S. trade deficit. Andy Xie at Morgan Stanley (Jan 2005) suggests that the PBoC have four policy options or 2005, namely, maintaining the current regime, raising interest rates, revalue in line with market expectations (15-25%) or allowing a gradual appreciation of the yuan. This report finds that raising the interest rates and maintaining a stable exchange rate are vital for China and the international economy for achieving a "soft landing". Although a rise in interest rates would have the effect of slowly deflating China's property bubble, reduce fixed investment and speculation on the Renminbi, the problem with this policy is that it does not allow any initial appreciation of the yuan, which could lead to further possible quotas and restrictions on China's exports imposed by the EU and U.S. Xie also concludes that with this policy the yuan would be able to float freely but only after the hike in rates. The potential problem with this method would be of premature liberalisation of the capital markets, as emphasized by Williamson, Goldstein to name a few, and will be analysed during the course of the paper. With this system there will also be no change in the global payments imbalances problem, although many authors argue that a substantial revaluation of the yuan is required to reduce the U.S. deficit. This is shown in a report by Yanick Desnoyers (NBF, 2004Q3), who creates a model using values for an appreciation of 10% and 20% to gauge the effects on the bilateral trade deficit. The report concludes that an initial Renminbi appreciation would do little or nothing to reduce the deficit, arguing that a large revaluation of 20% is needed. This is an unlikely scenario given that Frankel had calculated a 22.4% appreciation by the year 2010.

This review has focused on the literature reporting the extent of exchange rate misalignment. This then leads to the question as to how the central bank should facilitate an appreciation and what would be the best scenario primarily from a Chinese viewpoint and secondly from the point of view of the rest of the world. From the literature many authors have advocated for a move to a currency basket and a widening of the trading band coupled with an initial appreciation. The long-term strategy for the PBoC (People's Bank of China) should be to float the Chinese currency, hence giving more control of monetary policy to the Chinese authorities rather than to the Fed, which is the case with the existing dollar peg. The actual impact of the revaluation can only be assessed with time and future directions for

research into this topic should be aimed at gauging the effects of the revaluation and in determining that monetary policy and exchange rate regime which best suits the needs of China and the international economy in general.

#### **4. Detecting an Undervalued Exchange Rate**

The review of the literature illustrates the wide range of estimates that are obtained in assessing the yuan misalignment. This is the reason why in this section some of the underlying factors that indicate exchange rate disequilibrium will be assessed in determining whether the Renminbi is undervalued. The extent of the undervaluation will also be analysed, however the aim here is not to generate, through econometric modelling, a numerical value of the appreciation required to return to what is known as the “fundamental equilibrium” level of exchange rate. Instead I will derive a set of values from the findings of authors, shown in the literature review, and produce an average range that reflects the degree of misalignment.

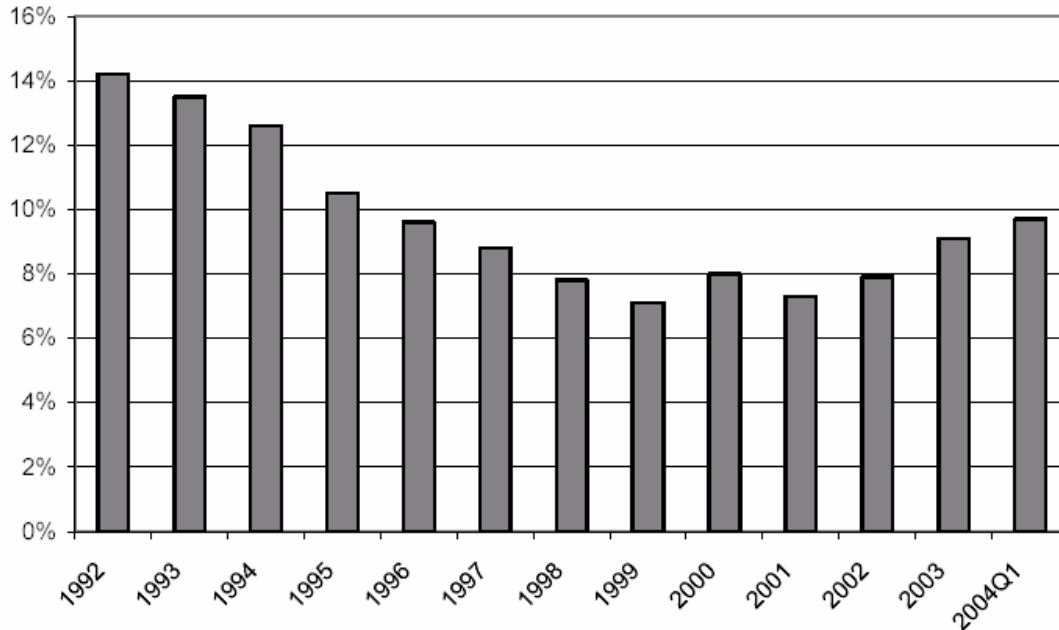
There are a number of different factors that point to the conclusion that China’s real exchange rate is undervalued. A primary indicator is the current account surplus, which has reached extremely high levels, peaking at USD 55 billion in Q3 2003, although by 2004 this figure had fallen dramatically to around the USD 20 billion mark. The fall in the current account and corresponding fall in GDP can be attributed to the SARS out-break, nevertheless, the economy is experiencing unprecedented levels of growth, and was around the 9.1% level during 2004. The graphs below confirm these figures. The surplus in the current account could be interpreted in two different ways. From China’s viewpoint the surplus has arisen due to her competitive advantage in the export sector, which in turn has stemmed from an undervalued currency. Another interpretation of the surplus is that it could be attributed to the high savings rate in China.

Current Account in billions of USD (annualised quarterly data)



(Source: Real Equilibrium Exchange Rate in China: Is the Renminbi Undervalued? Virginie Coudert and Cécile Couharde, 2005)

China's GDP Growth 1992-2004Q1 (annual % change)

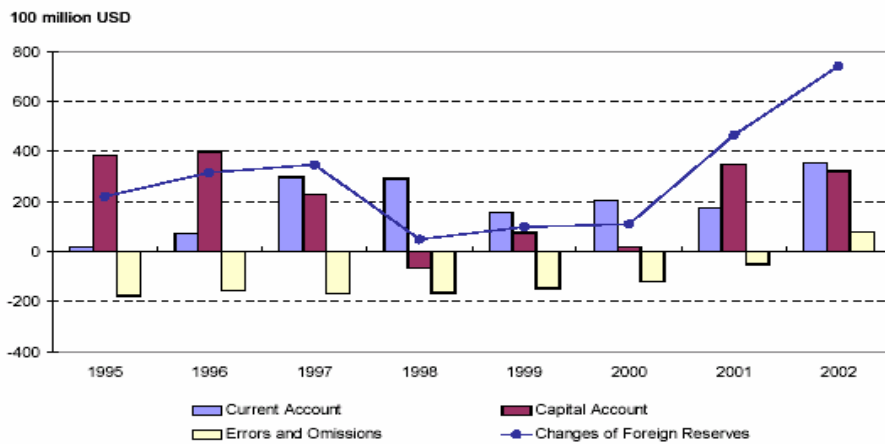


(Source: Goldstein, "Adjusting China's Exchange rate policies, 2004, p.7)

From IMF figures, the gross national savings rate was 47.6% of GDP in the year 2003, with an investment ratio of around 32-42% of GDP. This high level of savings is largely due to the household sector, since a tradition in China is for the male children to provide for their parents after their retirement. This will automatically result in families saving for the future resulting in a high national savings rate, which has only spiralled further upwards due to a policy of one child only. This has meant that families have begun to save more at an earlier stage. This high level of national savings has induced the surplus seen in the current account.

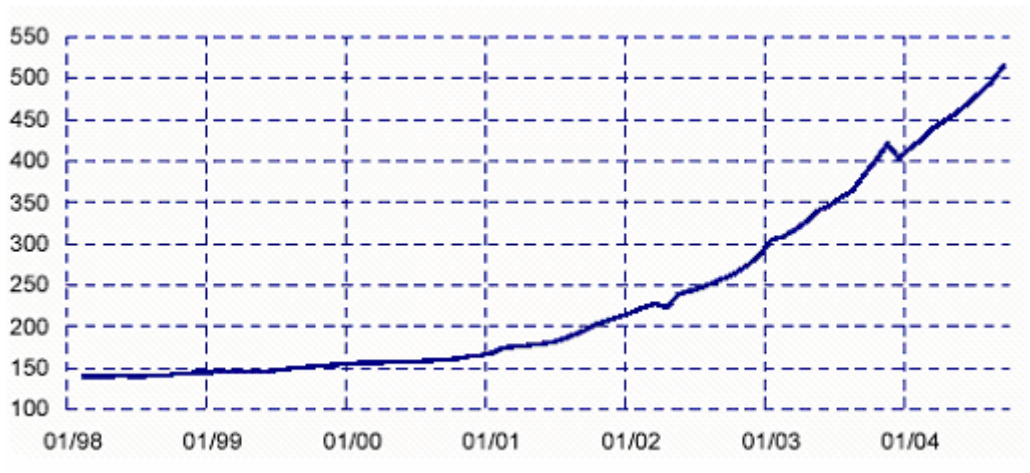
Another indication of an undervalued exchange rate is the substantial size of China's foreign exchange reserves, which again stems from the balance of payments surplus, the surpluses being in the capital and current accounts. This reserve accumulation is also due to the PBoC's intervention actions in the money market, which have artificially kept the yuan from appreciating against the dollar. The capital account was subject to increased foreign direct investment (FDI) which, by 2003, totalled USD 27 billion according to figures published by the BIS. By 2004Q3 total foreign exchange reserves had reached the USD 514 billion level. The graphs below explains the changes in the balance of payments and foreign reserves position of China during the period of 1995-2002, and the total foreign exchange reserves for China during the period of 1998-2004. Both of these diagrams illustrate the need for an appreciation since China's interventions and BOP surpluses can be seen as distorting the equilibrium exchange rate.

