



Document de travail de la série

*Etudes et Documents*

Ec 2005.23

**MODIFICATION OF CHINESE EXCHANGE RATE POLICY:  
RATIONALE, EXTENT AND RECENT DEVELOPMENT.**

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This version: October 21, 2005

25 p.

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### *Summary*

On July 21, China slightly revalued the Renminbi and officially modified the exchange rate regime. Interpreting this move as only the outcome of international pressures to reduce international trade imbalances is however misleading. To support our argument, we explore the rationale of the July 21 decision in the history of exchange rate management in China, and through the review of the twin debates of exchange rate level / regime. We argue that both external and internal concerns are taken into account by Chinese authorities in the exchange rate management. Moreover, the entire responsibility of Chinese exchange rate management in the world trade imbalances is doubtful. The review of the recent development since the July 21 shows that the impact of July 21 decision is limited. While the hot money inflows seem to have been tamed, the previous economic trends have not been modified to date.

Key words: China, Exchange rate policy, Trade imbalances

JEL : F31, F02

## **CHINA HAS MODIFIED ITS EXCHANGE RATE POLICY: RATIONALE, EXTENT AND RECENT DEVELOPMENT.**

### ***1. Introduction***

On 21<sup>st</sup> July 2005, the Chinese Central Bank revalued the renminbi from RMB 8.27 to 8.11 per dollar. This small revaluation (2.1%) is accompanied by an official modification of the exchange rate regime. Authorities announced that “RMB will be no longer pegged to the US dollar” and that “China will reform the exchange rate regime by moving into a managed floating exchange rate regime based on market supply and demand with reference to a basket of currencies”<sup>1</sup>, however without publishing the composition of the basket.

The revaluation occurred while the debate about Chinese exchange rate policy was intense since 2003, both among scholars and political leaders. American policy makers complained frequently that the renminbi has long been significantly undervalued, giving China an unfair trade advantage. Thus, China is blamed for a “currency manipulation” that induces job losses in USA, Japan, Europe and other Asian countries, threatening world economic equilibrium. Since the renminbi is now revalued, one might think that China yielded to this international pressure.

In this paper, we address two issues. First, in order to show that this interpretation is simplistic and misleading, we analyse the rationale of the recent modification of Chinese exchange rate policy and try to clarify the public debate, in particular the distinction between the level of the exchange rate and the exchange rate regime. Second, we explore the short-run impact of this economic policy decision.

The remainder of this paper is organized as follows. Section 2 recalls the main characteristics of exchange rate policy since the beginning of the transition toward a market economy, which are useful to understand the current exchange policy. Sections 3 and 4 analyse the two debates on the need of revaluation and greater flexibility, respectively. Section 5 assesses the main macroeconomic consequences to date of the July decision. Section 6 concludes.

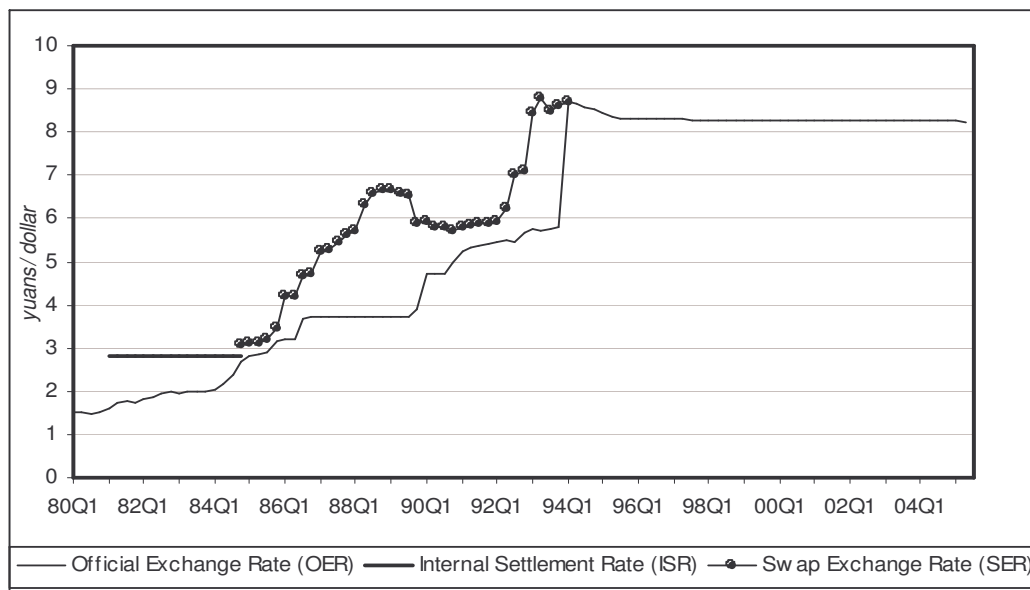
### ***2. What can be learned from the past?***

Two phases characterized the Chinese exchange rate policy in the transition period. From 1981 to 1994, a dual exchange rate system is applied, allowing the convergence of the official exchange rate to a “realistic” level and providing an experiment of managed float. Since 1994, while the exchange rate regime is officially a managed float, the exchange rate is de facto pegged to the US Dollar (see figure 1).

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<sup>1</sup>People's Bank of China. Public announcement ( [www.pbc.gov.cn/english/](http://www.pbc.gov.cn/english/))

Figure 1: Exchange rates of Chinese Renminbi, 1980-2005 (RMB per dollar)



Notes: Sources: PBC.

During its transition toward a market economy, China simultaneously had to improve its competitiveness and preserve macroeconomic stability. Thus, exchange rate policy was constrained by the traditional trade-off between "real target" and "nominal anchor" strategies (Corden, 1993), i.e. between "competitiveness" and "price stability". The first strategy consists in maintaining a competitive real exchange rate (RER) through a depreciation of the nominal exchange rate (NER), but at the risk of accelerating inflation, while the second aims at controlling inflation through a stable NER, but at the risk of an overvalued RER.

Considering the main features of Chinese exchange rate policy presented above, many authors argue that Chinese authorities pursued a "pure" real target strategy before 1994 and a nominal anchor policy since then<sup>2</sup>. Nevertheless, there is some evidence that authorities were also concerned by inflation control before 1994. As figure 1 shows, depreciations of the two rates were usually not simultaneous, suggesting that authorities maintained most of the time a nominal anchor, alternatively on the official and secondary exchange rate<sup>3</sup>.

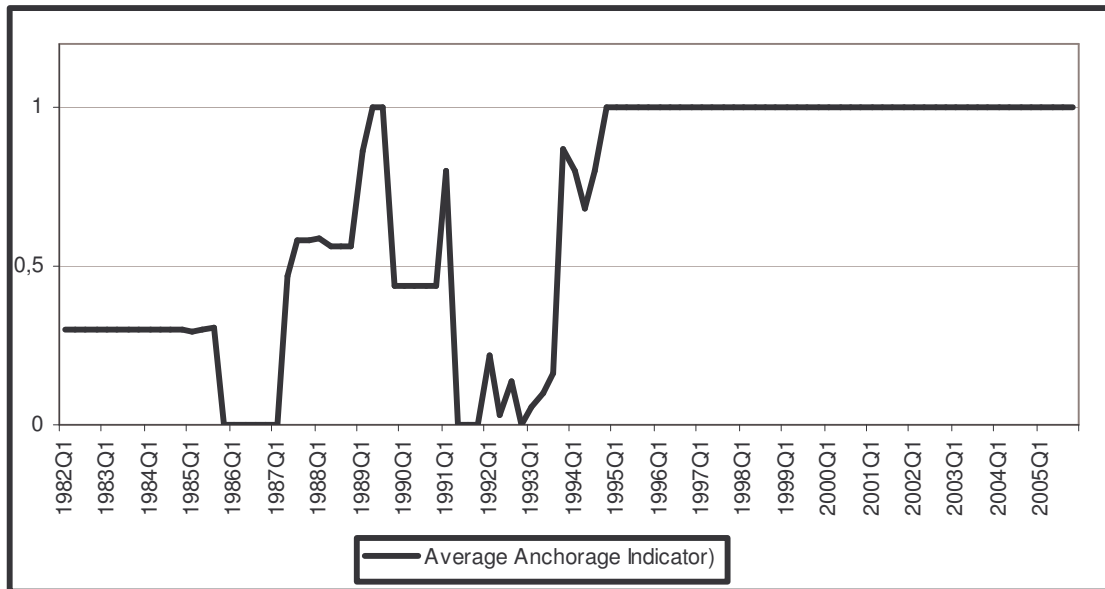
Two empirical works have showed the evidence of a mixed strategy. First, the calculation of a "nominal anchor policy" has been applied to China, allowing the identification of partial nominal anchor policies (see details in Annexe 1, and Guérineau and Guillaumont Jeanneney, 2003). Figure 2 shows the "average anchorage indicator", i.e. the average of indicators calculated with the official and swap exchange rates, weighted by the retention rate<sup>4</sup>. This average indicator gives a synthetic view of Chinese exchange rate policy and shows clearly the mix between real target and nominal anchor strategies until 1994.

