

# The evolving East Asian exchange rate system

16 September 2008

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## Abstract

It is well known that the renminbi has gradually appreciated against the dollar since July 2005 at varying rates. It has generally escaped the notice of observers, however, that the renminbi's effective exchange rate was confined in the two years to mid-2008 to a fairly narrow band. That is, despite the still narrow range of daily fluctuation of the renminbi against the dollar, the renminbi behaved as if it were managed to appreciate gradually against its trade-weighted basket of partner currencies. (Turbulent financial markets can test this policy, as with the recent sharp appreciation of the US dollar.) As in Singapore, such a gradual appreciation not only amounts to exchange rate policy but also serves as monetary policy, damping the prices of traded goods. In this role, it serves as a complement to interest rate policy. Given the evident Chinese policy and other similar policies, East Asia can be seen as taking an evolutionary path toward regional exchange rate stability and monetary cooperation. In particular, East Asian currencies managed against their respective trade-weighted currency baskets can show relative stability against each other, owing to the similarity of these baskets. Nevertheless, recent events have shown how this evolving East Asian exchange rate system is challenged by the international capital flows associated with equity price declines, which affect the renminbi and other Asian currencies differently. Regional cooperation intended to promote intra-Asian exchange rate stability might build on similar national policies of managing currencies against their own respective baskets.

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## Introduction

In July 2005, the announcement of the unpegging of the renminbi (RMB) from the US dollar was accompanied by a statement that the currency would be managed against a basket of currencies. This statement has since been doubted, both in principle and in practice. Citing China's relatively closed economy, McCallum (2006, p 11) concludes: "In sum, there is little or no reason to believe that a system like that of Singapore's will or has been adopted by China". Shah et al (2006), Frankel and Wei (2007) and Ito (2008) find that the renminbi has little but idiosyncratic variation against the US dollar, a finding inconsistent with the notion that the renminbi is managed against a basket of currencies.

Consistent with the May 2008 statement of the People's Bank of China (2008) and on the balance of payments report of the SAFE (2008), we contend that the renminbi is being managed against a basket of currencies. McCallum's prediction erred in assuming that China must choose between managing its exchange rate and setting domestic interest rates. Based on the evidence that China's capital controls are binding (Ma and McCauley (2008)), we instead describe Chinese monetary policy as a hybrid of standard interest-rate setting and Singapore-style monetary policy through the exchange rate. For example, monetary policy can be tightened through a combination of higher domestic interest rates and effective appreciation of the renminbi.

If the Chinese authorities persist in managing the renminbi against the weighted average of trading partner currencies, it would have important implications for East Asian exchange rate stability. To this end, it has been argued that East Asian currencies *should* be managed against a common basket<sup>2</sup>. Instead, we point to evidence that East Asian currencies that are managed against their own respective trade-weighted baskets can produce substantial stability among East Asian currencies.<sup>3</sup> Cooperation, including a concerted choice of currency basket, is a sufficient but not a necessary for intra-Asian currency stability.

The plan of this paper is as follows. To begin, we recall the conventional short history of the renminbi against the dollar since July 2005. Then, we cast most of that history in terms of a basket, band and crawl (BBC). The renminbi's nominal effective rate has been confined over the last two years to a fairly narrow band, with an appreciating centre.

The third section describes how monetary policy looks like when it is focused on the BBC. Singapore provides an example. Chinese monetary policy works both through domestic interest rates and through the management of the exchange rate.

Finally, we draw the implications for Asian exchange rates. What happens when several neighbouring economies manage their currencies against their trade-weighted baskets? Can substantial exchange rate stability arise within Asia with no more than similar policies of this type? The answers to these questions point to the possibility of a domain of currency stability in East Asia wider than that seen as likely by Kenen and Meade (2007).

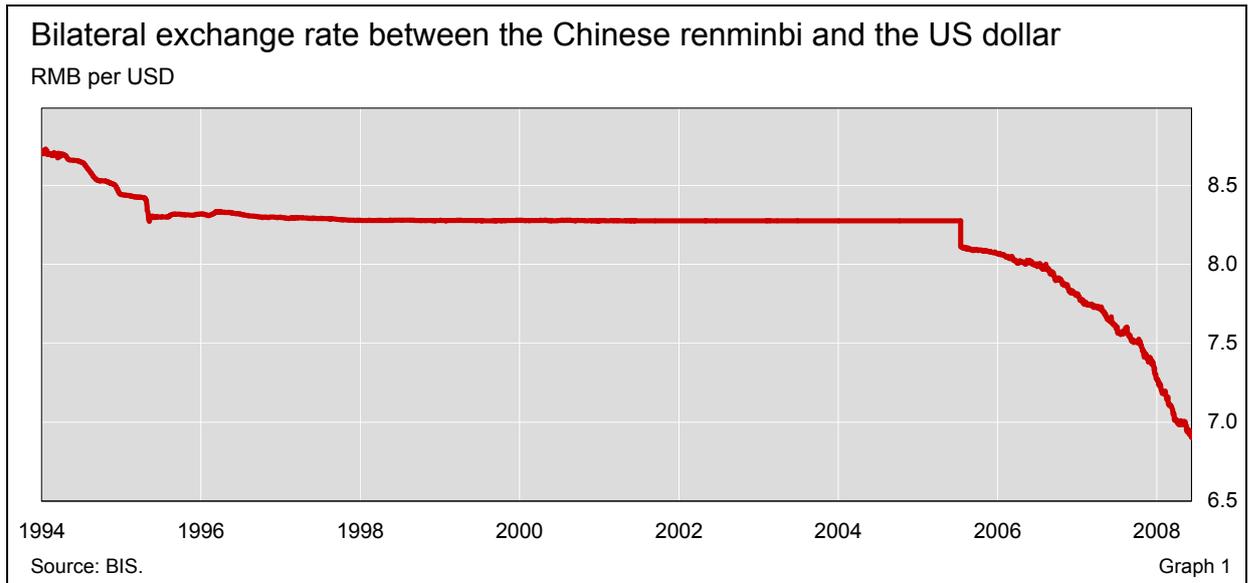
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<sup>2</sup> See Williamson (1999, 2001), Dornbusch and Park (1999) Ogawa and Ito (2002), Mori et al (2002), Kuroda and Kawai (2003), Ogawa, Ito and Sasaki (2004), Kawai (2004), Ogawa (2006), Ogawa and Shimizu (2006), Ito (2008))

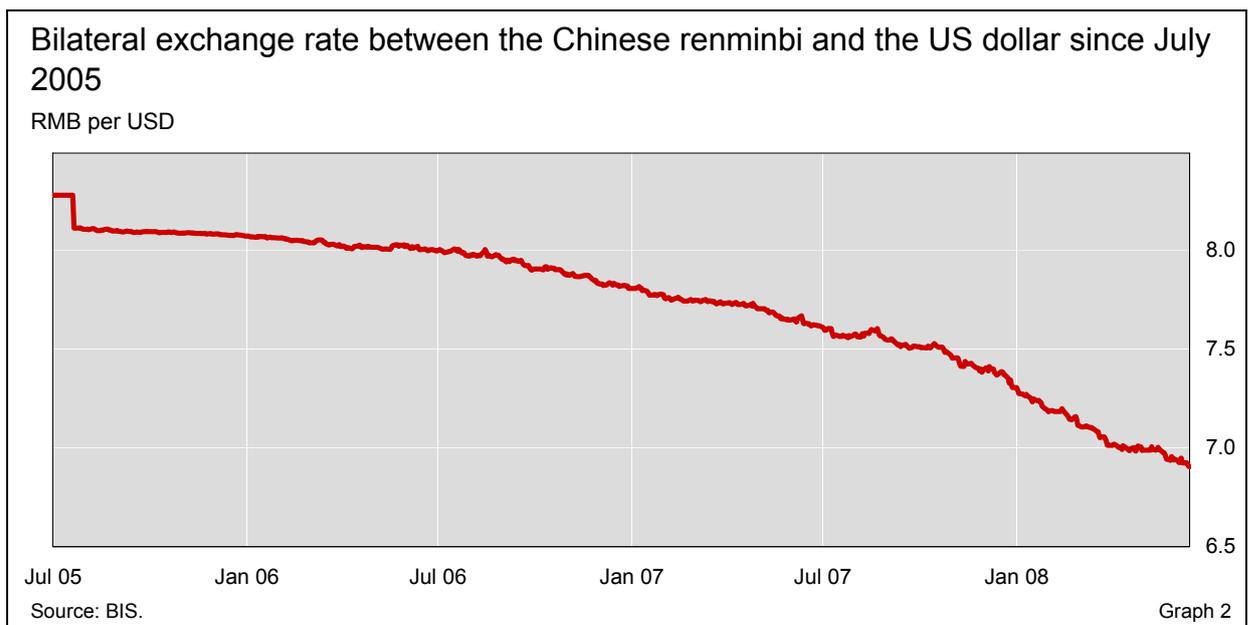
<sup>3</sup> This is called an "attractive solution" by Park and Wyplosz (2008).