### Change in China's BOP and Foreign Reserves



(Source: Challenges to China's Monetary Policy, BIS working paper no. 23)

### Foreign Exchange Reserves (USD billions)

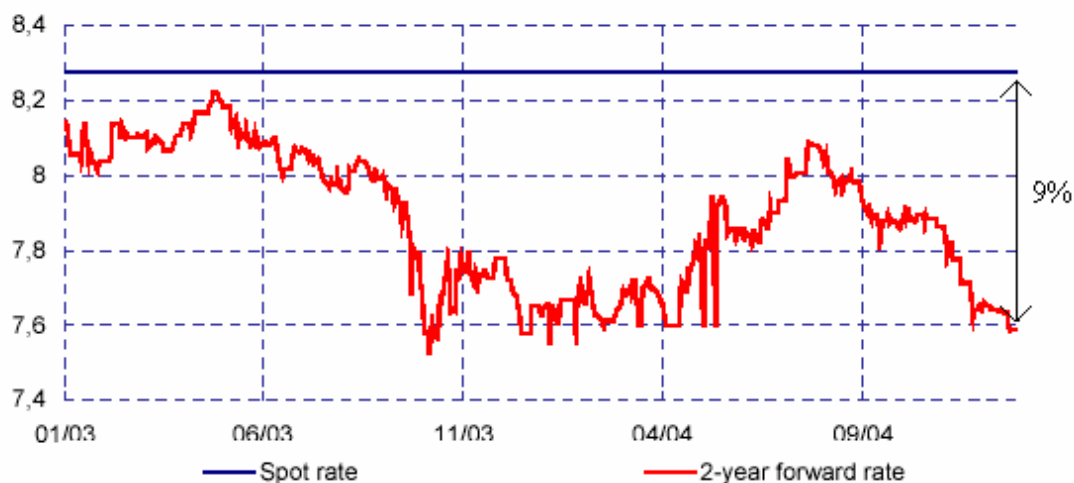


(Source: Real Equilibrium Exchange Rate in China: Is the Renminbi Undervalued? Virginie Coudert and Cécile Couharde, 2005)

Through studying forward contracts there should also be a clear indication of how much the market is expecting the Renminbi to appreciate, hence this is another indication as to whether or not a currency is undervalued. The graph below is taken from the paper written by Coudert and Couharde (2005). It shows the yuan/USD spot rate and 2-year forward rates from the period 01/2003- 12/2004. As can be seen at the end of 2004, the market was pricing in a 9% revaluation. Although this method of detecting an undervalued exchange rate tends to hold for most currencies and results are quick and easy to interpret, the precise amount of the disequilibrium cannot be

determined, due to the fact that this estimate is based primarily on market expectations.

### Renminbi/USD spot and forward exchange rates



(Source: Virginie Coudert and Cécile Couharde, 2005)

Further evidence that the Renminbi is undervalued emanates from the analysis of the real trade-weighted exchange rate. The real effective exchange rate needs to be analysed, as opposed to the nominal exchange rate, in trying to determine the extent to which the Renminbi is undervalued. This is due to the fact that the nominal rate only indicates the market equilibrium at that particular point in time, whilst the analysis of the trade-weighted exchange rate will indicate the fundamental equilibrium rate. This fundamental equilibrium in the exchange rate is achieved when the basic objectives of macro policy can co-exist, namely the internal and external balance, as outlined in the IMF's original Articles. This document identifies that the internal balance is essentially that monetary or macro-economic policy which allows the economy to operate at non-inflationary full employment and the external balance as that policy which results in a sustainable balance of payments position. The concept of the fundamental equilibrium exchange rate is that if the economy is experiencing inflationary pressures coupled with an undesirable trade surplus, then the real exchange rate is likely to be undervalued, the opposite being true. Using this analysis, it can be seen, with respect to China's position, that the Renminbi must be undervalued. The Chinese economy is currently over-heated operating above full employment with high inflation and with a swelling current account surplus leading to an undesirable balance of payments position, thereby, the need for an appreciation is clear from this view point.

One basic and relatively light-hearted method of gauging whether currencies are under/overvalued is to analyse the "Big Mac" index, which is published on a regular basis by the Economist. This index is basically a measure of purchasing power parity

(PPP) and is that exchange rate that would equate the price of a Big Mac burger in America to that in another country, in this case China. As can be seen from the latest Big Mac index published on 9<sup>th</sup> June 2005, the Renminbi remained undervalued against the US dollar in the order of 59% (this estimate is close to that reported by Jeong and Mazier using a FEER approach, which find that the yuan was undervalued by 60% against the greenback in 2003). Although the use of a PPP model is regarded by some authors as an inaccurate way of measuring effective equilibrium rates, this model could be used to test results from other approaches. The problem with this measure now is that it will obviously be distorted due to the use of only one good, thereby not giving an accurate figure for the PPP. A more accurate use of the PPP measure would be to use a basket of goods as opposed to a single burger in the Big Mac Index.

### Big Mac Index 2005

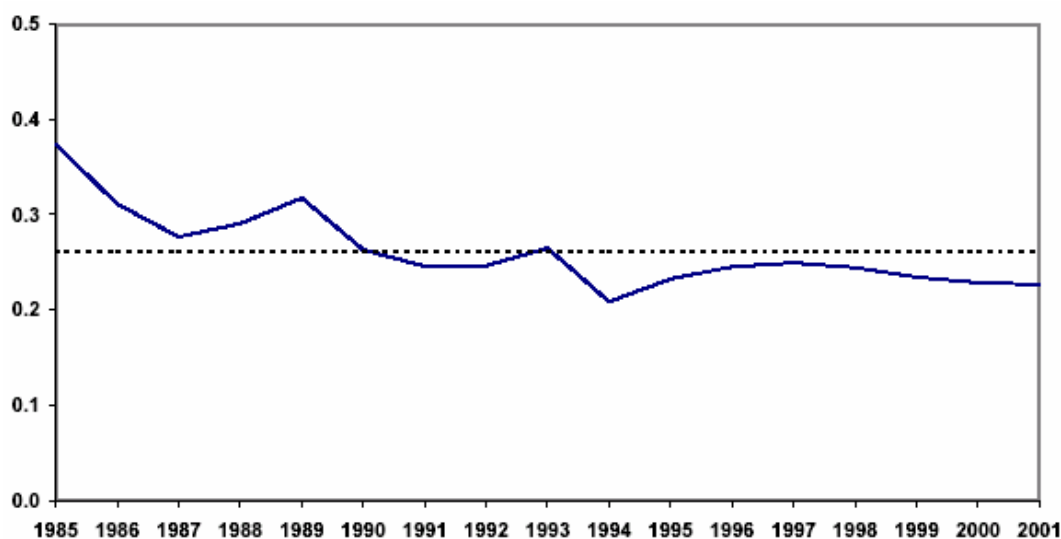
The hamburger standard			
	Big Mac price in dollars*	Implied PPP <sup>†</sup> of the dollar	Under (-)/over (+) valuation against the dollar, %
United States <sup>‡</sup>	3.06	—	—
Argentina	1.64	1.55	-46
Australia	2.50	1.06	-18
Brazil	2.39	1.93	-22
Britain	3.44	1.63 <sup>§</sup>	+12
Canada	2.63	1.07	-14
Chile	2.53	490	-17
China	1.27	3.43	-59
Czech Republic	2.30	18.4	-25
Denmark	4.58	9.07	+50
Egypt	1.55	2.94	-49
Euro area	3.58**	1.05 <sup>††</sup>	+17
Hong Kong	1.54	3.92	-50
Hungary	2.60	173	-15
Indonesia	1.53	4,771	-50
Japan	2.34	81.7	-23
Malaysia	1.38	1.72	-55
Mexico	2.58	9.15	-16
New Zealand	3.17	1.45	+4
Peru	2.76	2.94	-10
Philippines	1.47	26.1	-52
Poland	1.96	2.12	-36
Russia	1.48	13.7	-52
Singapore	2.17	1.18	-29
South Africa	2.10	4.56	-31
South Korea	2.49	817	-19
Sweden	4.17	10.1	+36
Switzerland	5.05	2.06	+65
Taiwan	2.41	24.5	-21
Thailand	1.48	19.6	-52
Turkey	2.92	1.31	-5
Venezuela	2.13	1,830	-30
Aruba	2.77	1.62	-10
Bulgaria	1.88	0.98	-39
Colombia	2.79	2124	-9
Costa Rica	2.38	369	-22
Croatia	2.50	4.87	-18
Dominican Rep	2.12	19.6	-31
Estonia	2.31	9.64	-24
Fiji	2.50	1.39	-18
Georgia	2.00	1.19	-34
Guatemala	2.20	5.47	-28
Honduras	1.91	11.7	-38
Iceland	6.67	143	+118
Jamaica	2.70	53.9	-12
Jordan	3.66	0.85	+19
Latvia	1.92	0.36	-37
Lebanon	2.85	1405	-7
Lithuania	2.31	2.12	-24
Macau	1.40	3.66	-54
Macedonia	1.90	31.0	-38
Moldova	1.84	7.52	-40
Morocco	2.73	8.02	-11
Nicaragua	2.11	11.3	-31
Norway	6.06	12.7	+98
Pakistan	2.18	42.5	-29
Paraguay	1.44	2941	-53
Qatar	0.68	0.81	-78
Saudi Arabia	2.40	2.94	-22
Serbia & Montenegro	2.08	45.8	-32
Slovakia	2.09	21.6	-32
Slovenia	2.56	163	-16
Sri Lanka	1.75	57.2	-43
Ukraine	1.43	2.37	-53
UAE	2.45	2.94	-20
Uruguay	1.82	14.4	-40

\*At current exchange rates †Purchasing-power parity  
<sup>‡</sup>Average of New York, Chicago, San Francisco and Atlanta  
<sup>§</sup>Dollars per pound \*\*Weighted average of member countries  
Sources: McDonald's; *The Economist* ††Dollars per euro

(Source:www.economist.com)

The following analysis is adopted from a study undertaken by Funke and Rahn (2004), “By how much is the Chinese Renminbi Undervalued”. This approach uses PPP data from the International Comparison Program and shows the PPP conversion factor divided by the nominal exchange rate making it possible to compare the cost of a basket of goods that make up GDP across countries. If this ratio is below one, then the exchange rate is undervalued and vice-verse. When the ratio equals one then, according to purchasing power parity, the currency is at the correct value. This can be seen in the graph below, and from the 2001 data entry it can be seen that the Renminbi was at 0.23 implying that the currency was over 4 times (400%) undervalued. This result seems extreme to say the least, however it again serves as another useful indication that the currency is not at its proper level.