<sup>2</sup> See for instance Zhang ZC (2000).

<sup>3</sup> Indeed, several authors noted signs of a nominal anchor concern. Zhang ZC (2000) note that "such an approach permits a certain fixity in the nominal while the effective exchange rate was flexible; hence it may help check price hiking in the domestic economy without international competitiveness being compromised". Zhang ZY (1996) points out that "one must note that the Chinese authority has been very cautiously to devalue its highly over-valued currency over time. It is mainly due to the consideration of the inflationary effect of currency devaluation".

<sup>4</sup> Corresponding to the relative importance of each exchange rate in foreign exchange transactions

Figure 2: Average Anchorage Indicator, China (1982-2005)



Notes: AI=0 complete real target; AI=1 complete nominal anchor. Sources: see Annexe 1.

Another evidence of a pre-1994 partial nominal anchor strategy can be found in the behaviour of authorities in the determination of the swap exchange rate through a reaction function.<sup>5</sup> Performing non linear estimations on such a reaction function, one can find that, only above an inflation threshold of 7.5%, government exhibits a countercyclical behaviour to both inflation and trade balance variations (see Guérineau 2002)<sup>6</sup>.

Therefore, government behaviour between 1985 and 1994 can be sum up as follows: (i) swap exchange rate determination was let to market mechanisms when inflation was under control; (ii) during overheating phases, swap exchange rate was managed according to dual objectives: decelerating inflation and maintaining exports competitiveness. This finding validates the hypothesis of a mixed exchange rate policy, which could also be considered as a "partial" nominal anchor policy<sup>7</sup>.

The main lesson that should be drawn from the past twenty years of Chinese exchange rate policy is that exchange rate policy aims at reaching both internal and external targets - and not only export competitiveness. Interpreting modifications of Chinese exchange rate policy assuming that it is only a tool to stimulate trade surpluses is thus misleading, as we will see in the following.

<sup>5</sup> Reaction function models have been widely used to analyse the behaviour of monetary authorities, particularly in fixing the Central Bank interest rate (Mac Nees 1986, Hakes 1990, Clarida, Gali et Gertler 1998).

<sup>6</sup> In short, we suppose that government reacts to inflation and trade balance records by adjusting swap exchange rate (the economic policy instrument). Empirical analysis was carried out by using quarterly data covering the period 1985 (4<sup>th</sup> quarter) – 1994 (1<sup>st</sup> quarter); Inflation and trade balance series are taken from *International Financial Statistics* (IMF), while swap exchange rate is taken from World Bank (1994).

<sup>7</sup> Estimating a reaction function in the same vein, Song (2001) found that price stability was a short-run objective of exchange rate policy, while the long-run response to inflation was insignificant.

### 3. The debate on the revaluation

#### 3.1 Is Renminbi undervalued?

To provide empirical elements to the debate on renminbi undervaluation, numerous studies have recently been dedicated to the assessment of renminbi misalignment (see appendix 2). This series of studies since 2003 has been preceded by another series in the late 1990s, which then attempted to assess the sustainability of the peg to the dollar after the Asian financial crisis (overvaluation was then suspected). As expected for a rapidly transforming economy, the estimated size of misalignment differ significantly across studies, and some estimations show almost perfectly reversed evolutions<sup>8</sup>.

Several general results may however be emphasized (see figure 3): (i) The initial overvaluation progressively disappeared during the 1980s. (ii) Exchange rate was close to its equilibrium value or slightly undervalued at the beginning of the 1990s. (iii) The nominal devaluation induced a 10-30% real undervaluation in 1994. (iv) Undervaluation was partially or fully erased between 1995 and 1997; (v) Since 1998, deflation and rapid economic growth have lead to a new drift of undervaluation. While there is a large consensus on the current yuan undervaluation, the range of the different misalignment estimations is very large, from 10% to 60%. The critical point is the diagnostic on the 1994-97 period: when considering that the exchange rate was already undervalued, the current misalignment is then large (20% - 60%), while not, the current misalignment is narrow (around 10%). Which interpretation is the more convincing? Let us start with the main arguments of a large undervaluation.

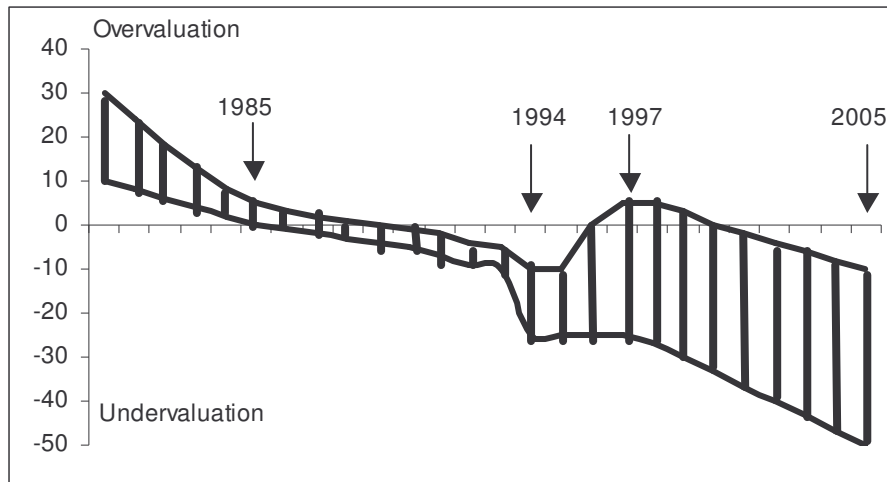
The first is trade dynamism. The growth of Chinese exports is impressive (for instance, merchandise exports increased by 33 % in the first half of 2005) and trade surpluses with USA and EU are huge (respectively \$162 billions and \$100 billions in 2004). These basic features are systematically emphasised by foreign policy makers. However, one can consider that trade balances would be more relevant than exports and recognize that Chinese imports also grew rapidly last years. Moreover, overall trade balance would be more relevant than bilateral trade balances and one have to consider that a large part of Chinese trade surplus with OECD country is offset by trade deficits with Asian countries.

Regarding the current account, China is running surpluses for almost ten years (3% of GDP in 2002 and 2003), which supports the undervaluation assertion. This situation is not common for an emerging economy, even more when this economy exhibits regularly signs of overheating (which increases demand for imports). Furthermore, Goldstein (2004) considers that the "underlying" surplus is larger than the actual surplus considering the overheating effect and the lagged effect of the earlier real depreciation. Since China runs capital account surpluses (which is common for an emerging economy), the "equilibrium" current account should exhibit a deficit. Consequently, there exists a huge gap between the "underlying" and the "equilibrium" current account balance, suggesting a large real undervaluation.