## The renminbi and the dollar since July 2005

This section reviews the evolution of the renminbi-dollar exchange rate over the last three years, showing how the conventional view has arisen. For more than ten years, the renminbi traded quite stably against the US dollar after the unification of the multiple exchange rates in 1994. Then, in July 2005, the Chinese authorities allowed a 2% appreciation, with a remarkably contained effect on market participants' expectations (Ma et al (2005)). Since then the RMB has trended gradually upward against the US dollar, rising a cumulative 20% (Graph 1). Whereas a renminbi used to cost 12 US cents, it now costs 14 US cents.

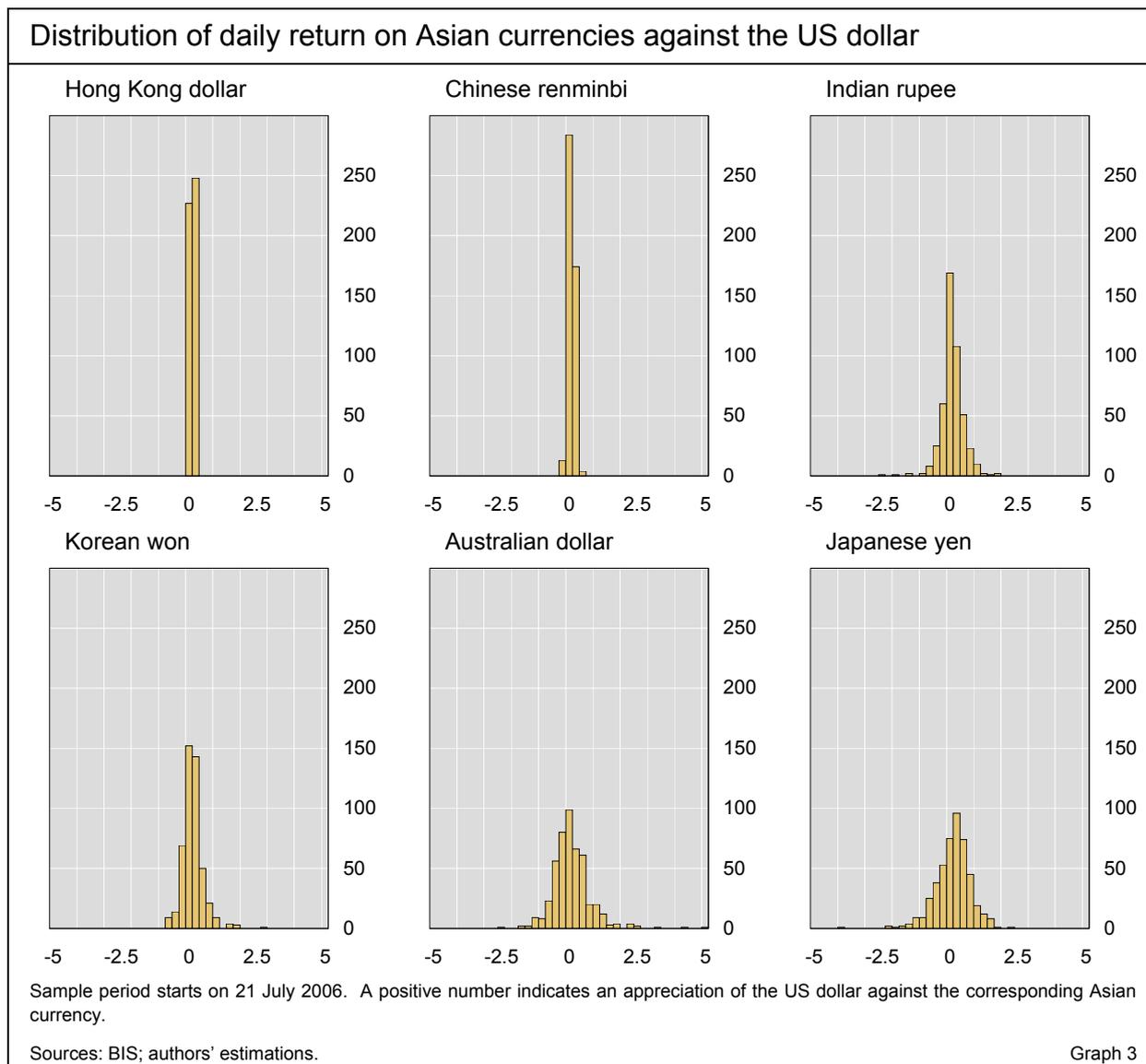


Naturally, market participants have focused on the daily movements of the renminbi against the dollar. These have been quite limited (Graph 2).



This observation holds if we examine the distribution by size of daily movements in the period since July 2006 after which daily movements against the dollar were allowed to be a

bit larger (Graph 3). Each bar in this graph counts the number of days that dollar exchange rates moved within ranges of 0.25%: on the right side, a depreciation of the named currency against the US dollar of 0-0.25%, 0.25-0.50%, 0.50-0.75%, etc. If we take the daily movements of the Hong Kong dollar as representing the pegged exchange rate case, and daily movements of the Australian dollar or Japanese yen as representing the floating exchange rate case, the renminbi is closer to the Hong Kong dollar. In the box in the upper left, one can see that the Hong Kong dollar's spot rate is either up or down by 0.25% or less on any given day. The renminbi doesn't look all that different from the Hong Kong dollar, although there are days of 0.25-0.50% depreciation against the US dollar and even more days when there is an appreciation in that range.



But this does not represent much daily volatility even by the standard of the Indian rupee. That heavily managed exchange rate against the dollar showed a wider range of daily movement against the dollar. The distribution of changes in the Korean won, with occasional official buying and selling of US dollars, contrasts even more sharply with the renminbi. And, by the standards of the Australian dollar or Japanese yen, the renminbi's daily movement is very constrained. Thus, at this daily frequency, one can say that the transition from a fixed exchange rate to floating exchange rate is still in the very early stages in China.

Analyses of daily and even intraday movements of the renminbi in relation to various currencies have also concluded that the renminbi's exchange rate is little more than an upward crawl against the dollar. Such analyses have used regression analysis to pose the question whether the movement of the renminbi against the dollar shows any reflection of the movement of US dollar against the euro or yen or other currencies. They have found that it is generally very hard to detect a substantial reflection of these movements in other currencies in the rate at which the renminbi has moved upward against the dollar. In particular, Frankel and Wei (2007) found that the weight on the US dollar was no less than 90% in the July 2005 to early 2007 sample. They found in certain subsamples some evidence of the renminbi's tracking the Korean won's, the Malaysian ringgit's and the Russian ruble's movement against the dollar. Ito (2008) runs the Frankel and Wei (1994) analysis and concludes, "The renminbi hews very close to the dollar peg". Shah et al (2006) concur. Taking this work as a body you would conclude that the reference in July 2005 to a basket was just talk. As Crockett (2008, p 343) observed: "if there is a basket, the weight of the US dollar must be pretty close to one in that basket, and therefore it is not nearly as effective as it should be".<sup>4</sup>

To summarise the short history since July 2005: There been a appreciation of 20% since then; and the renminbi remains tightly managed against the US dollar on the daily basis, with little resonance with movements in other currencies against the dollar. This is the conventional wisdom.

## **The renminbi's effective exchange rate in crawling band**

Last May, both the People's Bank of China's Monetary Policy Report (2008) and the State Administration of Foreign Exchange (2008) drew attention to an alternative interpretation of the course of the renminbi.<sup>5</sup> Both cited an effective exchange rate measure of the renminbi. The People's Bank argued against a widespread view that the appreciation of the renminbi had been accelerated in the first quarter of 2008. Not at all, the central bank replied: given the weakness of the US dollar against the euro and the yen, the renminbi had appreciated only 0.09% against the weighted average of its trading partner currencies. Taking this May report seriously, this section likens the management of renminbi to the long-standing management of the Singapore dollar.<sup>6</sup> The following section, however, distinguishes the monetary policy significance of the management of the two currencies.