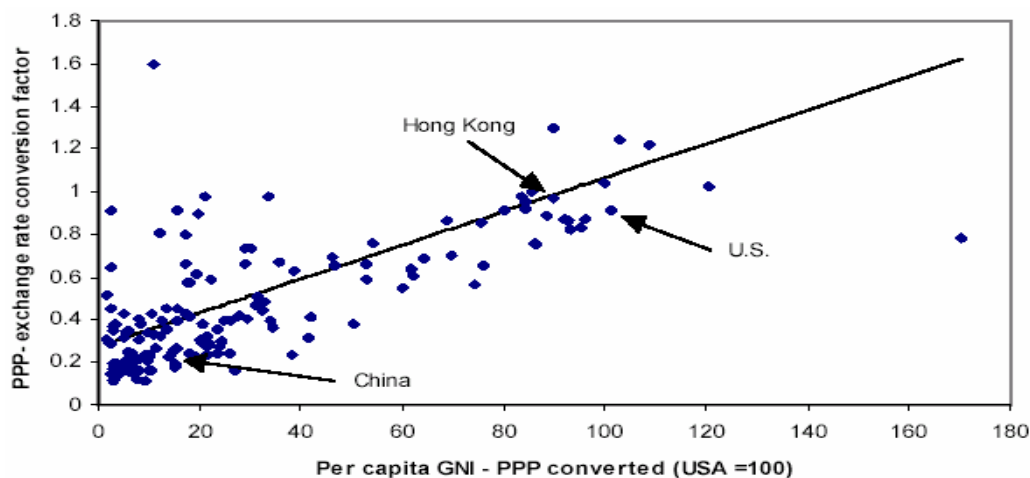
Renminbi PPP Conversion Factor to Nominal Exchange Rate Ratio, 1985-2001



(Source: Funke and Rahn (2004), “By how much is the Chinese Renminbi Undervalued”.)

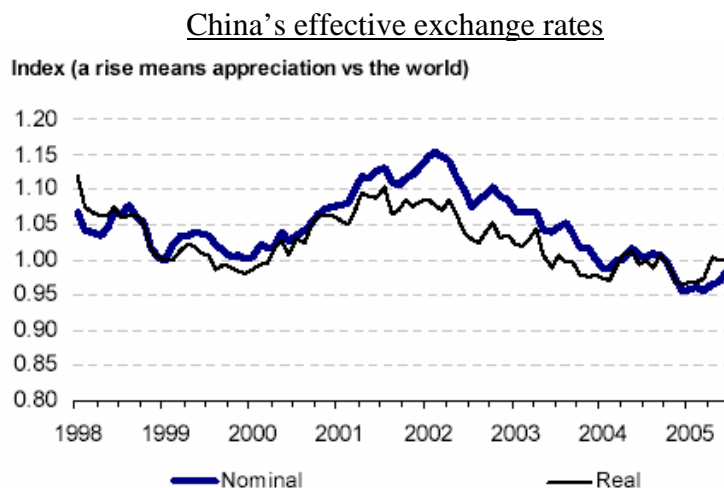
The figure below shows a scatter-plot diagram of 135 nations, the y-axis showing the PPP conversion factor/exchange rate and the x-axis showing the PPP converted per capita GNI (Gross National Income). This diagram clearly shows that in developing countries where income per capita is relatively low, the currency generally tends to be undervalued. Taking this matter into account, the degree of undervaluation declines since the ratio does not need to rise to one to achieve PPP. Therefore when analysing the diagram above, the dotted line through the middle is the average ratio over the period of 1985-2001 and is now used as the new x-axis. This effectively implies that the estimation of 400% in 2001 declines to around about the 15% level

## PPP Conversion Factor to Exchange Rate Ratio Versus PPP Per Capita GNI in 2001



(Source: Funke and Rahn (2004), “By how much is the Chinese Renminbi Undervalued”.)

The extent of the undervaluation of the yuan since 2001, however, has increased even more than the 15% since, after the slight deflationary period in 2002, seen in the corporate goods price index (below), the price of goods had risen at a great pace which has further led to both the real and nominal exchange rates being subject to further depreciation. This effect is clearly shown in the diagram below, which shows both the effective real and nominal exchange rates.



(Source: Treasury Report (NZ): The Renminbi: The Possibility of Change, and its Likely Effects, 2005)

### 4.1 Summary of Results Obtained by Authors

The aim of this section is to elaborate the literature review. This will enable the calculation of an average of the misalignment of the Renminbi. The method is to separate the results obtained through analysing the real effective exchange rate



(REER) and those results obtained for the Renminbi/dollar rate (\$) shown in the tables 1 and 2, respectively, and their corresponding graphs below. The results that have been included are between the 2000-2004 period, and the mean average has been taken where a range has been reported for the misalignment. Only a limited number of findings have been used since, in my opinion, these studies are some of the most comprehensive on the subject area. The studies that produce a zero result for the undervaluation have not been included in the data since this will only serve to distort the average estimate.

**Table1: Estimates for the REER Misalignment**

<b>Author</b>	<b>Approach</b>	<b>Rate</b>	<b>Result</b>	<b>Average</b>
Anderson	FEER	REER	25%	25%
Goldstein	Underlying Balance (FEER)	REER	15-30%	22.50%
	Global Imbalances (FEER)	REER	15-25%	20%
Couharde	FEER	REER	23%	23%
Jeong/Mazier	FEER	REER	33%	33%

The mean average of these estimates, indicated on the graph below, is 24.7% (or 25%). This figure now indicates the degree of misalignment of the real effective exchange rate, although it is just an average of approaches used by various authors. As was stated before that it is difficult to find a precise estimate for the misalignment (evidence of this is from the various different estimates the authors find from changing a number of variables in their models), this average can merely serve to illustrate that an appreciation of approximately 25% (or very likely a higher figure) is required to bring the Renminbi back to its true value. This figure also falls into the range indicated by Williamson (2004) of around 20-25%.

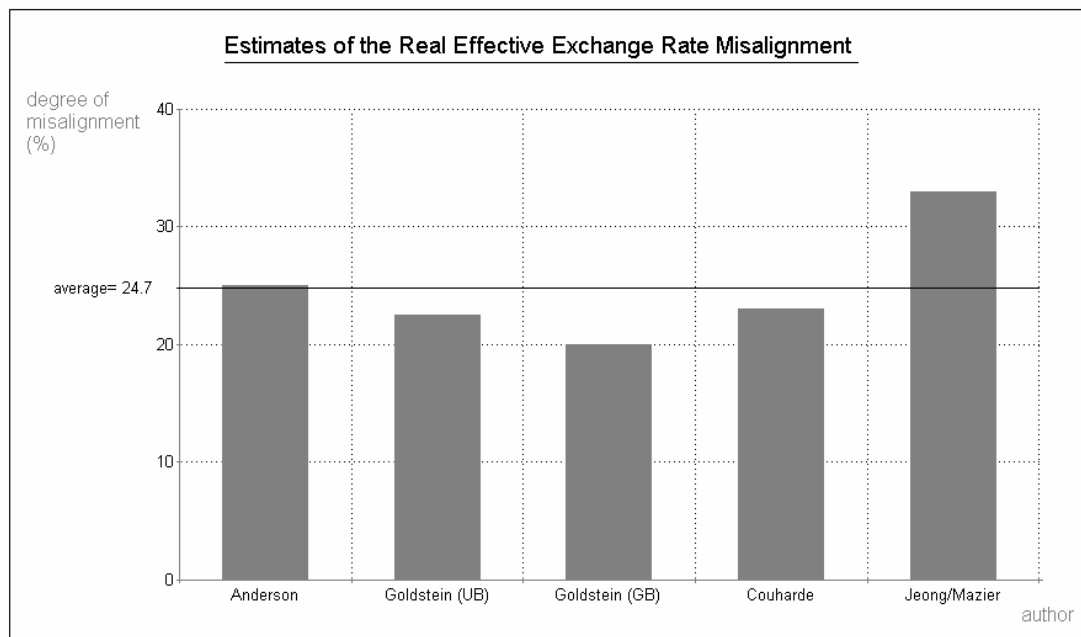
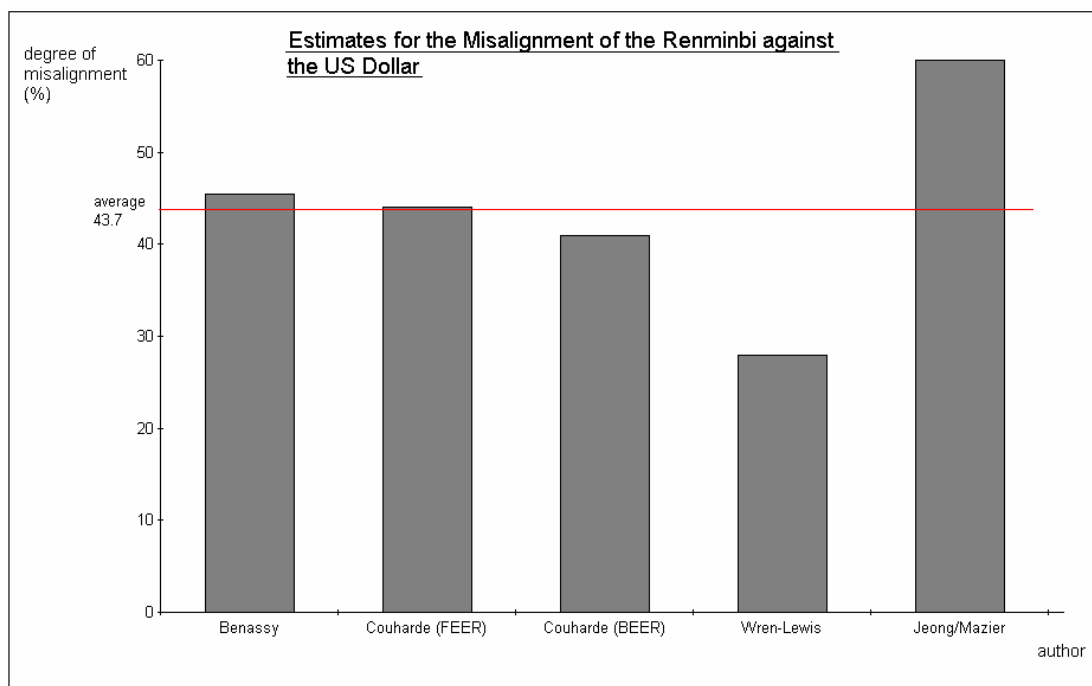