Undervaluation would also be the main source of the dramatic accumulation of foreign exchange reserves (from \$150 billions in 2001 to \$750 billions in mid-2005). The central bank had to buy huge amounts of dollars which would have induced the exchange rate to appreciate under floating.

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<sup>8</sup> For instance Bu and Tyers (2000) and Wong and Wong (1997) between 1988 and 1997.

*Figure 3: Estimations of Renminbi misalignment (1980 –2005)*

Notes: in percentage, a positive value is an overvaluation. Source: Various studies, See Appendix 2.

What are the reasons to be sceptical about the existence of a large undervaluation? The weaker argument for undervaluation is the bilateral surplus with the USA since, as noted earlier, China runs large deficits with Asian countries. In fact, this particular structure of trade balances has been strongly induced by a structural change in the division of labour in East Asia, i.e., the relocation in China of a part of the production of the emerging economies who grew rapidly in the 1970-80s. This organization has simultaneously raised imports from Asian countries and exports to OECD countries.<sup>9</sup>

Another structural factor of China competitiveness is the almost infinite pool of labour (underemployed workers in the countryside and workers laid-off from state-owned enterprises), which explains low (and flexible downwards) wages.

A particularly illustrative example of a structural advantage of China over other emerging economies on international markets is textile and garments, which has been dramatically revealed since the end of the MFA on January 1, 2005.<sup>10</sup> This is illustrated in the next table reporting EU trade statistics for the first five months of 2005, where obviously Chinese exports tend to replace other emerging economies exports.

<sup>9</sup> Gaulier, Lemoine et Unal-Kesenci (2005), China's integration in East Asia: production sharing, FDI and high-tech trade, Working Paper CEPII 2005-09, June.

<sup>10</sup> Studying the relative competitiveness between China and Vietnam on garment, Demurger and Goujon (2001) find that the advantage of Chinese firms seems to be more in the domestic industrial structure and environment than in labor costs and productivity: Chinese industries are more integrated (various intermediary inputs are produced locally in China), the business environment in China seems to be more propitious to the development of production sector with high saving and investment ratios, abundant and skilled labor and support policies from local administration. Constraints as regulation opacity and administrative clumsiness exist in China but are relieved by an advanced economic decentralization.

Table 1: EU Trade statistics – Textile and clothing imports

	Total		China		
	value (ml €)	volume (th tons)	value (ml €)	volume (th tons)	value share
Jan-May 2004	30651	4272	5416	748	18%
Jan-May 2005	27678	4117	7389	1050	26%
Variation	-10%	-4%	+36%	+40%	+8% points

Source: <http://europa.eu.int/>

Third, the current undervaluation should only come from a recent *appreciation of the equilibrium real exchange rate* because (i) the real effective exchange rate is almost stable since 1998, (ii) 1998 was marked by some depreciation tensions, suggesting the exchange rate was not undervalued in this year. An appreciation of the equilibrium RER should come from relative productivity gains (economic growth and economic reforms) according to the Balassa-Samuelson effect. However, the imports liberalisation induced by the WTO accession inversely calls for a depreciation of the equilibrium RER (since it would deteriorate China trade balance for any level of the exchange rate), even if the end of MFA reduces the net effect of trade policy changes. It is reasonable to think that the net effect of trade policy modification would partly offset productivity gain effect but would not, under reasonable assumption, lead to a huge appreciation of the equilibrium RER in a short period (Guérineau and Guillaumont Jeanneney, 2005, suggest that productivity gains decelerated in the second half of the 1990s).<sup>11</sup>

Fourth, the equilibrium real exchange rate is supposed to ensure simultaneously external and internal equilibrium but most studies have underemphasized this second condition. High underemployment, as experienced by China, rather suggests a *RER overvaluation* according to internal equilibrium condition. Consequently, studies that only focus on the external condition simply overstate undervaluation.<sup>12</sup> Exchange rate is not the instrument to be preferred against underemployment but a country that experiences high underemployment cannot, arguably, afford a massive revaluation.

Last, a huge undervaluation is not compatible with the trends in the non deliverable forward market for Chinese RMB (in Hong Kong or Singapore forex markets). First, appreciation expectations were not dominant until November 2002 (Fung et al. 2004). Second, the observed discount on the RMB forward rate has since remained very low (1,5% for the 1-year forward contract) until the recent revaluation. Even considering the distortion due to the peg, it is hard to believe that the "real" undervaluation is, say, twenty or thirty times greater than the forward rate discount.

Considering these arguments – but keeping in mind the difficulty to have a clear-cut opinion on exchange rate misalignment – the "moderate undervaluation" hypothesis (10-15%) seems finally more convincing. Moreover, as a developing country, China may reasonably keep a competitive cushion to manage external shocks. Therefore, a smaller revaluation than the 10-15% range would be acceptable by China and foreign trade partners. But what should be expected from such a revaluation?

<sup>11</sup>If the analysis is made with reference to the early 1990s (arguing that renminbi was already overvalued in 1998), the Balassa effect is of course greater, but the trade liberalisation effect is also much higher (thanks to the measures taken in 1993 and 1994)

<sup>12</sup>The Fundamental Equilibrium Exchange Rate method, used by Coudert and Couharde (2004), integrates this internal equilibrium. Nevertheless, internal equilibrium is assessed through an estimation of the output gap, that ignores labour market disequilibria.



### 3.2 *The main argument: the reduction of trade imbalances*

China is blamed for RMB undervaluation, which is assumed to exacerbate international trade imbalances (in particular the US trade deficit). Therefore, the reduction of trade imbalances is the main benefit expected from the revaluation. However, such a result depends on the very nature of trade imbalances and on the value of trade price-elasticities.

Let us start with China. As noted earlier, exports dynamism is certainly explained as much by structural factors (wage flexibility) as by exchange rate policy. Moreover Chinese exports have a high import content due to the export-processing sector (Lemoine and Unal-Kesenci, 2003). Therefore China trade surplus is unlikely to be very sensitive to exchange rate fluctuations. Tung and Baker (2004) consider that "the net effect on China's terms of trade from even the sort of maxi revaluation that we advocate [15%] would be modest".

Do empirical studies find low price-elasticities? Unfortunately, export price-elasticity estimations based on recent data are scarce and heterogeneous (see appendix 3), but most range from 0.7 to 1 (while Bénassy-Quéré and Lahrière-Revil 2003 found a high value of 1.3, Déès 2001 found a very low elasticity of 0.3<sup>13</sup>). Since these estimations cannot integrate the structural competitiveness of China, one could expect that the real elasticities are in fact smaller than estimated or non-linear (an appreciation-induced drop in export would be smaller than a depreciation-induced increase in export).

What could be the impact of RMB revaluation on OECD countries? China being the source of around 6% of OECD total imports, and assuming a unitary price-elasticity of OECD imports of Chinese products, a 10% RMB revaluation would lead to only a 0.6% reduction of OECD imports. Moreover, the reduction of the imports volume would certainly be totally offset by the increase in price with actually no effect on trade balance. In fact, any improvement should then come from the expansion of OECD exports to China. Exports to China represent 4% of total US exports, assuming a unitary price-elasticity, US exports would be raised by 0.4% following a 10% revaluation, i.e. \$4.6 billions opposed to a US current account deficit of \$618 billions in 2004. According to Anderson (2005), even a large RMB revaluation would have a limited impact on the US trade deficit, which is more affected by trade competition with UE and Japan. In the same spirit, MacKinnon (2004) and Stiglitz (2005) point out that the USA will run current account deficit as long as US private and public saving is very low, whatever the Chinese exchange rate policy.