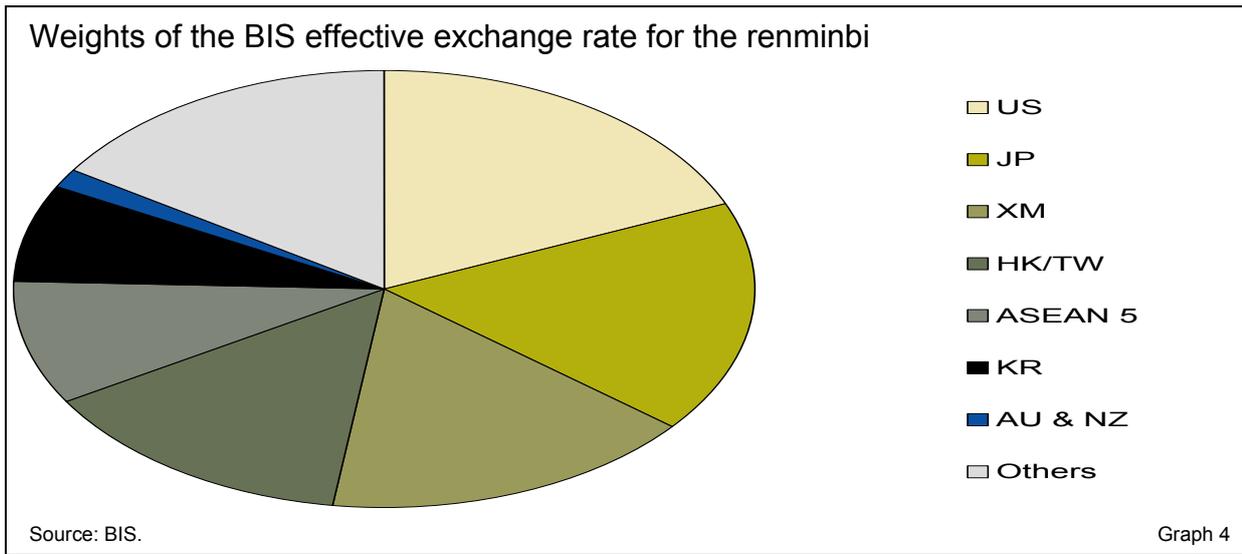
The PBC referred to the BIS index of the nominal effective exchange rate of the renminbi, so it is worth examining (Graph 4). The weights for this index are calculated from the merchandise trade among 52 economies. In a given currency's index, weight is placed on a given partner currency not only to reflect the direct trade between the two economies but also their competition in third markets. Weights are updated regularly and indices calculated with contemporaneous data are chain-linked (Klau and Fung (2006)). Importantly for China, allowance is made for entrepot trade through Hong Kong (Fung et al (2006)). Without an adjustment for such trade, the weight on the Hong Kong dollar, and thus the US dollar, is too large while that on the yen, won and other neighbouring currencies is too low. Adjusting for such trade, the weight on the G3 currencies amounts to about a half, the weight on Asian and Pacific currencies other than the yen amounts to about a third, and the weight on the rest of the world's currencies amounts to the remaining sixth.

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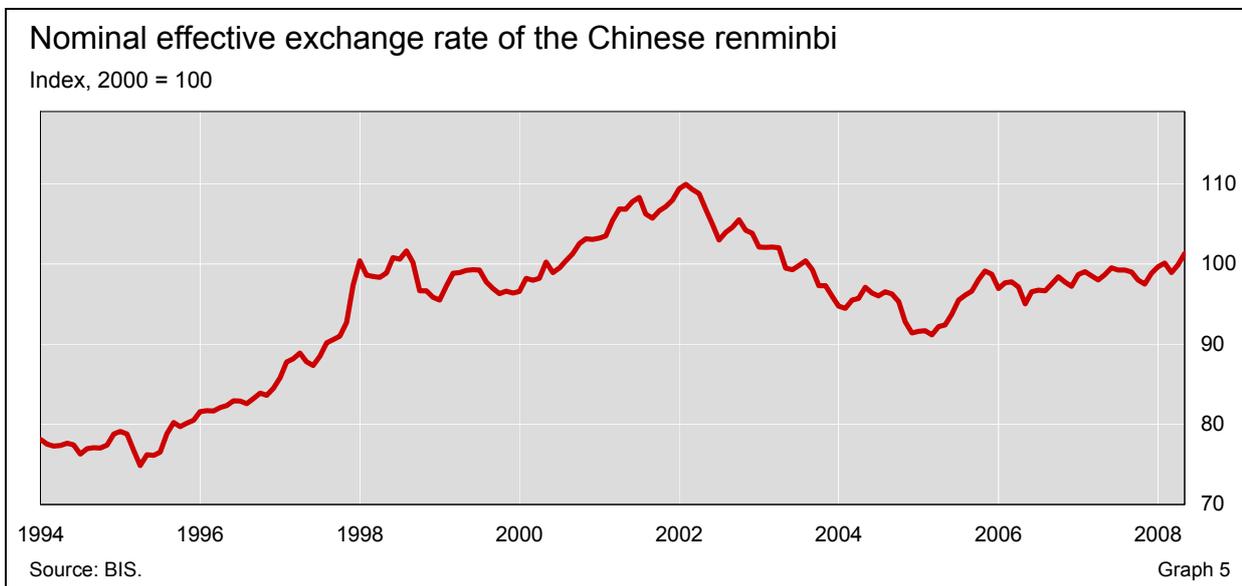
<sup>4</sup> At the discussion of McKinnon and Schnabel (2008) at the BIS conference in Lucerne in June, there was no objection to the notion that the renminbi is simply managed against the US dollar.

<sup>5</sup> Less specifically, Yi (2008, p 194) refers to the "appreciation of the nominal exchange rate".

<sup>6</sup> For a market analyst that takes the People's Bank of China's reference to the effective exchange rate of the renminbi seriously, see Henderson (2008).



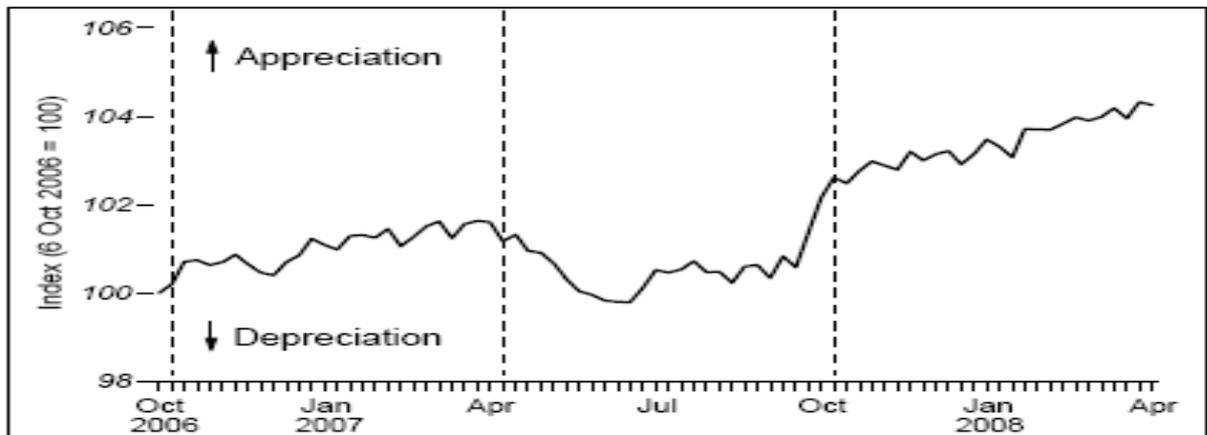
The critical observation from the 14 year history of the nominal effective exchange rate for the renminbi is its steadiness over the past two years (Graph 5). What catches the eye, of course, is the effect of the dollar's cycle on the effective exchange rate of the renminbi during its period of virtual peg against the dollar. The renminbi strengthened in effective terms from its trough in early 1995, peaking in the first quarter of 2002, and declining into 2005. Similar evolutions could be seen for the Hong Kong dollar, Saudi riyal or any other dollar-linked currency. This is the dog that barks. The dog that does not bark is the most recent steadiness, despite the further decline of the dollar.



This recent evolution of the renminbi effective exchange rate calls to mind the graph that the Monetary Authority of Singapore publishes twice a year with every monetary policy statement (Graph 6). Both show a steady upward movement from some time in 2006 into 2008.

### Nominal effective exchange rate of the Singapore dollar

6 Oct 2006 = 100



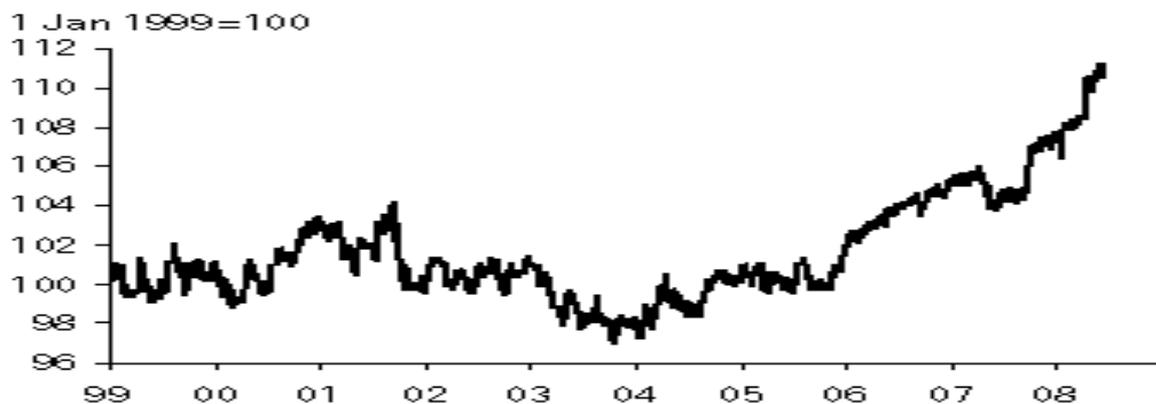
Source: Monetary Authority of Singapore (2008).