Table 2: Estimates for the Misalignment of the Renminbi against the US dollar

Author	Approach	Rate	Result	Average
Benassy	BEER	\$	44-47%	45.50%
Couharde	FEER	\$	44%	44%
	BEER	\$	41%	41%
Wren-Lewis	FEER	\$	28%	28%
Jeong/Mazier	FEER	\$	60%	60%



The graph above shows those estimates of the undervaluation of the yuan against the USD that were reported by the various authors. Again the mean average (43.7%) is taken to give an indication as to the extent of the undervaluation of the bilateral exchange rate, although by no means is this figure the definitive answer to the question of the misalignment. For the sake of this research a range of 30-50% for the misalignment against the USD will be used.

This section has served to illustrate to the reader the fact that the Renminbi remains undervalued by a number of different indicators and this is proven by the use of approaches aimed at estimating the size of the misalignment. Having shown the extent of the undervaluation the next logical step in this study would be to assess the exchange rate regimes that the Chinese central bank and authorities could use in order to facilitate this reform and appreciation.

## **5. Policy Options Available to the Central Bank to Facilitate an Appreciation**

There were a number of different policy options that the central bank and authorities could have used to bring the Renminbi back into line with its true value. My assumption in this paper is that, through the findings of other authors on this topic and through the pricing of non-deliverable forwards, the Renminbi is undervalued

anywhere in the range of 20-30% in terms of the real effective exchange rate and 30-50% against the U.S. dollar. Some of the potential exchange rate regimes that the Chinese authorities could utilise to facilitate the appreciation will now be analysed, the aim being to determine the best available option or regime. This then will allow the comparison of the actual decision taken by the central bank giving an insight into the thought process of the authorities when announcing the move to reform the exchange rate system.

### **5.1 Free-float**

In the past, the yuan was pegged to the US dollar by the PBoC purchasing dollars and selling the yuan every time there was pressure for the yuan to strengthen. If the currency were allowed to float freely, the bank would not have to intervene in stabilizing the Renminbi since, in theory, the currency should return to its equilibrium or true market value. Although, an exact figure could not be placed on this value, it can be generally accepted that the market bulls would drive the currency up if a free-float were to be the option. The problem with this method is that due to the extreme undervaluation, speculators could flood the market possibly leading to an overshooting of the exchange rate. This result would not be desirable on the Chinese economy which depends heavily on exports, and when overshooting of the Renminbi occurs exports will decline and if this is uncontrollable, unemployment levels should also increase. Given that China have a large surplus in their foreign reserves, accumulating over US\$500billion, and are the second largest purchaser of U.S. treasuries, then floating the currency would have adverse effects on the debt markets in the U.S. since China will now no longer need to buy treasuries and accumulate reserves to maintain a peg to the US dollar, thereby increasing the yield on these treasuries.

In 2003, U.S. Treasury Secretary John Snow had suggested that China should open (liberalize) its capital markets and float the currency. The argument against this proposition is the fear that it may induce a bank run on the economy. John Williamson (Institute of International Economics) explains this point by saying that after moving to a floating exchange rate, Chinese savers withdraw a percentage of their portfolio and switch it to foreign accounts to avoid the consequences of a potential financial crisis. These concerns are understandable given the relatively recent financial crises that hung over China's neighbours. A possibility could also be that the bank run turns out to be self-fulfilling in the sense that once depositors withdraw their funds in panic, their actions actually bring about the collapse of the banking system which might have otherwise survived. If this capital flight occurred on a large scale then it can only lead to a further depreciation of the currency which is already undervalued and therefore would also cause a worsening in the U.S. trade deficit, which should be cause for concern or the rest of the world. This then seems a rather strange suggestion by the U.S. Treasury Secretary given that the aim of a revaluation was to let the currency appreciate and allow China's reserve surplus to be more in line with their largest trading partner, the U.S. Williamson in his lecture suggested that the liberization process ought to be a slower process, thereby allowing the economy and markets to become more mature and to slowly absorb the effects of smaller re-

valuations, which in part the Chinese government has undertaken with the 2.1% change in the Renminbi.

From the analysis and evidence presented on dangers of floating the exchange rate with premature liberalization, it can be seen why the PBoC have not opted for this regime. The economy and markets need to be more developed with the establishment of proper hedging instruments and the banking system more stable before this method of revaluation can be used.

## **5.2 Pegging to a basket of currencies**

Under this regime, the Renminbi will be fixed not only to the US dollar but to a range of different currencies, as stated previously they are most likely to be the Euro and the Yen, since Europe and Japan are the next two largest trading nations to the Chinese, next to the U.S. By removing the peg against the dollar, there is more flexibility in monetary policy in China since a peg effectively means that the PBoC had given up monetary power to the Federal Reserve. With a currency basket, the Chinese authorities will have regained their monetary power and they will be able to do so by controlling the weights of each currency in the basket. This method in effect will reduce China's exposure to monetary policy shifts in one nation, and at the same time reducing the number of speculative bets ensuring that the true value of the Renminbi is reached. As was mentioned the shift away from dollar assets has become an increasing trend across nations. This is due to the fact that governments and central banks want to protect their positions in the global currency markets and this seems a logical step in response to the dollar which had been sliding over recent years. This approach seems to be plausible due to positive effects on both Chinese and international economy, and is seen as the ideal position for China as an initial step to a full exchange rate reform.

Goldstein (2004) proposes a "go-slow approach" as a possible option to use in reforming the exchange rate regime. In this method, a series of adjustments are made to the capital account, trade account and tax measures, which are assumed to be substitutes for a medium sized revaluation. In addition to this, there would also be a small revaluation between 2-3% (a widening of the trade band) in conjunction with a shift to a currency basket. The main advantage of this approach is that it is seen not to have a negative impact on China's exports, on foreign investment and on economic growth.

The problem, however, with this method now is that due to the apparent extreme undervaluation of the Renminbi, this choice of regime will not reflect on the yuan having an equilibrium value with only a small revaluation. The continued undervaluation of the currency could actually therefore prompt further capital inflows and speculative bets since market participants will view the small adjustments as a signal for further exchange rate appreciation, all this defeating the objectives of reducing the reserve surplus which arises because of the large capital inflows.

### **5.3 Maintain the dollar peg at a higher rate**

This strategy involves keeping the peg to the U.S. dollar, although be it at a higher rate, and widening the band within which the yuan is allowed to fluctuate. To maintain this dollar peg with a small upwards revaluation may seem to China to be a satisfactory exchange rate regime, since it could be viewed as a compromise to the ongoing pressure from the U.S. and the China's other large trading partners. The need for revaluation can be seen by the number of tariffs that the U.S. have enforced on Chinese products. Europe and Japan have also followed suit, also imposing tariffs on these products. In utilising this method, Chinese exports will not significantly be hurt by a small initial revaluation, and due to the increased trading band the Renminbi should help decrease the slide in the dollar, since the PBoC will need to maintain its dollar securities. The major problem with this mechanism rests with the theoretical assumption that the market will take a bullish stance in response to an initial revaluation, since even a 4% change for example might result in speculative bets that further adjustments are to be made to the yuan. The PBoC would therefore have to increase their dollar deposits in order to maintain the peg and not risk excess capital inflows, however by the PBoC increasing their dollar holdings, the reserve surplus would increase only resulting in further speculation that another revaluation is in line. This then turns into a vicious cycle and eventually the dollar peg may have to be abandoned, leading to the problems caused by premature liberalization and a free float, as mentioned above. Other problems associated with pegging to the dollar would also be inherent in this exchange rate strategy, for example China would have less monetary authority and the fundamental value of the yuan would not be reached with minor adjustments to the currency.