Recognising the small direct impact of the RMB revaluation, some authors emphasise the possibility of contagion.<sup>14</sup> If the other Asian countries (also blamed for undervaluation) follow China's decision to revalue, the overall impact of the RMB revaluation on OECD trade balances would be greater. Goldstein (2004) suggests that a 20% RMB revaluation could lead other Asian emerging economies and Japan to allow a 15% revaluation of their currencies. Bénassy and Lahrière-Revil (2003) discuss a case where most Asian countries follow a 10% RMB revaluation. However, they note that Asian countries would be certainly less prompt to follow an

<sup>13</sup>Bénassy-Quéré and Lahrière-Revil (2003) show that the main part of this reduction is due to the direct competitiveness impact on OECD markets. The direct competitiveness impact on Asian trade and the relative competitive impact on OECD markets seem on the contrary weak. Déès (2001) also presents separate elasticities for "ordinary exports" (0.50) and "processing exports" (0.15).

<sup>14</sup> As explicitly argued by Bénassy and Lahrière-Revil (2003, p.18) "since the direct impact of the yuan on foreign imbalances was expected to be relatively small, the main issue was on whether neighbouring countries would follow a revaluation of the Chinese currency"

appreciating RMB (the current scenario) than a depreciating RMB (recalling the fear of the "dominoes' scenario" during the Asian crisis).

At last, the expected impact of a 10% RMB revaluation on the intra-Asian trade would be even weaker, given the growing importance of the vertical intra-industry. (Bénassy-Quéré and Lahrière-Revil (2003) estimate the elasticity of intra-Asian trade to bilateral exchange rate at 0.5). One can not ignore however the impact of the revaluation on third markets (EU and USA) where China's products would be less competitive.

In conclusion, the Chinese responsibility in international trade imbalances and consequently, the capacity of a RMB revaluation to reduce significantly trade imbalances seems to be highly overstated. By contrast, China itself is obviously the most sensitive to a large revaluation, which gives room to Chinese government to determine exchange policy according to their own objectives, rather than to an hypothetical effect on trade imbalances. Thus the next question is whether the revaluation is beneficial to China.

### *3.3 Other arguments: some conflicting effects*

Some authors suggest that revaluation will serve China's self interest.<sup>15</sup> The main advantage in avoiding RMB undervaluation would be to dampen hot money inflows (probably about \$50 billions in 2003, Tung and Baker (2004)). Indeed, these inflows lead to a rapid foreign exchange reserves accumulation that has some awkward macroeconomic effects (Goldstein, 2004). On one hand, the amount of reserve accumulation that is not sterilized produces a surge of money supply (+20% in 2003), which may have two main adverse effects: i) it may give rise of inflation pressure through an increase in bank loans and investment; ii) it may make the banking reform harder by giving banks an excessive liquidity, which reduce the incentives to improve credit allocation inducing a new surge of non performing loans. On the other hand, the fraction of such an increase in reserves that is sterilized (almost one half of the total in 2003) induces a significant cost (interest payment on sterilizing instruments such as government bond).

An indirect benefit from revaluation would be to lessen the risk of a revival of protectionism from countries running bilateral trade deficits with China (mainly USA, Europe and Japan).

However, revaluation is potentially costly for China. One of Chinese policy makers' concerns is the risk of deflationary pressures, though mitigated by a current rise in inflation (almost 4% in 2004). However, one can not exclude that a large revaluation may put downward pressure on wages, causing a fall in domestic demand (already weak) and output.

Financial stability is also of concern. Revaluation is automatically reducing the value of dollars assets held by commercial banks and the Central Bank, with the latter being the main loser given its net foreign assets of \$750 billions. Additional destabilising effects on the financial sector may be expected if the revaluation is carried through a flexibilisation of the exchange rate, but this point is related to the exchange rate regime, and not to the revaluation itself.

Another undesirable effect might come from the strengthening of investment in the non-tradable sector and particularly in the already speculative real estate. In addition, the Chinese reluctance to revalue may be linked to the political will to promote the

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<sup>15</sup> Tung and Baker (2004) "RMB revaluation will serve China self-interest", *China Economic Review*, 15, p.331-335

development of local firms, of which productivity is probably lower than that of foreign funded enterprises and joint-ventures. .

At last, financial markets response to revaluation (and thus future speculative inflows) is far to be clearly anticipated. The size of the revaluation needed to cancel appreciation expectations may be too large to be economically affordable.

To sum up, the above analysis suggests that China could bear a moderate revaluation of, say, 10%, i.e. without incurring unacceptable costs on *both* external and internal sides.

However, such a revaluation can not be considered as a unilateral effort of China to reduce international trade imbalances. Since China is not involved in an international monetary arrangement, any cooperative action has to be negotiated between sovereign partners (as it has been done in the 1980s between the USA and Japan) and not unilaterally required by one of them. In short, as the Chinese prime Minister Wen Jiabao recalled<sup>16</sup>, China government freely determines its own exchange rate policy. Moreover, considering that the responsibility of international imbalances is shared, why should China (a developing country with a per capita income of around \$1000) take a greater share of the adjustment costs than the high income economies (above \$25000 per capita).

#### **4. The debate on flexibility**

Many agree that RMB exchange rate regime need greater flexibility. The main argument is the "impossible trinity" identified by Mundell, (1962). As China is opening up to the world economy, financial market integration is increasing, which, under a fixed exchange rate, is not compatible with an independent monetary policy. Since China needs monetary policy for stabilisation purposes, the transition toward a greater flexibility seems unavoidable (Prasad *et al.*, 2005). This view is also predominant in economic newspapers across OECD countries<sup>17</sup>.

Several authors however (e.g. McKinnon 2004, Dooley *et al.* 2003) think that the dollar peg remains the best available option for China and other East Asian countries, both for trade and financial concerns. Trade intensity is a basic argument for pegging: The USA are still a major trade partner of East Asian countries, (even if the share has slightly declined over the last two decades) and of China (in 2004 the USA account for 15.2% of Chinese total trade with 22.8% for exports, 7.7% for imports). However several arguments give stronger support to the peg. First, the US dollar is not only used for trade with the USA, but is also the hegemonic currency for invoicing trade in East Asia (except for direct trade with Japan which is invoiced in Yen). Furthermore, the benefits of a dollar peg are reinforced by the lack of foreign exchange rate hedging instruments (the only way to hedge foreign exchange risk with RMB is to rely on the offshore non deliverable forward markets located in East Asian financial centres, mainly Hong Kong and Singapore, see Fung and Leung, 2004).

As for trade, the US dollar is the main currency for invoicing capital flows in East Asia since domestic financial markets are underdeveloped. In particular, most of East Asian economies are unable to borrow internationally in domestic currency. Nevertheless, since they have run current account surpluses, most emerging East Asian countries, and particularly China, are currently net creditors, thus accumulating a large stock of dollar claims. McKinnon named this particular currency mismatch the

<sup>16</sup> in the 6<sup>th</sup> Asia-European Union Meeting (ASEM) in Tianjin, June 26, 2005

<sup>17</sup> The renminbi is likely to appreciate with a more flexible exchange rate regime. Therefore, from the US point of view, a good reason to advocate a greater flexibility is to get an appreciation of the Chinese currency. Obviously, this argument confuses the revaluation and the flexibility debates.

“conflicted virtue” syndrome. This mismatch leads to appreciation pressures on domestic currencies, inducing the risk of loss on dollar claims value, thus pushes governments to the dollar peg. Since a hard peg commitment is too risky and regional coordination is far to be efficient, soft dollar peg remains an attractive option.<sup>18</sup>

Moreover, greater exchange rate flexibility may produce serious disturbances in the Chinese financial sector, which is not prepared to manage foreign exchange risks. Admittedly, the restrictions on capital account transactions may mitigate these risks in the short-run, and give time to improve banking competences in this field. Nevertheless, paying great attention to macroeconomic stability and recognising the financial sector vulnerability, the Chinese government is greatly reluctant to increase significantly the RMB flexibility.