Graph 6

It is convenient that the pdf technology allows this graph to be lifted from the MAS publication, because the precise weights underlying the graph have not been made public. But a cottage industry of research assistants in Singapore has lifted the data points from such graphs, and market analysts have run the Frankel and Wei regressions to recover the weights. There are subtle differences across analysts, but it is safe to say that for the present purposes, they have reached considerable consensus. Thus it is without much loss of generality that Graph 7 is drawn from a single such analyst (Baig, 2008).

### Nominal effective exchange rate of the Singapore dollar: market analyst

1 January 1999 = 100



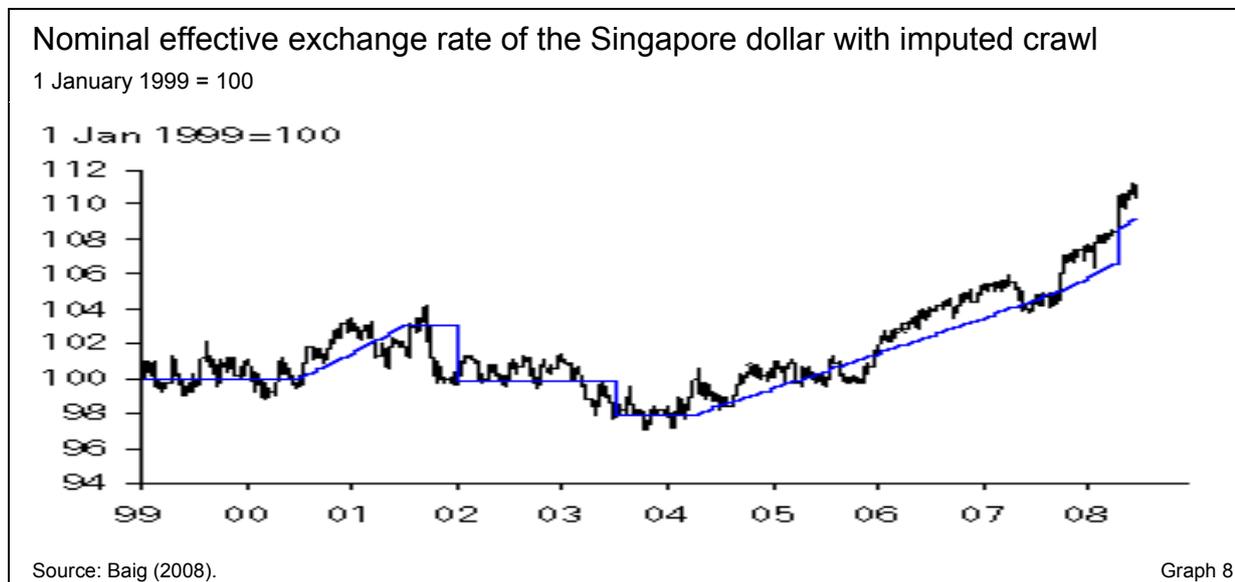
Source: Baig (2008).

Graph 7

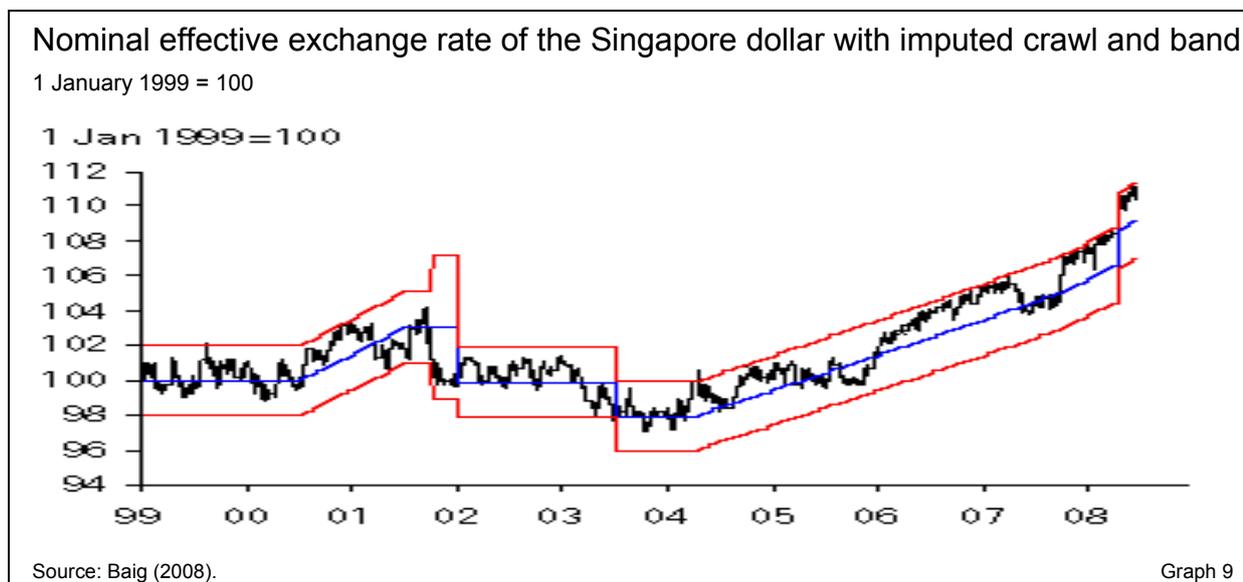
So far, a likeness has been drawn between the evolution of the renminbi over the last two years and the evolution of the Singapore dollar. Now, the analogy is extended by showing how market analysts interpret the Monetary Authority of Singapore policy, and venturing a parallel interpretation for the renminbi. In the terms of Williamson (1999), we have the basket, and it now remains to illustrate the upward crawl and the bands. Our exposition proceeds in the order of B-C-B, rather than the more memorable BBC.

The Monetary Authority of Singapore has at various times called for a steady nominal effective exchange rate, a gradually appreciating nominal effective exchange or a slightly less gradual appreciation. These three settings are reflected in the three slopes of the

imputed target in Graph 8. After the Asian financial crisis, after the bursting of the dot.com bubble and during the SARS scare, the target was taken to be a flat nominal effective exchange rate. For a time in 2000-01, and again from April 2004 to October 2007, the target was taken to be a 2% per annum rise. Since October 2007, the target has been taken to be a 3% per annum rise.

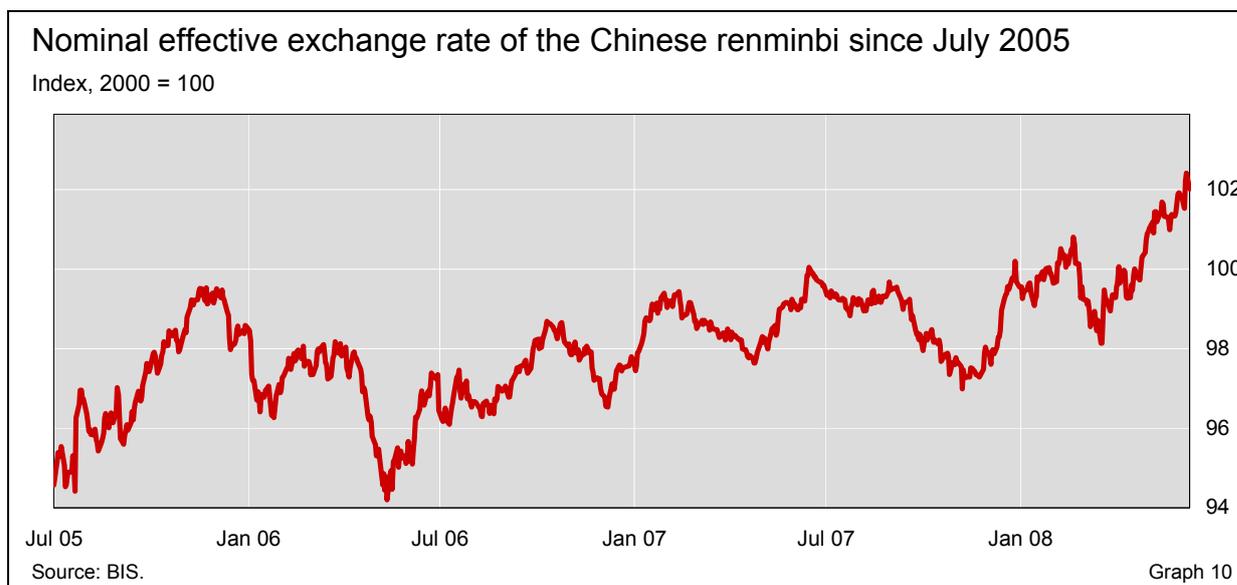


Around this target, market participants have inferred a band of tolerance of plus or minus 2% (Graph 9). The Monetary Authority of Singapore is seen as prepared to intervene to buy or sell Singapore dollars to defend this band. Its record of doing so engages a certain amount of stabilising speculation by market participants.