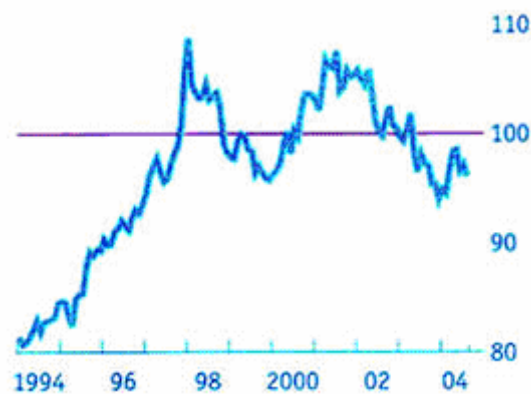
### **5.4 Two-stage currency reform**

In taking all the negative impacts of the three policy options outlined above, Lardy and Goldstein (2003b) suggest an alternative approach labelled the "two-stage reform". In this proposal the first stage involves removing the peg to the U.S. dollar and replacing it with a peg to a currency basket, a medium sized revaluation in the order of 15-25%, as well as widening the trading band to over 1%, as opposed to the current 0.3% band. The second stage being a move to a managed float, to be adopted after there is enough strength in the banking system of China so as to allow a significant liberalization of the capital markets. The rationale behind this approach is that it allows for a much more appreciated value for the yuan during the transition process until China are economically ready to remove the restrictions on its capital flows, benefiting both China and her trading partners. They justify that a medium-sized revaluation is necessary to avoid the large capital inflows and its associated reserve accumulation, which would be the case if smaller revaluations are undertaken, as was the problem in the previous approaches due to the influx of speculative capital. The substantial revaluation, it is argued in this study, will cause other Asian countries to follow suit of China and help in addressing the global payments imbalances, rather than being the major cause of the problem, which China is now.

A move to a currency basket should also in theory provide more stability in China's effective exchange rate, through diversification spreading the risk if one currency experiences a slide, which the dollar has over recent years. The graph below shows how the real trade-weighted exchange rate had remained volatile over a ten year

period under the dollar peg. The currency basket should reduce this volatility and would allow a further depreciation of the dollar to bring it more in line with the Renminbi without having to make further changes. This would also have the effect of reducing speculative bets once the system has become more mature and stable, which potentially would otherwise cause an influx of funds making the rate increasingly volatile.

Renminbi, real trade-weighted exchange rate (2000=100)



(Source: JP Morgan Chase)

The second stage in the reform process involves adopting a managed float thereby allowing China to regain its monetary power, which is essential since in the past the monetary policy of the U.S. has not fitted with the needs of the Chinese, as witnessed by incorrect valuation of the yuan and from the volatility in the exchange rate (see diagram above). With respect to the inflation side, it can be argued that China follow a similar path to other emerging market economies by having a managed float as well as setting monetary policy frameworks to target inflation. This would allow for greater flexibility in the exchange rate and through meeting inflation targets, monetary policy can be used to control any changes in output which is primarily export driven.

Funke and Rahn are also advocates of this two-step exchange rate reform, the only difference being that they propose an initial appreciation of 8-12%. This difference in the sizes of the appreciation between these two studies should be relatively small, however the 15-25% appreciation stated by Goldstein should have more of an impact on the U.S. trade deficit since, as was found by Y. Desnoyers (refer to literature review) that a larger significant revaluation of around 20% is required to have any positive effect on reducing the U.S. trade deficit. This approach, therefore, seems to be reasonable seeing that it takes into account the problems caused by other exchange rate regimes and to a certain extent rids these factors making it a strong option that must be considered by the PBoC, however, the aim of reforming the exchange rate should not be primarily based on its potential effects on the U.S. economy, instead should be concentrated on the needs of China and should be aimed towards reducing the costs of moving to a market based system in the future.

## **6. Potential Effects of the Revaluation on the Chinese Economy**

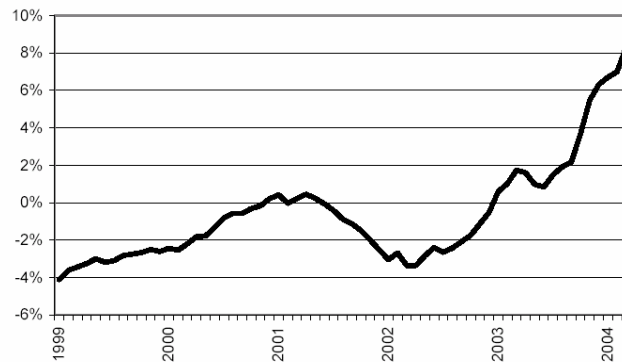
One of the most obvious effects of the currency revaluation would be that imports into China would effectively become cheaper, since an appreciation of the currency would translate into the yuan buying more of the dollar. With the emergence of China as a growing economic power and the recent industrialisation of the nation, there has been an increase in the amount of core inputs, such as metals, crude oil and machinery, that is being imported. With the surges in the price of oil as well as other key materials such as coal and steel, the argument being put forward here is that a stronger Renminbi would help to offset, to a certain extent, the high prices paid for these imports. If the revaluation is handled correctly by the PBoC, then this will translate into cheaper import prices, resulting in the prices of these imports and their substitutes being lower domestically, hence consumers will be paying lower prices.

### **6.1 Inflation**

Reforming the exchange rate regime and a revaluation of the Renminbi should also prove a useful tool in curbing the inflation problem in the Chinese economy which reached a seven year record high in August 2004 at a level of 5.3%. With an overheated and rapidly expanding economy there has been an increase in consumer spending, due to higher incomes, resulting in price hikes adding to inflationary pressures. The low savings interest rates that have resulted from the high level of national savings has also meant that depositors are turning to industries such as construction, steel, cement and the housing market which are all offering higher returns than the bank rate. As a result there has been overinvestment into these sectors as well as a property boom, currently being experienced in China. An increase in interest rates has been used by the central bank in the past to lower inflation, however this method alone is not enough to neutralise the possibility of spiralling inflation, and in the long run will add further pressure for a revaluation. Hence, a revaluation will help dampen the price rises and mop up excess liquidity that is flooding the markets.

In a study by Goldstein 2004, the corporate goods price index is used to illustrate the rising inflation in China, as below in the diagram: (Goldstein, "Adjusting China's Exchange rate policies, 2004, p.32). The paper explains that an undervalued exchange rate results in an increase in speculative capital entering the domestic market, excessive reserve accumulation and expansion of monetary aggregates, all these factors increasing inflationary problems. From the graph below it can be seen that after the deflation experienced in 2002, the price of goods had risen fairly rapidly up to 2004. The need to keep inflation under control is in the best interests of the Chinese economy, and through a revaluation these problems leading to inflation can be avoided.

### PBoC Corporate Goods Price Index, percentage change, 1999-2004



Another positive effect of a revaluation on the Chinese economy would be to reduce the dollar-debt obligations since an appreciation of the yuan would, in real terms, reduce the value of the debt. Many analysts and research papers have suggested that the currency is undervalued in the range of 15-25%, some even stating that this estimate may be rather conservative and could be as high as up to 40%. Taking the lower end of this range, if the Renminbi was re-valued 15% upwards, this would have the effect of reducing the principal amount of dollar denominated debt by the same amount. This would prove to be a useful debt reduction method for the PBoC, since they would be able to borrow dollars at a fixed rate, allow the currency to appreciate against the US dollar and thereby reducing the real value of the interest that they have to pay back as well as the principal repayment. This may however cause political tensions and could constitute a form of currency manipulation.

### **6.2 Exports**

China's economy is heavily export-orientated and if there was to be a sudden fall in global demand for their imports this would have an effect on the entire economy. Japan is a good example of this, whereby the country has been undergoing deflation and recession over the past decade due to their emphasis on exports, leaving domestic demand underdeveloped in comparison. The argument is that if China were to revalue the yuan there will be a more stable mix of export and import activities, thereby reducing the risk of a shock in global demand. The revaluation should also make the Chinese economy more efficient and productive since products will now become more expensive in real terms, manufacturers will have to incur the majority of these expenses, however they will now have to compete by increasing product quality rather than gain a competitive advantage merely because of an undervalued currency, which effectively makes their exports cheaper in comparison. The point here is that by allowing the currency to appreciate, an increase in output and efficiency should be realised, with higher valued products generating greater wealth in the economy. The Renminbi at its current market value makes it difficult for Chinese companies and investment firms to invest abroad since it does not have much purchasing power. A revaluation would make the currency stronger in terms of its purchasing power parity, allowing domestic firms to enter foreign markets and commence their expansion policies with respect to mergers and acquisitions. A true and fair value is also required for the yuan if China is to be able to sustain its economic growth since there is a



strong demand for raw materials, for example steel and oil, which needs to be imported, with an undervalued currency these become more expensive to purchase, resulting in domestic price rises, which in turn adds further pressure on an economy already suffering from rising inflation. The government has however tried to help Chinese companies in their foreign direct investment plans by granting loans to fund acquisitions and expansions, however with these loans have a high element of risk, and to an extent they must be labelled as an inefficient method of using funds, hence a revaluation would be in the best interests of the government and central bank, and the economy as a whole.