To increase exchange rate flexibility, four main options can be listed, ranging from the more to the less flexible: (i) free floating, (ii) dollar peg within a widened band, (iii) basket peg, and (iv) adjustable dollar peg. Considering the fragility of the financial sector, free floating is not a feasible option in the short term (although suggested by US treasury secretary John Snow in 2003).

Goldstein and Lardy (2003) suggested a two-stage reform. In a first stage, a widening of the band (from less than 1% to 5-7%) would be carried out simultaneously with a 15-25% revaluation. In the second stage, when the banking system would be strong enough to allow a significant liberalisation, foreign exchange regime would move to floating. Widening the band is also advocated by Lu (2004), while Williamson (2004) thinks that the basket peg would be the first stage of foreign exchange reform.<sup>19</sup>

Among the three short-run "feasible" options, the Chinese authorities have chosen a basket peg, so far without informing about the basket composition. A logic composition should include the three main international currencies but giving more weight to the US dollar. Williamson (2005) however derives an “optimal” 5-currency basket from the China trade structure: the US Dollar (20,9%), the Euro (22,9%), the Yen (25,1%), and also the Hong Kong Dollar (19,3%) and the Korean Won (11,8%).<sup>20</sup> At the regional level, Williamson (2005) advocates the adoption of a peg to a common basket by East Asian countries and using the same methodology, the optimal basket would be USD 40%, Euro 30% and yen (30%). Recently, Chinese monetary authorities indicated that the basket contains more than three currencies, *i.e.* not only the three major currencies (probably other Asian currencies).

## 5. What has occurred since July 21?

### 5.1 *Is the exchange rate really flexible?*

To date, the main target of the July 21 decision – to slow down hot money inflows – seems to have been reached. Did it allow the Central Bank to improve significantly the actual flexibility? There is some purposeful ambiguity in the announcement of the new foreign exchange regime on July 21.<sup>21</sup> Allowing small and discretionary

<sup>18</sup> To sum up the McKinnon's view, soft pegging on the dollar is an acceptable 3<sup>rd</sup> best, since the 1<sup>st</sup> best (regional common currency) is politically unfeasible in the short run, and the 2<sup>nd</sup> best (hard pegging) is too risky without regional co-ordination.

<sup>19</sup> On the long run options, see Eichengreen (2005), McKinnon (2004), Williamson (2004) and Mundell (2003).

<sup>20</sup> Williamson uses the total trade and excludes countries whose trade with China is smaller than 5% of the total.

<sup>21</sup> According to Krugman's comment (Wall Street Journal, July 23, 2005), “the statement was terse and uninformative” or even “inscrutable”.

exchange rate adjustments does not imply a loss of control over exchange rate fluctuations. The modification of foreign exchange regime is actually likely to have a slight impact if adjustments are scarce. A crucial point is the use of the band mechanism, since the daily trading band of 0.3% a day theoretically allows a significant appreciation, even in the short-run. A few days after the revaluation, the *Financial Times* calculated that a 15% appreciation could be attained in less than two months and a half, and financial markets seemed to believe in the gradual appreciation scenario. In Singapore, the one-year RMB non-deliverable forward rate then rose to 7.64 per dollar (corresponding to a 6% appreciation over the next 12 months). Some financial institutions (Merrill Lynch or BNP Paribas) forecasted a significant appreciation by the year-end (respectively RMB7.5 and RMB7.9 per dollar).<sup>22</sup> However, while initially having declared that the revaluation is only an initial step, a few days later the Central Bank denied that there are any plans for further revaluation.

Actually the Chinese exchange rate has experienced an almost unperceivable revaluation trend since July, 21 (from the revaluation rate of RMB8.11 per dollar, it stabilized at RMB8.10 on August 10 and at 8.08 on September 7). The exchange rate reached RMB8.09 on October, 5<sup>th</sup>, which corresponds to a 0.25% revaluation since July 21. In short, the scenario of a gradual appreciation seems to move away, or at least to be postponed for several months. On September 30 - a few days after the G7 meeting during which USA and EU urged China to free the yuan further - the Central Bank announced a widening of the renminbi's trading band against non-dollar currencies. The renminbi's trading range against currencies such as the euro and the yen is then doubled to  $\pm 3$  per cent. As in July, most foreign policymakers commented favourably this decision, although suggesting that the move was far from sufficient.

At this point, the move to flexibility is too modest to produce significant effects and, on statistical grounds, the *de facto* exchange rate regime is still to be classified as a dollar peg, though less hard than it used to be<sup>23</sup>. However, this "pseudo-flexibilisation" has the same virtue as the "mini-revaluation", it makes it harder to criticise China for not contributing to solve world trade imbalances. This move is probably not only a diplomatic decision; it also aims at signalling that the move towards a more flexible exchange rate regime is officially initiated.

### 5.2 *Is there a contagion effect among Asian currencies?*

Table 2 reports the very short run response to the RMB revaluation of 10 Asian exchange rates since July 21. Exchange rate responses have varied, depending on the exchange rate regime and, on circumstances<sup>24</sup>. For instance, maintaining a currency board arrangement, Hong Kong SAR has not seen any significant move in the HK Dollar exchange rate at 7.77 per USD (within the 7.75-7.85 trading band introduced in May 2005).

One can roughly classify the remaining countries as follows: The Yen and the Baht have shown an almost complete absorption of the Yuan revaluation even after 8 weeks; The Won and the Singapore dollar (and to a lesser extent the Ringgit) have shown an almost complete absorption within two weeks but have tended to recover progressively their past level since then; The Rupees, the Rupiah, the Pesos and the Taiwan dollar have been affected by the revaluation announcement but have demonstrated independent fluctuations quickly after.

<sup>22</sup>Dickie, Mure. (2005) "Renminbi's tight rein a damper on US hopes", *Financial Times*, July 22.

<sup>23</sup>Ogawa, Eiji (2005) "Chinese exchange rate policy", 1<sup>st</sup> Conference on Transition and Economic Development in China, Fudan University, September 10-11.

<sup>24</sup>As of April 30, 2005, the *de facto* exchange rate arrangements in the region were : currency board in Hong Kong SAR, fixed peg in China and Malaysia, managed floating with no predetermined path for the exchange rate in Indonesia, Thailand, India and Singapore, independently floating in Korea, Philippines, Taiwan and Japan. IMF Annual Report Table II.13.

Table 2: Incremental appreciation as compared to the yuan appreciation (% change in currency exchange rate / % change in yuan exchange rate against the dollar, from July 20)

		Yen	HK\$	Rupees	Rupiah	Ringgit	Pesos	SG\$	Won	TW\$	Baht
Reval. day	Thu 21/07	<b>126</b>	5.6	<b>45</b>	16	-0.3	16	<b>105</b>	33	-6.5	88
1 day after	Fri 22/07	97	2.6	7,2	15	24	38	89	101	<b>53</b>	86
2 days after	Mon 25/07	80	2.6	0.6	11	<b>62</b>	<b>39</b>	80	138	31	91
1 week after	Thu 28/07	47	2.1	13	-8.8	62	-19	68	70	0	39
2 weeks after	Thu 04/08	93	2.8	2,9	<b>37</b>	55	-2.8	104	<b>138</b>	14	110
4 weeks after	Thu 18/08	117	4.8	-4,1	-61	38	-0.8	64	87	-31	90
8 weeks after	Thu 15/09	109	<b>9.8</b>	-33	-81	32	-4.4	25	66	-118	<b>113</b>

Notes: peaks are in bold. Source : Own calculations using Sauder's data.