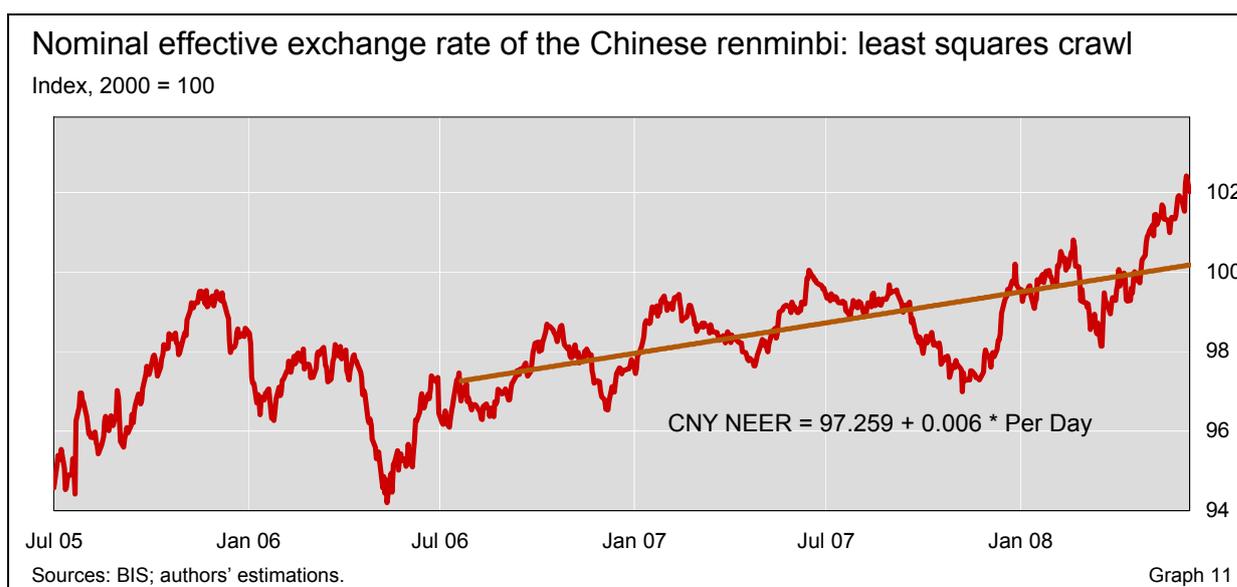


Having reviewed the manner in which market analysts interpret the Monetary Authority of Singapore's exchange rate policy, a parallel hypothesis can be sketched for the renminbi. To start, Graph 10 provides a close-up of the evolution of the BIS effective exchange rate index for the renminbi since July 2005. We observe that, for the 12 months after July 2005, the effective renminbi continued to move with the US dollar, rising quite sharply as the renminbi glided up against a recovering dollar, and then declining as the dollar resumed its downtrend.

For the time being, we assume that the Chinese authorities took a year to ease into the management of the renminbi's effective rate.

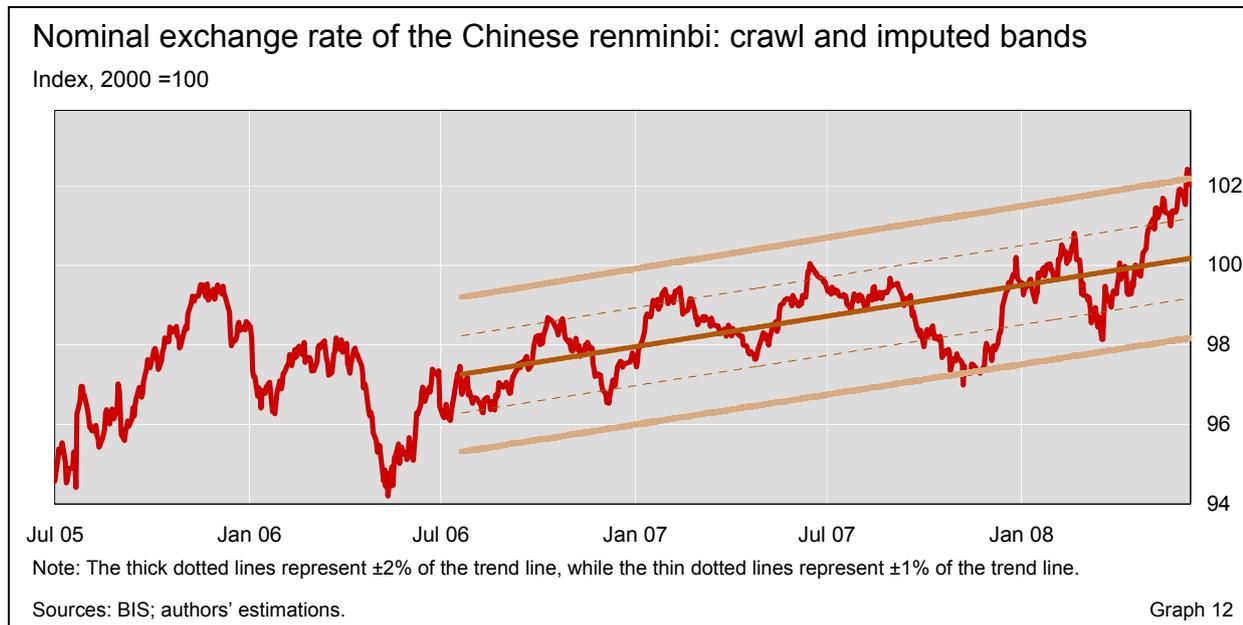


On that hypothesis, the data can be allowed to speak on the question of the rate of crawl that the Chinese authorities are targeting. If we take the two year's data since July 2006 and take the least squares line, we obtain a rise of 0.006 per day (Graph 11). Since the nominal effective exchange rate index is in the neighbourhood of a hundred, this is about six thousandths of a percent a day. Multiplying that by the number of the days in a year produces something just shy of 2%. On this showing, the least squares line is indicating something very close to the most frequent policy setting imputed to the Monetary Authority of Singapore. Indeed, this was thought to be the setting in 2004-05, around the time when the renminbi was de-pegged.



To finish off the analogy it remains to put a band around the least squares line. We hypothesise that a +/- 2% band is used, much like what the Singaporean authorities are perceived to defend in the foreign exchange market (Graph 12). As a hypothesis, a band of

this width takes us some distance. Indeed, much of the variation takes place within +/- 1% sub-bands.<sup>7</sup>

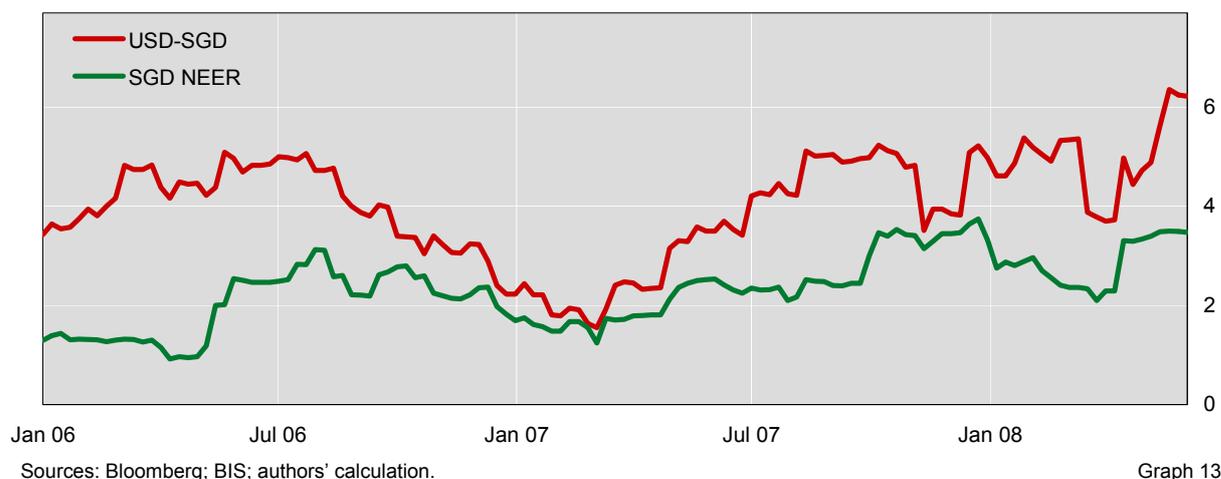


The strangling of daily movements against the US dollar, which may be regarded as a side constraint on the management of the effective renminbi, distinguishes the renminbi's current management from that of Singapore. In particular, the announced intention is to keep daily fluctuations against the dollar to plus or minus 0.3%. Thus, we have drawn a likeness to the Singaporean approach but the evolution is far from complete. This may be seen by comparing the volatility of the nominal effective exchange rate to that of the US dollar bilateral rate at the weekly frequency (Graph 13). For the Singapore dollar, a rolling 13-week annualised volatility against the currency's basket of partner currencies (green line) is uniformly below the volatility against the US dollar (red line). This is characteristic of the Singapore dollar.