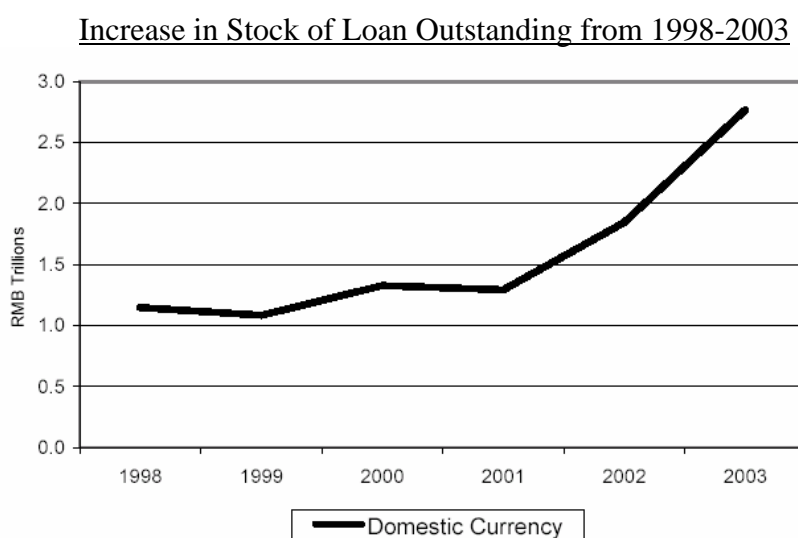
### **6.1 Negative Effects**

The upside effects of a revaluation have been looked at above, however, there may also be a number of disadvantages of a change in exchange rate policy which need to be taken into account before the reform process is undertaken. Ultimately the magnitude and direction of these effects depends upon how the PBoC choose to coordinate the revaluation. For now, the possible negative impacts will be analysed below.

A stronger currency tends to imply that the Chinese exports will become more costly to the importing nation. This cost is translated into higher prices, which from elementary economics results in a decrease in output demanded, depending on the elasticity of demand. This reduction in demand can only be accommodated by creating redundancies, which could prove to be disastrous on an economy which already employs above capacity, resulting in an increase in unemployment levels. The revaluation would be seen to hurt exports in this sense, and in the short run would also dampen the growth rate which is already at a high level of 9%.

It was stated above that a revaluation reduces the value of dollar denominated debt; however, the downside effect of this is to make the real value of domestic loan repayments higher, thereby increasing the risk of default, resulting in an increase in the number of loans turning non-performing. When loans become unserviceable the banking sector becomes volatile and the government and central bank will incur immense costs and this coupled with the fact that banks dollar-denominated assets have declined in value could be a reason for resisting an appreciation. This is the reason why the bank has been shifting its dollar assets into other currencies over the past year, and speculators have picked up on these actions making a forthcoming revaluation more obvious. Goldstein (2004) shows that due to an increase in reserve accumulation, Chinese banks had relaxed their credit lines, resulting in an increase in bank loans, as illustrated below in figure 2. As can be seen from the graph, that amount of loans outstanding had increased by almost 2 trillion yuan in 2002 and then rose at great pace to the 3 trillion yuan mark by 2003. Measures had been taken by the PBoC in 2003 in an attempt to reduce the growth rate of bank loans by enforcing an additional 1% deposit reserve requirement and in March 2004 this was further increased by an additional ½% for financial institutions that were poorly capitalised. As a result of these interventions, the amount of loans outstanding had started to decline in the final quarter of 2004 and early 2005. The point made by this study is that during the last lending boom in China, almost 40% of the outstanding loans turned non-performing. Although a revaluation could possibly increase the risk of

default on loans (stated above), thereby increasing the number of NPLs, this effect would only be short term, and a currency reform would benefit the economy since it promotes better banking practice and price stability, and in the long-run these factors would automatically result in better credit lines and therefore a reduction in non-performing loans.



(Source: Goldstein, “Adjusting China’s Exchange rate policies, 2004, p. 24)

A revaluation in some instances could lead to a round of capital flight whereby foreign speculators whom have flooded the market with external funds may withdraw funding, post-revaluation, from the Chinese economy. The pace and size of the revaluation are key factors in this theoretical assumption. A revaluation of less than the amount by which the Renminbi is undervalued (25% from the average estimate ,as suggested by a number of analysts, some have suggested up to 40% in the nominal exchange rate) will almost certainly reduce the amount of speculative capital that will be withdrawn since future revaluations will be expected to come into line with the true value of the yuan, hence, speculators will keep their capital in the market. If the PBoC revalue quickly to the fundamental exchange rate equilibrium level, investors and speculators will not be able to gain from trading in the currency, hence, they would be more willing to pull out funds from the country.

In the Chinese financial markets, the trading of derivatives and futures is still relatively in its infancy. This effectively means that it is more difficult for firms to hedge against currency movements, only having a limited number of instruments available for hedging. However in mid 2004, the government, in an attempt to open up the financial markets had introduced new regulations enabling foreign banks to directly trade in derivatives with local firms. These regulations allow for credit and fixed income trading between cross border firms, however in light of a currency revaluation, there is still a need for the futures exchanges in China to become more mature before China’s export-sensitive firms can be fully protected from any movements in the Renminbi.

Although a number of factors have been put forward against a revaluation, it can be seen from the above evidence that a revaluation would be in the best interests of the Chinese to rid the problems, such as inflation and excessive bank lending, caused by the exchange rate policy. In taking the decision to reform the exchange rate, the central bank will need to assess these positive and negative effects that have just been identified so that they are able minimize the costs of an appreciation on the Chinese economy by implementing the most suitable policy.

## **7. Potential Implications for the world's major currencies**

This section will attempt to identify some of the ramifications that the Renminbi appreciation and change in exchange rate policy will have on some of the world's major currencies, namely the Dollar, the Yen and the Euro. The possible implications for U.S. treasuries and for the U.S. trade deficit problem will also be assessed and can be compared to the actual outcomes, post-revaluation.

### **7.1 What would a revaluation mean for the Dollar?**

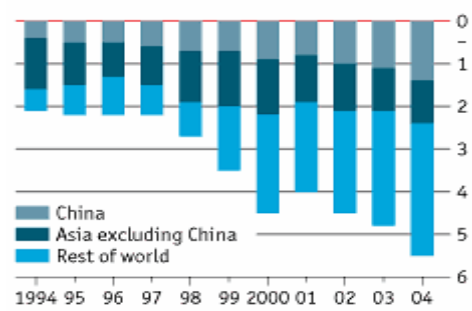
As has been noted before the U.S. have been the main advocates for a Chinese revaluation, making it well known that their trade deficit has arisen from the fact that the yuan is undervalued. This has meant that China have been able to sell of surplus goods at low prices with China constituting only around 4% of U.S. exports in comparison to the 13% of China's total exports that the U.S. import (figures from Q1 2004).

In theory a realignment of the Renminbi with the dollar means that the dollar depreciates against the yuan with a smaller depreciation against a basket of currencies as the PBoC diversify their reserves away from the dollar. This change in the nominal exchange rate results in short-term price and wage stickiness, effectively implying that incomes within China gain in value in terms of the dollar. This will therefore result in an improvement in the trade balance between these two nations, since the Chinese will now buy more of the American products, all be it on a temporary basis. In the medium-term the market will facilitate this increase in demand by adjusting prices upwards. Chinese wages should also decline during this period ultimately resulting in decreased demand both for domestic products and foreign products, which should in turn reduce the inflationary problem that China is currently experiencing. The problem here is that lower prices coupled with an appreciated value for the yuan will effectively mean that China's price competitiveness will move back to a similar level as before the revaluation. In the long-run this income effect will nullify the short-run price changes; therefore, the dollar will still be facing the pressures of depreciation.

With respect to the trade imbalances between the U.S. and China, there needs to be a sizeable appreciation to have any permanent effect on the trade deficit (noted earlier that a revaluation of around 20% is required). This is partly due to the extent to which the yuan is under-valued; however, a large part of this can be attributed to the fact that, while China's current account surplus is forecast at around USD 100 billion for 2005, this is only a fraction of the U.S. deficit forecasted at USD 800 billion. One may argue that this essentially means that the majority of the increase in the U.S. trade

deficit has come from outside of China (shown in the graph below), and is generated by the lack of domestic savings in the U.S. The argument against this view is that the lack of domestic savings can be partly attributable to China since they produce lower priced goods, thereby reducing inflationary pressures allowing the Fed to hold the real interest rate low.

U.S. Trade Deficit as % of GDP by Region



## **7.2 What would a revaluation mean for the Euro?**

With the move to a currency basket the most likely scenario for the PBoC, there has been great interest as to what this would imply for the Euro. When the revaluation occurs the expectation is for the central bank to commence with the selling of U.S. treasuries, instead, replacing them with more of the Euro as well as other currencies. This possibility could mean that the Euro will skyrocket once the revaluation takes place given that it has already become the second favourite currency that central banks around the world are holding since its introduction in 1999. This effect will not, however, be immediate and is expected to occur over the medium-long run as China diversifies its currency basket, eventually increasing their Euro holdings. This will essentially mean that China will still however need to hold dollars since the U.S. are the largest trading partners to them, and therefore with the adoption of a currency basket, the dollar should still be included along with the Euro and Yen (as is expected).