An increased exchange rate flexibility or volatility in the region would have been expected following July 21. Surprisingly however, almost all exchange rates demonstrated an unchanged or even a narrower volatility after July 21, except India, Indonesia and Malaysia (see Table 3).

Table 3: Exchange rate variance before and after the Yuan revaluation

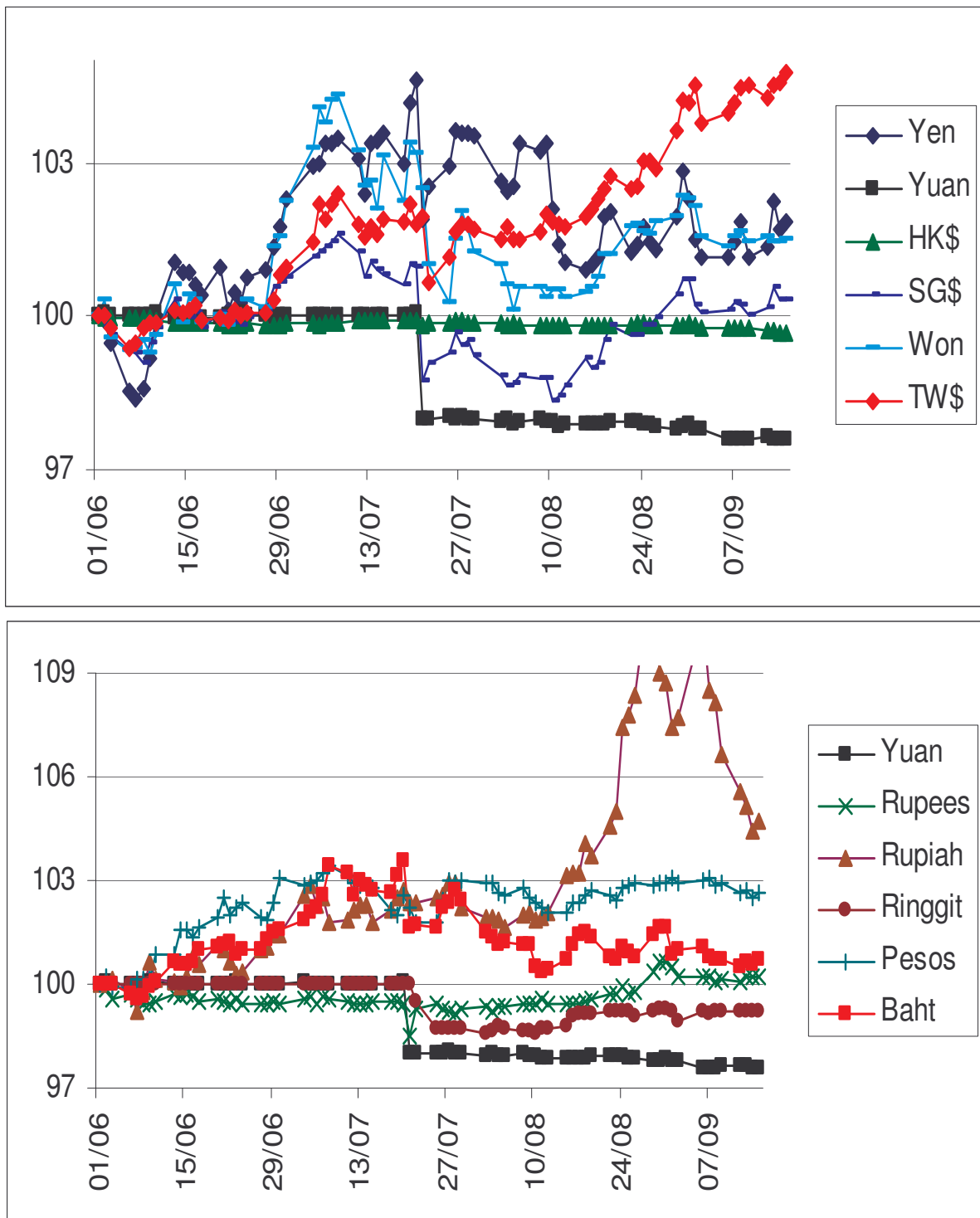
	Yen	Yuan	HK\$	Rupees	Rupiah	Ringgit	Pesos	SG\$	Won	TW\$	Baht
pre-variance	2,182	0,000	0,002	0,009	0,845	0,000	0,630	0,370	2,694	0,863	1,133
post-variance	0,809	0,004	0,001	0,174	8,199	0,075	0,130	0,418	0,468	0,875	0,349

Notes : Variance of currency exchange rate index against the dollar, 6 weeks before and 6 weeks after the 21 July (excluded). Sources : own calculations using Sauder's data.

Admittedly, observed moves in some exchange rates gave strength to the contagion scenario (particularly Malaysia, by scrapping its peg to the dollar and allowing the ringgit to appreciate right after China's decision<sup>25</sup>). However, one can guess that this would be a simplistic interpretation. In fact, currently almost all countries experience an economic and financial recovery following Asian crisis and the turbulent year 2001, underpinning the move to greater exchange rate flexibility. The Yuan revaluation announcement may have created a favourable regional context, and, for instance, Malaysian authorities used this opportunity to abandon the peg with less risks of market speculation. In conclusion, even if the instantaneous impact was noticeable in all Asian countries, the contagion effect has vanished rapidly for the most of them (except the Yen, the Baht and, to a lesser extent, the Won).

<sup>25</sup> Pesek, Willian jr, (2005) Unpegging the Ringgit is a Sign of Malaysia's Strength", Bloomberg News, July28..

Figure 4: Daily exchange rate of Asian currencies, June 1 – September 15



Notes: Nominal exchange rate against the dollar, index June 1 = 100. Sources : Own calculations using Sauder's data.

### 5.3 Does it impact on economy?

One could consider that the time span is too short to feel the effect of the revaluation. However, one could try to extract some rough information from short-term situation indicators and from economic forecasts before and after the revaluation. Right after the revaluation, comments mainly support the view of forthcoming negative impacts on activity and price<sup>26</sup>. Two months later, this negative impact has less support. Concerning the external accounts, export performance is not affected by the 21 July decision (see Table below). Furthermore and surprisingly, medium-run expectations about the current account show even more improvement compared to 2004 (\$53 billion or 4.2% of GDP), IMF being the most optimistic.

*Table 4a Actual Monthly Trade*

	<i>Before revaluation</i>	<i>After revaluation</i>	<i>Gap</i>
	July	August	
Exports growth (y-o-y %)	28.7	32.0	+3.3
Trade surplus (\$ billion)	10.4	10.0 <sup>(a)</sup>	-0.4

Notes: (a) Against \$4.5 billion in August 2004.

*Table 4b Current Account Forecasts (% GDP)*

		<i>Before revaluation</i>	<i>After revaluation</i>	<i>Gap</i>
ADB (April and October)	2005	1.2	4.7	+3.5
	2006	0.4	3.6	+3.2
IMF (May and September)	2005	4	6.1	+2.1
	2006	3.7	5.6	+1.9
Dresdner Bank (April and September)	2005	3.5	3.6	+0.1
	2006	3.4	3.7	+0.3

Considering this impact on trade, it is not surprising that economic activity would not be hurt by the recent revaluation. There is no short-run effect on industrial production in August (even more, industrial production growth in August, +16.0%, would exceed latest projection of +15.7%). Moreover, whatever the source, the growth outlook has been revised upward since the revaluation for the entire year 2005 (from 0.2 to 1.0 percentage point) and has been unchanged for 2006.<sup>27</sup>

*Table 4c Actual Monthly Industrial Production*

	<i>Before revaluation</i>	<i>After revaluation</i>	<i>Gap</i>
	July	August	
y-o-y growth %	16.1	16.0	-0.1

<sup>26</sup> For instance, the State Information Centre cuts the GDP growth forecast by 0.5 percentage point, a export growth by 1.5 percentage point and inflation by 0.4 percentage point.