<sup>7</sup> We hypothesise that movements within the band are largely associated with sharp and sustained movements of the US dollar against major currencies. Such movements would require movements of the renminbi against the dollar to maintain a stable effective renminbi that are outside the de facto limits on daily movements of the renminbi against the US dollar (recall Graph 3). When such dollar moves pause or reverse themselves, the renminbi has a chance to move back toward the centre of the band. A seminar participant suggested that movements within the band might be associated with Sino-US bilateral discussions.

## Volatility of the Singaporean dollar

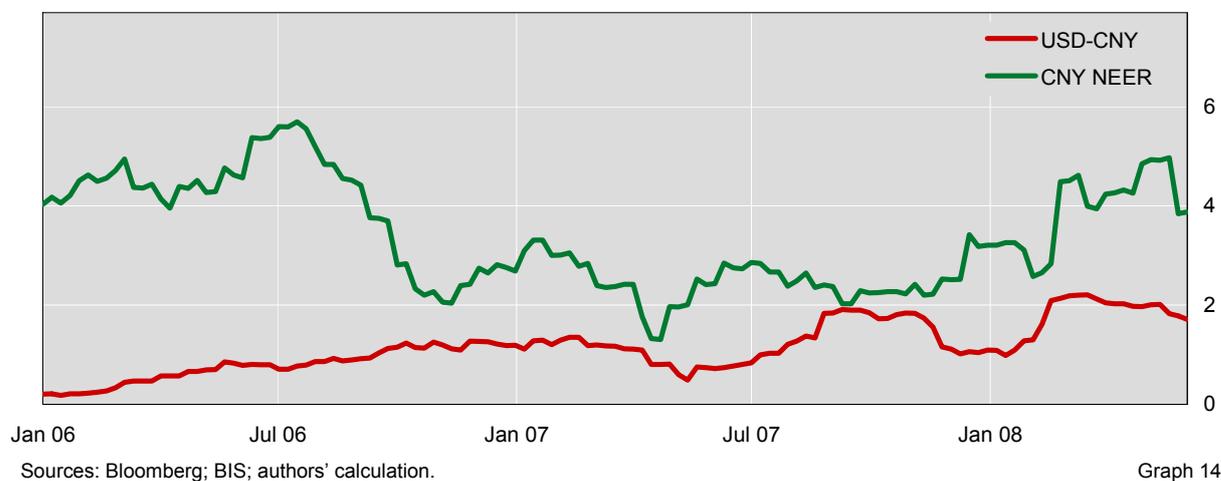
Rolling 13-week standard deviation on weekly change in exchange rate, annualised



The same measures for the renminbi stand in the opposite relation (Graph 14). That is, even at the weekly frequency, the renminbi's volatility against the US dollar remains lower than that against the renminbi's trade-weighted basket. It is worth noting, however, that the volatility of the renminbi against its basket declined after July 2006. Given that this measure looks back over 13 weeks of data, there is a suggestion that an important step away from the crawl against the dollar toward the crawl against the trade-weighted basket occurred in the second quarter of 2006. This provides inductive evidence for our using the data from July 2006 to estimate the rate of crawl. In any case, the orientation of the renminbi's management to the US dollar is evident not only at the daily but also at the weekly frequency. This distinguishes the renminbi's management from that of the Singapore dollar. Again recalling Graph 3, the renminbi's narrow range against the dollar at the daily frequency appears to be constraining the renminbi's tracking of its effective exchange rate. Nevertheless, the renminbi seemed from mid-2006 to mid-2008 to remain over months and quarters in the neighbourhood of its target of a gradual appreciation against its basket of trading partner currencies.

## Volatility of the Chinese renminbi

Rolling 13-week standard deviation on weekly change in exchange rate, annualised



Econometric analysis supports both slow tendency of the effective renminbi to return to the centre of the crawling band *and* the high-frequency influence of the US dollar over the period July 2006-June 2008. We analyse the ratio of the renminbi's effective exchange rate to the centre of the band, as estimated by the least squares regression of the effective against time over this period. We consider two specifications. In the first, changes in the log of this ratio are regressed on the previous trading day's level of this ratio, along with lags of the changes in the log of this ratio. The key question is whether the estimated parameter on the level of the ratio is significantly negative. This would imply that the effective renminbi moves back to the centre of the band. A side question is the magnitude of the estimated parameter, which gives an indication of the speed of the return. In the second specification, we add the lagged change in the major currency effective exchange rate of the US dollar as calculated by the Federal Reserve. A significantly positive coefficient on the effective dollar would confirm the influence of the side constraint on daily movements of the renminbi against the dollar. In particular, a stronger effective dollar yesterday would tend to produce a stronger effective renminbi today.

The first specification is just supported by the data (Table 1). An estimated 2% of the gap between the effective renminbi and its trend is closed every day, and this estimate is significant at the .90 level of significance. This makes for a very leisurely return to the centre, with a half-life of deviations of 33 trading days, or a half a quarter. When we add the effective dollar, the reversion to trend is estimated to occur marginally faster, with a half life of 30 days. The response to yesterday's change in the US dollar's effective exchange rate is eight times stronger than the response to the gap between yesterday's effective renminbi and the trend. Overall, the fit of this second specification to the data is much better.

Reversion to trend of the renminbi nominal effective exchange rate		
July 2006-June 2008, dependent variable: $\Delta \text{Log} (\text{RMB NEER actual} / \text{RMB NEER estimated trend})_t$		
	(1)	(2)
Intercept	0.0042 (0.0087)	0.0074 (0.0088)
Log (RMB NEER actual / RMB NEER trend) $t_{-1}$	-0.0209* (0.0107)	-0.0228** (0.0107)
$\Delta \text{Log} (\text{RMB NEER actual} / \text{RMB NEER trend})_{t-1}$	-0.0620 (0.0460)	-0.1960*** (0.0511)
$\Delta \text{Log} (\text{RMB NEER actual} / \text{RMB NEER trend})_{t-2}$	0.0274 (0.0457)	0.0050 (0.0454)
Log (Federal Reserve USD index $t_{-1}$ / Federal Reserve USD index $t_{-2}$ )	- -	0.1613*** (0.0283)
Adjusted R-squared	0.0078	0.0757
Number of Observations	489	459
Sample period is between 26 July 2006 and 9 June 2008. *** represents 1% significance; ** represents 5% significance; * represents 10% significance.		
Sources: Federal Reserve; BIS; authors' calculations.		

Table 1

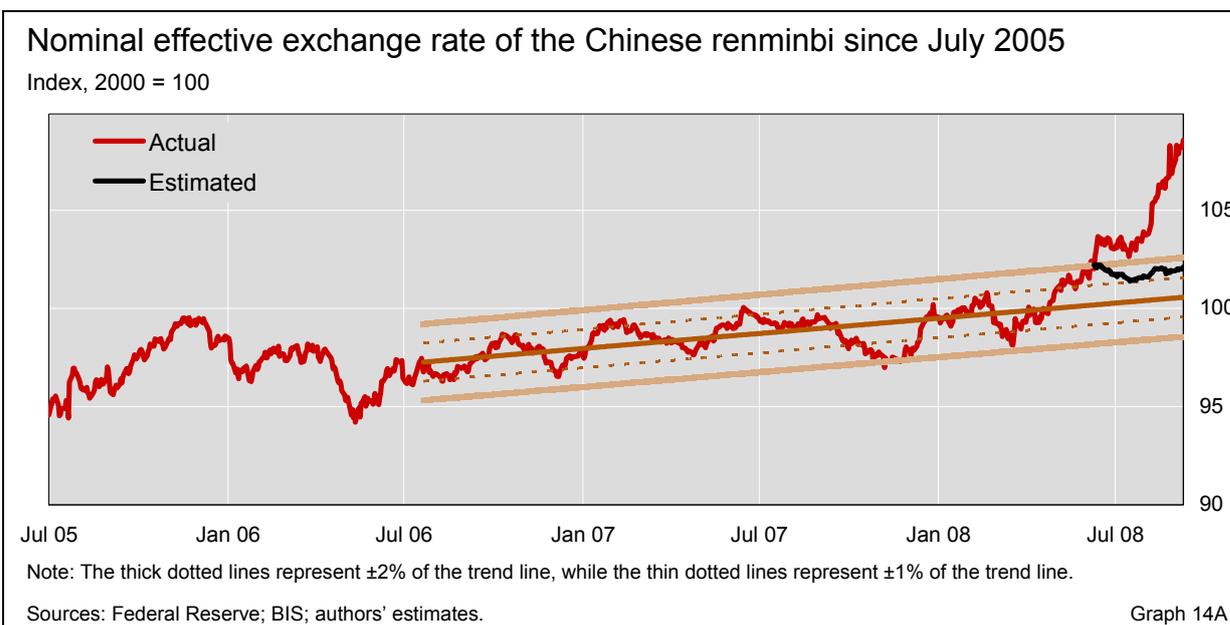
These results may provide a clue to the negative findings of the Frankel-Wei regressions cited above. The immediate effect of the US dollar's exchange rate on the renminbi's effective exchange rate is powerful, while the force of the reversion of the effective renminbi to its trend appreciation is subtle and slow-acting.