The decrease in the amount of dollar assets being held, as previously mentioned, has become a growing trend among world banks, and is expected to continue. According to figures from the B.I.S. (Bank of International Settlements), some of the major international oil exporters have been significantly reducing their dollar assets in favour of the Euro. This is due to the fact that they need protection from the losses incurred from poor dollar performance and diversifying to other currencies enables this option. Russia, have noticeably reduced their dollar assets, could soon start pricing their oil barrels in Euros, which should enable them as well as other countries to make currency conversion cost savings since most of the oil exports from Russia are to Europe. Iraq had already been pricing oil in Euros, since 2000, and it is suspected that the other major oil producers (Saudi Arabia, Iran and Venezuela) have been considering the move to the Euro. If more and more central banks allow this to occur, the Euro will strengthen on the back of increased world demand and the dollar will fall drastically. This could be dangerous to the global economy and yet even worse for the U.S. as a depreciated value of the dollar means they would find it

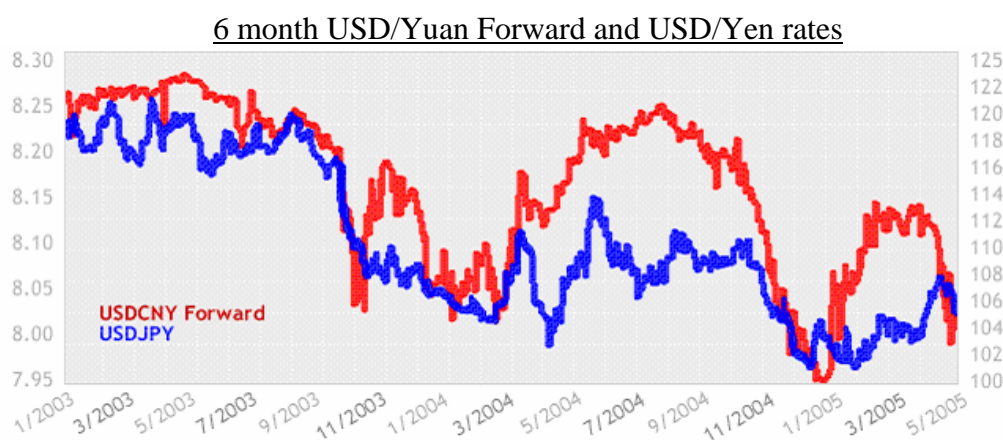
extremely difficult to finance their twin deficits, namely the budget deficit and trade deficit. The budget deficit will have to be financed by the public selling of bonds, which will ultimately result in an increase in long-term interest rates. This in turn would have a damaging impact on economic growth, hampering the U.S. recovery, of which the housing market has played an important role. The hike in long-term lending rates should result in a fall in the housing sector. The U.S. have always been able to take out loans at relatively low interest rates to finance their deficit, due to the dollar's status as a reserve currency, which is now coming under threat by the emergence of the Euro. The point being made here is that when/ if China moves to a currency basket, other countries (mainly Asian) could follow their lead and establish a similar regime for managing their exchange rates. This would reduce world demand for the dollar, these pressures not being helped by the moves of the oil exporters, by pricing oil in Euros. The problem however with this assumption is that when the dollar falls, Europe may also feel the negative impact that it imposes. Dollar weakness could lead to the possibility that U.S. inflation surges, with the Fed having to raise interest rates, and as a worst case scenario resulting in a stock-market crash by investors withdrawing funds from the market reinvesting in bank deposits in the search for higher returns. All these factors coupled with a stronger Euro would mean that Europe's products are too expensive and would be priced out of world markets. This would be disastrous for euro-zone growth and stability due to the fact that they will not be able to realise the income gained from exports.

If, however, the Chinese authorities decide against a move to a currency basket and insist on maintaining the dollar peg, the dollar should depreciate against the Renminbi depending on the size of the revaluation and should hold against other currencies, although this would not do much to ease the political tensions that have been increasing between the U.S. and China. This could possibly result in Europe and U.S. imposing more restrictions and quotas on the Chinese, whom have been accused of stealing jobs and dumping goods onto these regions due to the undervalued nature of the Renminbi. The Euro may potentially experience an initial gain, which may be attributable to market speculation before the regime is made public, however this is likely to regain and stabilize at its original level once speculators are convinced that the PBoC will not move to a currency basket.

### **7.3 What would a revaluation mean for the Yen?**

The revaluation of the Renminbi will almost certainly have implications on the Yen. This is based on the notion that the Chinese currency is not yet fully convertible on the capital markets (not readily available for individual investors to trade on), therefore investors tend to speculate on the Yen when news or data regarding the Chinese economy is made public. This can be confirmed by analysing the USD/Yen rate with the six month forward rate for the USD/Yuan (CNY) between the period of 2003-2005, as shown below in the graph below. It shows how over the 2 year period both rates have moved in line closely together, largely due to the fact that these two nations are fierce competitors in the manufacturing and export industries. Since the yuan has been pegged to the dollar, its value has been kept artificially low thereby making China's exports relatively cheaper than its competitors. This has meant that in order to regain competitive advantage Japan had to intervene in the currency market during 2003-2004, to keep the Yen from rising against the USD. The point here is that

the Yen in response to a Chinese revaluation should appreciate also against the USD by approximately the same value, should the Japanese government decide to intervene.



(Source: [www.fxcm.com](http://www.fxcm.com))

## **8. The Actual Impact of the Revaluation**

Although the revaluation has only been undertaken recently, this section will identify some of the key areas that were affected as a result of the actual reformation decision that the central bank undertook. The actual repercussions for the currencies and treasury market will be reported comparing it to the expected effects that were identified in the previous sections.

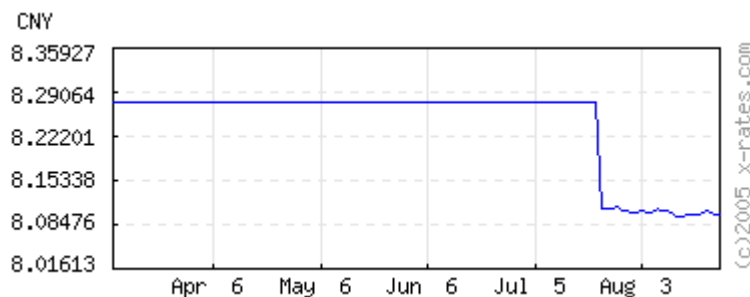
After years of speculation, China finally re-valued in July 2005, the Renminbi was adjusted to a little over 2.1% from 8.31 to 8.11. The trading band of 0.3%, it was decided, would still be appropriate with a move to a currency basket, although no announcement was made as to what currencies would be held in this basket. What this actually means is that while the intention is there to adopt the currency basket, there is still effectively a dollar peg which is allowed to be re-valued up or down by 0.3% on a daily basis. The 2.1% revaluation will not do much to resolve the U.S. trade deficit problem, seeing this is only a small fraction of the true undervaluation, however, this move was undertaken partly to relieve the pressure that was mounting for a revaluation, and mainly as an initial step.

The initial global market reactions to the revaluation justified the expectations arising from the appreciation. There was overall dollar weakness as news that the peg would be removed would have filtered through to the market, creating heavy selling pressures. U.S. treasury yields rallied from the news that there would not be a free-float, which as discussed earlier would signal that China would not need to hold dollar-denominated assets, forcing yields on treasuries down. In fact, in response to the move to a managed float, yields on ten year treasuries actually reached a peak of 4.28% during trading on the day of the announcement, rising 12.4 points through the key technical level of 4.25%. Other initial effects were that the Asian currencies were all trading higher which was directly linked to the news that the float would be managed with respect to a basket of currencies. The Euro and the Yen were the main

gainers against the US dollar, which was hardly a surprise since these regions are the main trading partners with China, with the exception of the U.S. The Yen also experienced gains against a range of currencies, including the Euro which fell from ¥136.8 to about ¥133.8. The rise in the Japanese currency can also be partly attributed to the appetite of investors since the market expected, in response to the Renminbi appreciation, that the other Asian countries would also allow their respective currencies to strengthen, which in theory should increase the strength of the Japanese economy.

The graphs below show the yuan/dollar, the Yen/dollar and the Euro/dollar rates respectively. The revaluation effect can be seen in the yuan/dollar chart. The sharp drop off in mid July indicates the size of the revaluation of the yuan, which thereafter stabilizes at its new found level (8.11 to 1 USD). The rise in the Yen against the dollar can be seen by analysing the rate which is illustrated below. On the day of the announcement the dollar drops to around about the 110 mark against the Yen, although the dollar later regained ground on the Yen at a lower level than before the announcement by the PBoC. This is approximately an appreciation of 2.5% given on the previous day the Yen was trading at 113.44 against the dollar. This result confirms the relationship, identified in the previous section (7.3), that the Yen should appreciate in line with the Renminbi against the US dollar.

#### Yuan/Dollar rate



#### Yen/Dollar rate



### Euro/Dollar rate

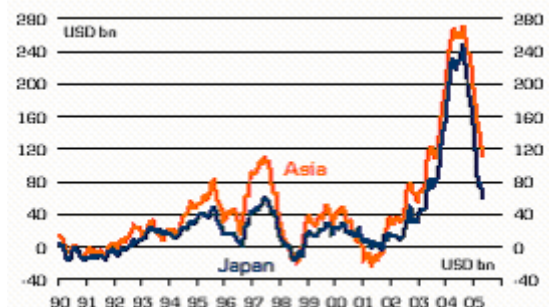


(Source: www.x-rates.com)

Although the initial reactions by the markets were as expected, the fact that the revaluation was small meant that the markets would return to normality once the excitement had cleared. The U.S. dollar/Euro rate had returned to their pre-revaluation levels (from the graph above to around the 0.825 mark), with 10-year treasury yields dropping back to around about the 4% mark. Again as expected the gain in Asian currencies had settled down to stronger levels than before the reformation decision, this due to the fact that speculators were expecting a strong weighting of these currencies to be used in the new system of the currency basket (see yen/dollar chart above). The dollar has not fallen sharply due to the fact that there is still essentially a dollar peg, removing the fears that China would rapidly diversify its reserves away from the dollar immediately. Another factor that has kept the dollar at bay in spite of the revaluation is that the U.S. is the main destination for Chinese exports. This essentially means that China would want to fund the excessive U.S. consumption to protect the export sector, hence the need to still keep dollar reserves to stop the yuan depreciating again and returning to previous levels.