<sup>27</sup> However, Crédit Agricole - CLSA chief economist Jim Walker expect that economic growth in China will slow in 2006 (in a range of 5– 7%) as domestic demand eases and manufacturers continue to face high oil and commodity prices.



Table 4d Annual GDP growth Forecasts (%)

		<i>Before revaluation</i>	<i>After revaluation</i>	<i>Gap</i>
PBC (Research bureau)	2005	9.0	9.2	+0.2
ADB (April and October)	2005	8.5	9.2	+0.7
	2006	8.7	8.8	+0.1
IMF (May and September)	2005	8.5	9.0	+0.5
	2006	8.0	8.2	+0.2
Dresdner Bank (April and September)	2005	8.0	9.0	+1.0
	2006	8.0	8.0	0.0

Before revaluation, 2005 inflation forecasts ranged from 2.5 to 3.6%, showing a downward trend from the 2004 peak of 3.9%. An appreciation of the exchange rate should have put further downward pressure on domestic prices. The overall picture does not depart from this theoretical outcome. Year-on-year CPI increase in August was down by 0.5 percent point from July figure. Post-revaluation revised forecasts for the entire year are effectively weaker now (except for the IMF that have maintained its prevision of 3.0% because of a surprising growth in M2 in August, a y-o-y +17.3% compared to a target of +16.5% and a July growth of 16.3%). All 2005 inflation forecasts are now lying within the 2.0 to 3.0% range.

Table 4e Actual Monthly Inflation

	<i>Before revaluation</i>	<i>After revaluation</i>	<i>Gap</i>
	July	August	
y-o-y %	1.8	1.3	-0.5

Table 4f Annual Inflation Forecasts (%)

		<i>Before revaluation</i>	<i>After revaluation</i>	<i>Gap</i>
PBC (Research bureau)	2005	2.7	2.0	-0.7
ADB (April and October)	2005	3.6	2.5	-1.1
	2006	3.3	2.6	-0.7
IMF (May and September)	2005	3.0	3.0	0.0
	2006	2.5	3.8	+1.3
Dresdner Bank (April and September)	2005	3.5	2.5	-1.0
	2006	3.0	2.0	-1.0

While, as expected, price deceleration has slightly reinforced, a surprising outcome is that external account and growth expectations have improved since the revaluation. These results, arguably, may be explained by the small size of the revaluation that was unable to lead to a dramatic break in the previous macroeconomic trends.

## 6. Conclusion

By revaluing its currency, China did not yield to international pressure. Admittedly, the Chinese government took into account the political benefit of such action, since this will mitigate protectionist pressure for a few months. However, its decision was essentially driven by the wish to dampen the surge of hot money, attracted by revaluation expectations. One might have expected that the revaluation was too small to ease these expectations. However, the Central Bank repeated denial of further revaluation seems to succeed in curbing short-term capital inflows<sup>28</sup>. To date, this is the main effect of July 21 decision, since the other expected effects are limited. First, the lessening of exchange rate tensions is not large and old enough to lead Chinese government to speed up the move to *de facto* flexibility. Second, the impact of RMB revaluation on Asian currencies has been modest and transitory. At last, RMB revaluation has not modified the previous macroeconomic trends of Chinese economy (increasing current account surpluses, sustained growth and deceleration of prices). In a broader perspective, the most important effect of July 21 decision might be to signal the official start of the move to flexibility, even if this move is slower than expected two months ago.

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<sup>28</sup> The fight against revaluation pressure may also rely on interventions on the domestic financial system (Sun and Ma, 2005).

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*Appendix 1: The Anchorage Indicator (AI)*

The two strategies defined by Corden (1993) are theoretically in competition with one another and thus mutually exclusive. Nevertheless, according to internal and external shocks, a government may consider it useful to pay attention to the goal that is not predominant in its policy. For instance, to adjust its fixed exchange rate when firm competitiveness is threatened by an excessive real appreciation. An indirect positive effect of a more flexible policy is to mitigate the calls for protection by domestic producers (Drabek and Brada, 1998). Therefore the strategy chosen is generally an evolving trade-off between the two short-run targets (competitiveness and stabilisation), and not a clear-cut choice of one policy. In addition, long run constraints can not be ignored; given that these countries have to catch-up with industrialised economies, exchange rate policy must promote capital inflows (needed to improve productivity). Policies observed in transition countries globally show the need to consider mixed strategies, as such countries have integrated both targets in their policies with evolving weights during the period.

With a view to measuring the weight of each target, we used implications of their target on the evolution of the nominal and real exchange rates. The nominal anchor policy indicator is built by comparing nominal and real evolution. The “anchorage indicator” (AI) is measured as the ratio of two elements: the absolute value of the rate of variation of the real exchange rate of the dollar in terms of yuans ( $gRER_s$ ) during the last four quarters and the sum of this same rate and the rate of variation of the nominal exchange rate ( $gNER_s$ )(both in absolute value):

$$AI = \frac{|gRER_s|}{|gRER_s| + |gNER_s|}$$

Therefore, in order to measure the strategy used by monetary authorities, private agents compare the observed short-term trends (over the previous year) of the nominal and real exchange rates. We assume that the very-short-term fluctuations around this trend (seasonality, small shocks) do not reveal the strategy used by the Central Bank. W

This indicator allows us to characterize three exchange rate policies: (i) when the monetary authorities apply a “pure” nominal anchor policy  $|gNER_s|=0$  so that  $AI=1$ ; (ii) when the monetary authorities apply a “pure” real target strategy  $|gRER_s|=0$  so that  $AI=0$ ; (iii) when the monetary authorities apply a partial nominal anchor policy  $|gNER_s|\neq 0$  and  $|gRER_s|\neq 0$  so that  $0 < AI < 1$ . Moreover, the smaller is the nominal depreciation (and the bigger is the real appreciation), the greater is AI.<sup>29</sup> .

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<sup>29</sup> In order to obtain a consistent indicator, a nominal appreciation is classified with nominal stability since it corresponds to the same strategy, and similarly a real depreciation is classified with real stability, see appendix 1. For a complete explanation of the indicator see Guérineau and Jeanneney Guillaume (2002).

*Appendix 2: Estimation of Chinese Renminbi misalignment*

Study	Sample	Methodology	Undervaluation	Determinants of the equilibrium exchange rate (NER or RER)
<b>Recent studies</b>				
Goldstein (2004)	?	?	15/25% (2003)	
Coudert et Couharde (2005)	2002-2003	Fundamental Equilibrium Exchange Rate	59/49% (2002) 54/44%(2003)	Internal eq. (output gap) External eq.(Current account structural factors)
Coudert et Couharde (2005)	2002-2003	Purchasing Power Parity	41/50%(2003)	RER: GDP
The Economist	1992-2003	Big Mac Index	56% (2003)	RER (specific RER= relative price of Big Mac)
Yang (2004)	2003	Adjusted Big Mac Index	0% (2003)	
Zhang and Pan (2004)	1996-2002	Reduced equation of structural factors	15/22% (2003)	NER: Openness, GDP, GDP growth rate differential
Chang and Shao (2004)	2001	Purchasing power Parity	20% (2001)	RER: GDP
Fung and Leung (2004)	Jan1999-nov2003	Discount on the RMB forward market rate	1,5% (2003) <sup>(a)</sup>	
<b>Previous studies</b>				
Chou and Shih (1998)	1978(q1)-1994(q4)	Purchasing power Parity	Official; Bilateral (USA)	RER: (Constant equilibrium) Reference = average (1981-94)
Bu and Tyers (2001)	1987-1998	Devarajan- Lewis - Robinson	Average <sup>(b)</sup> ; Effective <sup>(c)</sup>	RER: Terms of trade; Net capital flows
Ma (2000)	1980(q1)-1997(q4)	Reduced equation of structural factors (Edwards 1989)	Average <sup>(b)</sup> ; Effective <sup>(c)</sup>	RER: Technical progress; Fiscal policy;
Zhang ZC (2001)	1952-1997	Reduced equation of structural factors (Montiel 1999)	Average <sup>(b)</sup> ; Bilateral (USA)	Trade policy World context
Chou and Shih (1998)	1978-1994	Shadow price of foreign exchange	Official; Bilateral (USA)	NER: adjusted according to trade barriers)
Wong and Wong (1997)	1981-1996	Domestic resource cost to produce 1\$ of export earnings	Average <sup>(b)</sup> ; Bilateral (USA)	NER:

- (a) Since Renminbi is pegged to the dollar, the forward market premium/discount gives a distorted measure of the exchange rate misalignment which integrates the probability of a de-pegging.
- (b) Average exchange rate is a weighted average of the official exchange rate (internal settlement rate from 1981 to 1984) and the swap rate, but the weights differ among studies.
- (c) The number of trade partners used in the calculation of the effective exchange rate differs among studies.

*Appendix 3: Estimation of price–elasticity of Chinese exports*

Study	Sample	Endogenous variable	Exchange rate	Estimated elasticity	Additional explanatory variables	Estimation method
Brada et alii (1993)	1981(T1)-1989(T4)	Exports /Imports	REER	3,34*	World Revenue Chinese GDP	CV (Johansen)
Brender (1992)	1981(Q1)-1990(Q4)	EX (excluding petroleum)	REER	-0,33***	World IM Chinese IP	OLS
	1981(Q1)-1990(Q4)	EX (excluding petroleum)	REER	-0,53***	Chinese IP	OLS
	1981(Q1)-1990(Q4)	EX (excluding petroleum)	REER	-0,32*	Chinese IP ; REER (-2)	OLS
	1981(Q1)-1990(Q4)	EX (excluding petroleum)	REER	-1,39**	Chinese IP	TOLS
Hua (1996)	1978-1994	EX (total)	IRPE	0,39***	Chinese IP	CV (Johansen)
	1978-1994	EX (manuf)	IRPE	0,58***	Chinese IP	CV (Johansen)
	1978-1994	EX (total)	REER	0,40***	Chinese IP	CV (Johansen)
	1978-1994	EX (manuf)	REER	0,58***	Chinese IP	CV (Johansen)
Guillaumont J and Hua (1996)	1980-1993	EX (manuf)	REER	0,42***	IM (manuf) Domestic expend.	OLS (Growth rate)
Chou (2000)	1981(Q1)-1996(Q4)	EX (total)	REER	1,15*	World Revenue	CV (Johansen)
	1981(Q1)-1996(Q4)	EX(agro-alimentary)	REER	0,40	World Revenue	CV (Johansen)
	1981(Q1)-1996(Q4)	EX (manuf)	REER	0,68***	World Revenue	CV (Johansen)
Dées (1999)	1985(Q1)-1994(Q4)	EX (total)	IRPE	0,68 <sup>(a)</sup>	World IM; IDE	CV (Banerjee)
Dées (2001a)	1984(Q1)-1995(Q4)	Ex (total)s	IRPE	0,93 <sup>(a)</sup>	World IM; IDE	CV (Banerjee)
Cerra and Dayal-Gulati (1999)	1983(Q1)-1997(Q4)	EX (total)	REER	-3,15	World IM	CV (Johansen)
	1983(Q1)-1997(Q4)	EX (manuf)	REER	-0,37	World IM	CV (Johansen)
	1983(Q1)-1997(Q4)	EX (Foreign firms)	REER	1,65***	World IM; Output Gap	OLS
	1983(Q1)-1997(Q4)	EX (Chinese firms)	REER	-0,32*	World IM; Output Gap	OLS
Lahrèche-Revil and Benassy-Quéré (2002)	1984-1999	EX (total)	RER	0,69***	Gravity model	Panel (fixed effects)
	1984-1999	EX (total)	RER	0,74***	Gravity model	Panel (fixed effects)
	1984-1999	EX (total)	RER	0,73***	Gravity model	Panel (fixed effects)

(a) Short run elasticity equals 2.01 in Brada and alii (1993), and respectively 0.20 and 0.40 for total exports and manufactured exports in Hua (1996).



*Appendix 3 (continued) : Estimation of price-elasticity of Chinese exports*

Study	Sample	Endogenous variable	Exchange rate	Estimated elasticity	Additional explanatory variables	Estimation method
Bu and Tyers (2000)	1987-1988	EX /CPN	IRPE	0,66		OLS
Cerra and Dayal-Gulati (1999)	1988(Q1)-1997(Q4)	EX (total)	REER	0,32*	World IM	CV (Johansen)
	1988(Q1)-1997(Q4)	EX (manuf)	REER	0,89***	World IM	CV (Johansen)
Girardin (1998)	1992(feb)-1996(dec)	EX (total)	Swap ER	0,98 <sup>(c)</sup>	Price gap USA/China U.S IP	CV (Johansen)
Dées (2001b)	1995(jan)-1999(dec)	EX (total)	REER	0,29 <sup>(b)</sup>	World IM	CV (Engle-Granger)
	1995(jan)-1999(dec)	EX (ordinary exports)	REER	0,48 <sup>(b)</sup>	World IM	CV (Engle-Granger)
	1995(jan)-1999(dec)	EX (export processing)	REER	0,15 <sup>(b)</sup>	World IM	CV (Engle-Granger)
	1995(jan)-1999(dec)	EX (total)	REER	0,19 <sup>(b)</sup>	World IM	CV (Banerjee)
	1995(jan)-1999(dec)	EX (ordinary exports)	REER	0,59 <sup>(b)</sup>	World IM	CV (Banerjee)
	1995(jan)-1999(dec)	EX (export processing)	REER	0,09 <sup>(b)</sup>	World IM	CV (Banerjee)

\* implies that the null hypothesis is rejected at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level.

(b) The significance of price-elasticity in the cointegrating vector is not mentioned.

(c) The coefficient is significantly different from 0, since the variable is integrated in the cointegrating vector, but the threshold is not mentioned..

<b>Abbreviations used in appendix 3</b>	
<b>Endogenous variable</b>	<b>Additional variables</b>
EX : Exports. EX (manuf) : Manufactured Exports. EX (prov): Exportations (provincial data).	IM : Imports  World IM : Volume of world imports (weighted by the structure of Chinese exports).
<b>Exchange rate</b>	World revenue : Index of world GDP (or GNP) imports (weighted by the structure of Chinese exports).
NER : Nominal exchange rate. RER : Real exchange rate (bilateral). REER : Real effective exchange rate (weighted by Chinese trade structure). IRPE : Index of the relative price of exports, based on export unit values.	IP : Industrial production FDI : Foreign Direct Investment. INV : Investment.
<b>Estimation methods</b>	Output Gap : gap between actual and potential GDP (applying a Hodrick-Prescott filter on IP).
OLS : Ordinary Least Squares TSLS : Two-Stage Least Squares. CV (Johansen) : Johansen Cointegrating vector. CV (Engle Granger) Engle Granger Cointegrating vector. CV (Banerjee) : Banerjee's one-step Cointegrating vector Panel : Panel data estimation (fixed or random effects).	Gravity model : Model explaining bilateral trade flows, at least with GDP, population and distance between trade partners. Additional variables: frontier effect and trade agreements..