In sum, in the two years to mid-2008, the renminbi traded as if it were managed to appreciate gradually against its trade weighted basket. Much in the manner of Singapore exchange rate policy, it seemed to describe a 2% annual crawl within a +/- 2% band. At least, the data into mid-2008 did not strongly reject such a hypothesis. But unlike the Singapore dollar trading, the renminbi's exchange rate seems to be constrained by a certain de facto daily limit movement against US dollar. While this constraint has been eased a bit over time, it still seems to make some difference at the frequency of daily and weekly trading. However, for the macroeconomic use of the management of the effective exchange rate described in the next section, quarterly averages matter more than high-frequency movements.

The strong upward movement of the US dollar that started in mid-July 2008, however, has carried the renminbi onto a steep path of appreciation that may be interpreted in various ways. Some would argue that it merely demonstrates that the previous stability of the renminbi was mere happenstance.

In contrast, if one interprets the move in terms of a basket management of the renminbi, then there are two possible views. First, the rise in the renminbi effective could be seen as the *unintended result* of the sharp correction of the dollar. That is, given the high frequency limit on bilateral moves against the US dollar, persistent dollar strength in effect could force a widening of the band, without necessarily any change in the underlying policy. On this view, the prospect would be for the exchange rate to be managed back to the same crawling centre inferred from the data from mid-2006 to mid-08, with at some point possibly narrower bands as well. Second, the rise in the effective exchange rate could be seen as *intended or at least welcomed*, and possibly opportunistic in its timing given market participants' focus on the bilateral exchange rate. The analogy would be the Singaporean shift from a perceived 2% upward crawl to a 3% upward crawl in October 2007. However, the steepness of the new path would be well outside of the Singaporean experience and would be unlikely to be maintained for long. Instead, policy might revert to the previous gradual appreciation from a new, more appreciated centre ("re-centring", see next section below).

Evidence that, in some sense, policy rather than the environment has changed gives weight to some version of the second interpretation. In Graph 14A below, the black line traces the out-of-sample prediction of the second specification in Table 1, using the actual movements of the effective dollar over the period mid-June to end-August 2008. Had the responsiveness of the effective renminbi to the dollar and the reversion to trend been similar to those previously observed, then the effective renminbi would have remained strong, but not out of line, as observed. Whether the evident change in policy is a parenthesis between stretches of a sustained policy experiment or something else remains to be seen.



## Making monetary policy with a crawling band: Singapore and the hybrid

This section analyses how monetary policy is done through an exchange rate that crawls against its trade-weighted basket. First, we recall how monetary policy is done generally with a short-term interest rate as the policy variable. Then, we review how the Monetary Authority of Singapore uses a target for the nominal effective exchange rate *instead of* a short term interest rate in an otherwise standard policy framework (Monetary Authority of Singapore (2001), McCauley (2001), Khor, Robinson and Lee (2004)). Then we argue that China's monetary policy is a hybrid of the two that uses both short-term interest rates and the nominal effective exchange rate as policy variables.

Monetary policy as practiced in many economies starts with an inflation rate or a range of inflation rates that is acceptable and some notion of the level and growth of trend output of the economy. Policy is centred on setting a short-term interest rate so as to maintain an acceptable rate of inflation and rate of output growth. So, for instance, if the inflation is above policy-makers' comfort zone, the situation in most of the world today, the tendency will be to raise the interest rate. Similarly, if growth seems too fast for the underlying supply capacity of the economy, the tendency will be to raise the interest rate to slow the economy. This is monetary policy as practiced in the United States, Europe and Japan. Explicit inflation targeting is a special case of this standard approach to monetary policy. In symbols, the standard Taylor rule has the following form:

$$r_t = a + b [(\pi_t - \pi^*)] + c [(Y_{t+1} - Y^*_{t+1})], \text{ where}$$

$r$  is short-term policy interest rate;

$\pi$  is relevant measure of inflation, and  $\pi^*$  is target inflation;

$Y$  is output and  $Y^*$  is trend output.

Viewed properly, much of this holds in Singapore. The authorities there enjoy monetary independence in the sense they have chosen an inflation rate that has averaged something like 1.5% per year. They do not have an exchange rate target in a sense of something fixed and quite apart from their experience and prospects for inflation and growth. Rather, they have an exchange rate target that is chosen to achieve the inflation that they want and to take into account the level and growth in the economy's output. Thus, they are operating in much the same way as other central banks except that, instead of having a short term interest rate lever to move around, their lever is the effective exchange rate of the currency. So the form of their Taylor rule is much like that above except the left-hand side:

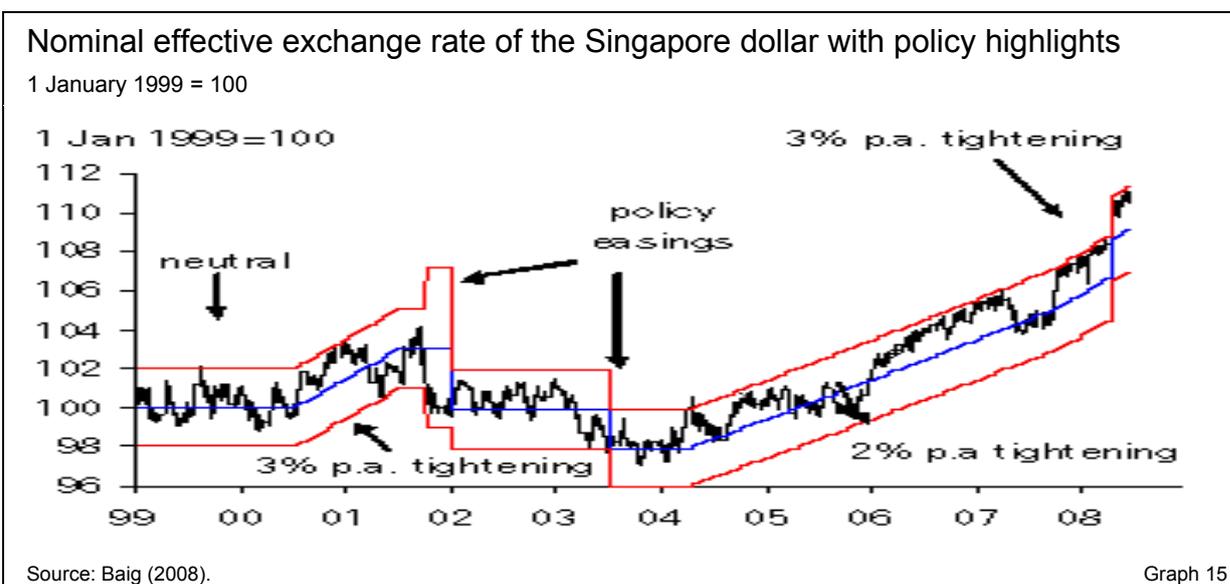
$$NEER_t - NEER_{t-1} = a + b [(\pi_t - \pi^*)] + c [(Y_{t+1} - Y^*_{t+1})], \text{ where}$$

NEER is the nominal effective exchange rate.

It is thus not so much a system with a different logic as an economy with a different sensitivity. Singapore is an extremely open economy, with both exports and imports larger than GDP. It is thus understandable that the authorities operate differently, guiding the exchange rate. Given the high degree of capital account openness, interest rates are ultimately set endogenously through the combination of trading partner interest rates and exchange rate expectations (open interest parity). Accordingly, while most central banks operate in domestic money market, the Monetary Authority of Singapore guides the exchange rate by operating in the foreign exchange market. Such operations in the foreign exchange market are generally sterilised, so the overall domestic bank reserves are not necessarily affected while the exchange rate is kept within the bands.