The revaluation has similar implications for the U.S. treasury market. Although China (and Asia) has been less active in purchasing treasuries, the region still remains a net buyer which should mean that the effects of the currency reform should be negligible. Again China's export industry is a major factor that the region remains a net buyer of these treasuries. From the graph below it can be seen that Asia have decreased their purchasing of treasuries substantially between 2004-2005, partly due to the gradual shifting away from the dollar peg and partly due to the fact that the U.S. budget deficit has declined, thereby reducing the reliance on China and the rest of Asia to finance it. The fact that Japan have also stated that they will intervene should the yen become too strong, essentially means that Asia will not become net sellers of treasuries, as they are needed in the intervention process.

### Asia's Net Buying of U.S. Treasuries- 12 month moving sum





(Source: Danske Bank Research paper, July 22<sup>nd</sup> 2005, Chinese revaluation: .A baby move.).

Due to the relatively minor revaluation of the Renminbi that the PBoC have undertaken, the effect on GDP growth will generally be minimal when compared to the impressive 9% growth that China has been experiencing. This statement is however made on the assumption that the market is not expecting a stronger appreciation of the Renminbi against the U.S. dollar over the next 12 months. This is where the 0.3% daily trading band comes into play, as mentioned earlier, making it possible for an appreciation of up to 93% per annum, although this is not likely. The following basic relationship can now be identified: the greater the revaluation the greater the negative effect on GDP growth in China, and vice-versa. This relationship seems reasonable given that a stronger yuan would effectively mean that Chinese exports, in real terms, will become more expensive in the importing country by the amount of the revaluation. This in turn should reduce the amount being exported, due to the higher price, which will have a direct knock-on effect to economic growth, since less is now being earned due to the reduction in exports. The reduction in exports may be seen as a potential problem to the Chinese, however by the same line of reasoning it will have the effect of reducing the global payments imbalances, which will again only be a minimal change due to the small appreciation in the Renminbi. Therefore, it can also be stated that there is a direct negative relationship between the size of the revaluation and the U.S. trade deficit. However, a much larger revaluation than two percent is needed to have any effect on the deficit. Goldstein and Lardy have claimed that if Japan and other Asian emerging markets revalue 2% similar to the Chinese, then the trade weighted value of the dollar would only fall less than 1%, improving the U.S. current account by less than USD 10 billion, which is a relatively small fraction compared to the 2004 deficit of USD 660 billion. Other studies have also shown that a substantial revaluation is required to have any effect on the trade imbalance, with Y. Desnoyers reporting in a study that a 20% appreciation is required.

## **9. Conclusion**

In general it can be said that the choice of regime and the initial appreciation of the yuan seems to be a step in the right direction towards achieving a more market driven exchange rate system. It is actually similar to the two-stage approach that was advocated by authors such as Funke and Rahn as well as Goldstein; however there was not a large initial appreciation that was proposed in these studies. This is possibly due to the fact that the authorities were trying to resist any shock arising from a sizeable revaluation that was discussed in section 6. A major factor being that China would direct their exchange rate policies at protecting her export industry. From the average estimate taken in section 4.1 the Renminbi was undervalued in the range of 20-30% in terms of the real exchange rate and by 30-50% against the USD, therefore, the revaluation of 2% is merely a symbolic move and was probably motivated by political reasons. The PBoC have undertaken this process rather cautiously to avoid potential problems that were identified with alternative approaches. The aim of this change in the exchange rate policy should be primarily based on the Chinese objectives in their search for macroeconomic stability, financial reform and financial liberalisation to free-up the capital markets, as well as securing the export industry for the long-term. They should also be aiming to achieve a sustainable rate of economic growth, as opposed to revaluing due to external pressures, however having said that

the burgeoning U.S. trade deficit needs to be addressed. The need for a correct and effective reform has been analysed and it can be said that the cost of further instability in the exchange rate will be extremely high. This is why China will have to enforce proper measures to manage the rate over the foreseeable future until there is greater stability and the yuan has been brought back into line with its real value.

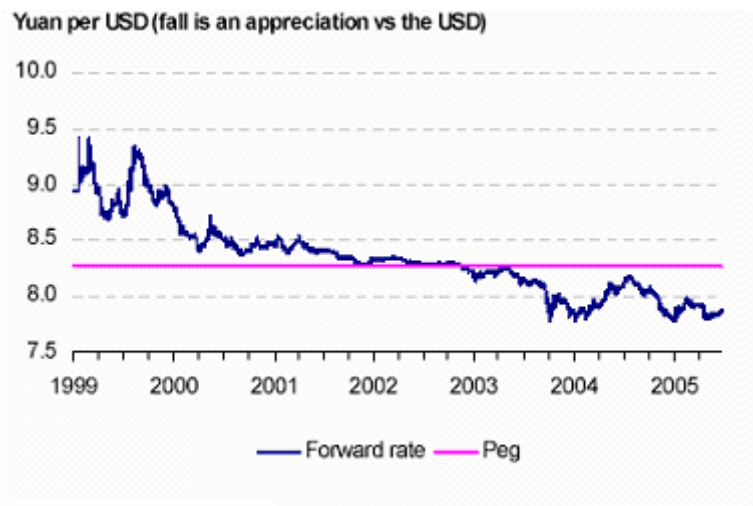
The optimum strategy of the PBoC, for the medium-term, seems to be that it will remove the dollar-peg and float the Renminbi with respect to a currency basket, consisting of several different currencies. The regime is expected to be similar to that of neighbouring Singapore which operates with a system known as a dirty float and dirty basket, whereby neither the trading bands are disclosed, nor is the composite and weighting within the basket made public. This is a strategy that has worked well in Singapore and the benefit of this is that it stops speculators from manipulating the currency. The obvious currencies would be, as noted already, the Euro, Yen and U.S. dollar (all be it on a much smaller level). The fact that China's interbank system was trading the Euro and Yen in May 2004 is another indicator that these currencies will appear in the basket.

The tensions between the U.S. and China seem to have been laid to rest, at least for the time being, in response to the Chinese move. Senator Chuck Schumer, the founder of the Schumer-Graham bill which levies a 27.5% tariff on all goods entering the U.S. that are imported from China, effective if China did not revalue within a specified 6-month timeframe, stated that, "We are going to watch what happens over the next few months before deciding whether to seek a vote on the China trade legislation" (Danske Bank Research paper, July 22<sup>nd</sup> 2005, Chinese revaluation: A baby move.). This effectively means that further pressure will be forced onto the Chinese if they do not move forward again with another revaluation in the coming months. These expectations will increase capital inflows into China resulting from the potential profits arising from future revaluations. Goldstein and Lardy elaborate on this view further by explaining that larger capital inflows should, in the future, increase the difficulty to sterilise reserve inflows and maintain control over bank lending without continuing to implement strong controls. This however is not in the best interests of China in the long-term, given that one aim of reforming the exchange rate policies was to liberalize and open up the markets, reducing controls on inflows. This is possibly the reason why the central bank has insisted on maintaining a band on the exchange rate, thereby reducing the danger of a sudden influx of funds overshooting the exchange rate.

It seems that the PBoC are well aware of the dangers of premature liberalization as was discussed previously when analysing the range of exchange rate regimes, in the sense that they have not moved immediately away from the dollar peg and removed the existing restrictions on capital flows. It is expected that this change will be made in the medium-term once the banking system and exchange rate have become less volatile, only then will the currency float and monetary independence be regained. A large appreciation of the yuan against the dollar will almost certainly not occur in the short-term, however, when working with a longer time-scale of say a decade, a revaluation of even 40% may not seem so far fetched. But for now a series of smaller revaluations can be expected as part of a more gradual approach towards a fairer value. The fact that the currency is not yet convertible will also help in resisting foreign speculation which can distort the market equilibrium with excessive influx of funds.

With this approach it can be guaranteed that the Chinese authorities will want to maintain tight controls over their monetary policy and will closely monitor the currency. The danger of this however is that now the aim of having a floating exchange rate is defeated if the rate is closely monitored and managed. The PBoC, during the adjustment, had also announced their decision to increase the upper limit on U.S. dollar deposits by 50 points up to 1.625% as well as on H.K. dollars to 1.5%, in line with their regime reformation. This acts as another mechanism to reduce inflow of speculative capital into the Renminbi. Analysts have predicted further U.S. dollar strength over other international currencies, implying that the Renminbi will appreciate more on the real trade weighted exchange rate, possibly by as much as 5-8% over the next year. The graph below seems to confirm this view, through analysing the movements of non-deliverable forwards (NDF) contracts (a hedging instrument similar to a derivative to protect investors from fluctuations in the Renminbi exchange rate). The NDF contracts are currently implying that over the next twelve months, the Renminbi could appreciate very conservatively at around 5%.

NDF rate (implied expected spot rate in 12 months)



(Source: Bloomberg)

It will be useful to analyse the real and nominal exchange rate in 12 months' time to determine whether or not the yuan has appreciated by the amount being predicted by the NDF chart above. Future studies should provide a more comprehensive study of determining whether the reform has had the desired effects on both the Chinese economy and trade imbalances, since data should show that inflation has been stabilized with continued GDP growth and should result in a reduction of exports from China. The effects, on the currency markets, of removing the dollar peg will best be judged with time and it will be useful for future studies to determine the levels of dollar and euro deposits being held by central banks across the world, which should show that dollar deposits held decline, with the Euro strengthening and Yen moving closely in line with the Renminbi.

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