We return to the market participant's characterisation of the Singapore policy, and review the two kinds of policy changes (Graph 15). One is a change of the slope. The target exchange

rate can be flat (or even declining, though this has not been observed in Singapore) during a recession, or it can crawl upward at a rate of 2% or 3% per annum: these are the choices that we have seen over the past 10 years. For instance, the October 2008 monetary policy statement called for a slightly less gradual rise in the effective exchange rate, which was interpreted as a shift from a 2% upward crawl to a 3% upward crawl. Another form of policy loosening or tightening takes the form of re-centering the band. If the exchange rate is at the weak edge of the band, then a re-centering is a loosening move (as in the early years of the century); if the exchange rate is at the strong edge of the band, then a re-centering is a tightening of policy (as in April 2008). (This is akin to base drift in monetary aggregate targeting.) Thus, the Monetary Authority of Singapore announces either having a flat outlook for the currency or foreseeing a gradual rise or a not so gradual rise, on the one hand, or allowing the centre to move to today's exchange rate. In all cases, these moves were rationalised in terms of the outlook for inflation and growth.



Where does monetary policy in China fit in? Our answer is all of the above. That is, we interpret the Mainland authorities at this stage to be running a hybrid policy. Mostly, they are operating like major central banks in the world. For instance, the authorities have raised interest rates in the face of higher inflation. But they are also using gradual effective exchange rate appreciation as a way to squeeze inflation through lower import prices by virtue of the rise of the renminbi against the currencies of China's major trading partners. This is a two-lever monetary policy: an interest rate lever in one hand, and an exchange rate lever in the other hand (Ito (2007)). (Indeed, they have yet another lever of quantitative control on bank loans, not to be pursued here.) A hybrid Taylor rule looks like:

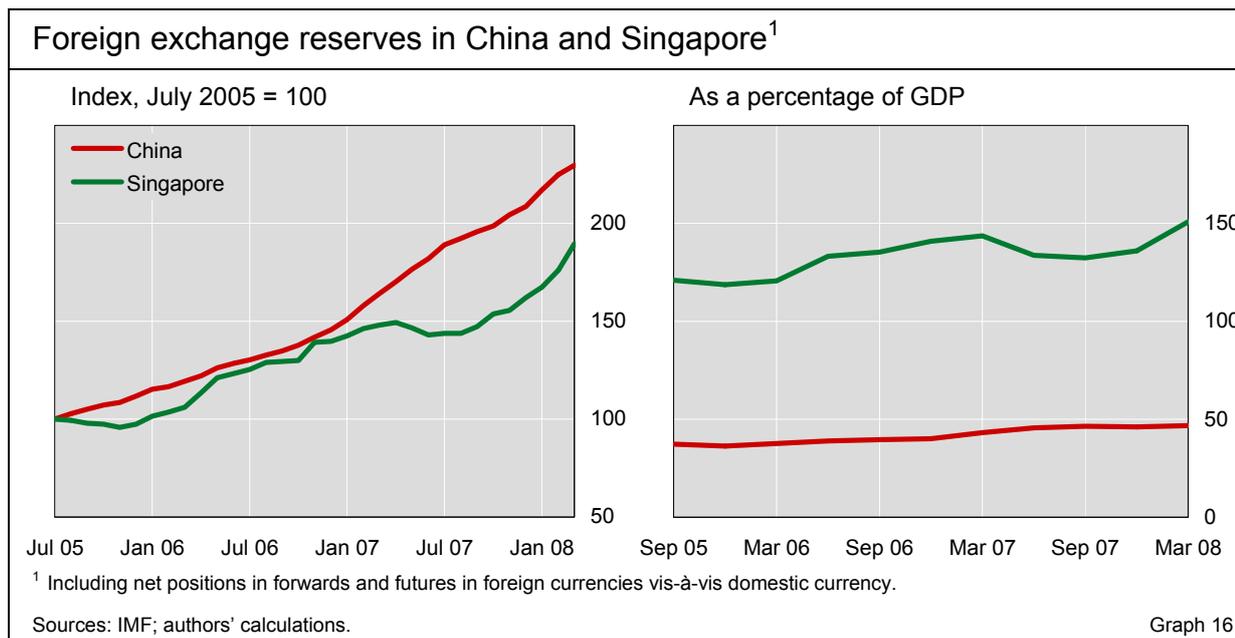
$$r_t, (NEER_t - NEER_{t-1}) = f[(\pi_t - \pi^*), (Y_{t+1} - Y^*_{t+1})].$$

As McCallum (2006) argues, if China has to choose between the standard Taylor rule and the Singapore style rule, it would have to choose the standard Taylor rule, given its (by Singapore standards) relatively closed economy and large, frequently repriced inside stock of corporate and household debt.<sup>8</sup> But if its capital controls still bind (Ma and McCauley (2008)),

<sup>8</sup> For these reasons, a one percent increase in China's interest rate is almost certainly considerably more powerful than a 1% rise in the nominal effective exchange rate of the renminbi. But note that the Chinese authorities have been loathe to raise interest rates this year, while continuing to allow the renminbi to appreciate. This

then China does not have to choose. With an open capital account, Singapore does have to choose, and it has chosen the exchange rate, just as US monetary policy has chosen interest rates.

Guiding the nominal effective exchange rate can require very large intervention, capital controls or no capital controls. Both China and Singapore have been prepared to intervene in size. Just since the change in the policy in China July 2005, a huge rise in reserves is evident both in China and in Singapore, including in the latter case forward purchases of US dollars (Graph 16). In the left-hand panel, the rate of growth of Singapore's reserves has fallen short of that of China's reserves. But in the right-hand panel, the rise in relation to GDP has been more rapid in the case of Singapore than in the case of China.



In sum, while Singapore relies on the exchange rate as the centre of its monetary policy, China supplements a more standard monetary policy with its exchange rate policy. The Singaporean authorities basically give up control over interest rates because capital flows freely between Singapore and the rest of the world. With capital controls, the exchange rate for China complements interest rate policy and quantitative control in setting monetary conditions.

### Implications for intra-Asian exchange rate stability

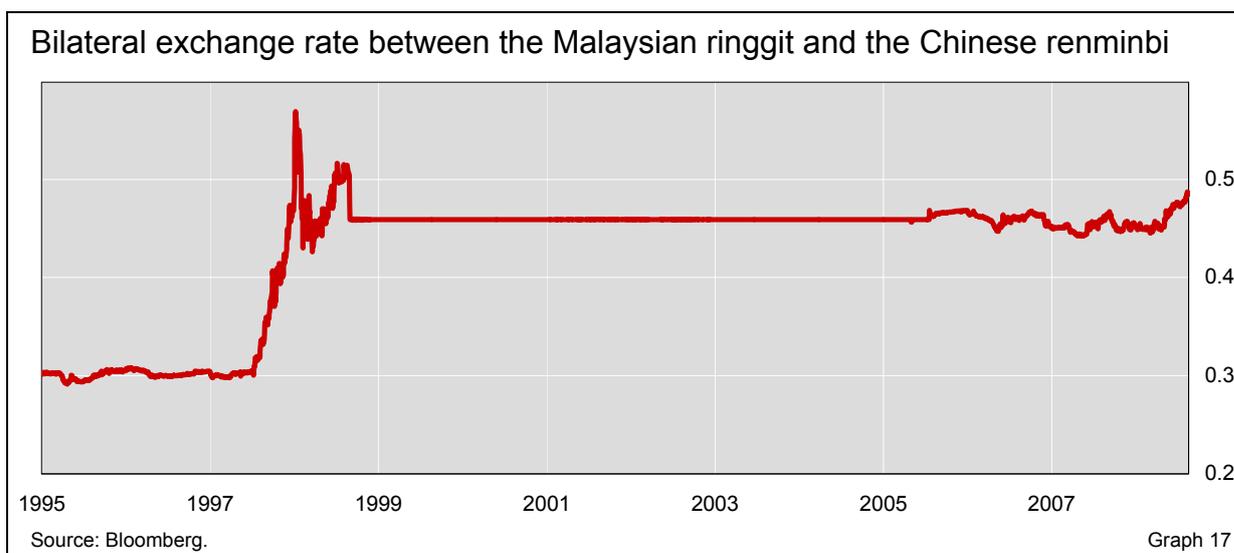
If China is indeed pursuing a policy of allowing the renminbi's nominal effective exchange rate to appreciate, then it would have profound implications for intra-Asian exchange rate stability. To assess these implications, it is useful to review the proposals of McKinnon and Williamson, Kuroda and Ito for keeping Asian exchange rates relatively stable against each

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year, one can safely say, the appreciating exchange rate has been a more powerful force against inflation than policy interest rate rises because there have been no policy interest rate rises.

other.<sup>9</sup> Then we will argue that policies like that pursued by Singapore can be conducive to the stability of intro-Asian exchange rates even without even a common dollar orientation as proposed by McKinnon or coordination on a common basket as has been proposed by Williamson, Kuroda, Ito and Kawai. We illustrate this point with by examining the trading of the renminbi against the Malaysian ringgit and against the Singapore dollar. At the same time, we recognise that asymmetric shocks, including a large capital outflow from the region's equity markets, can challenge this informal route to intra-Asian currency stability.

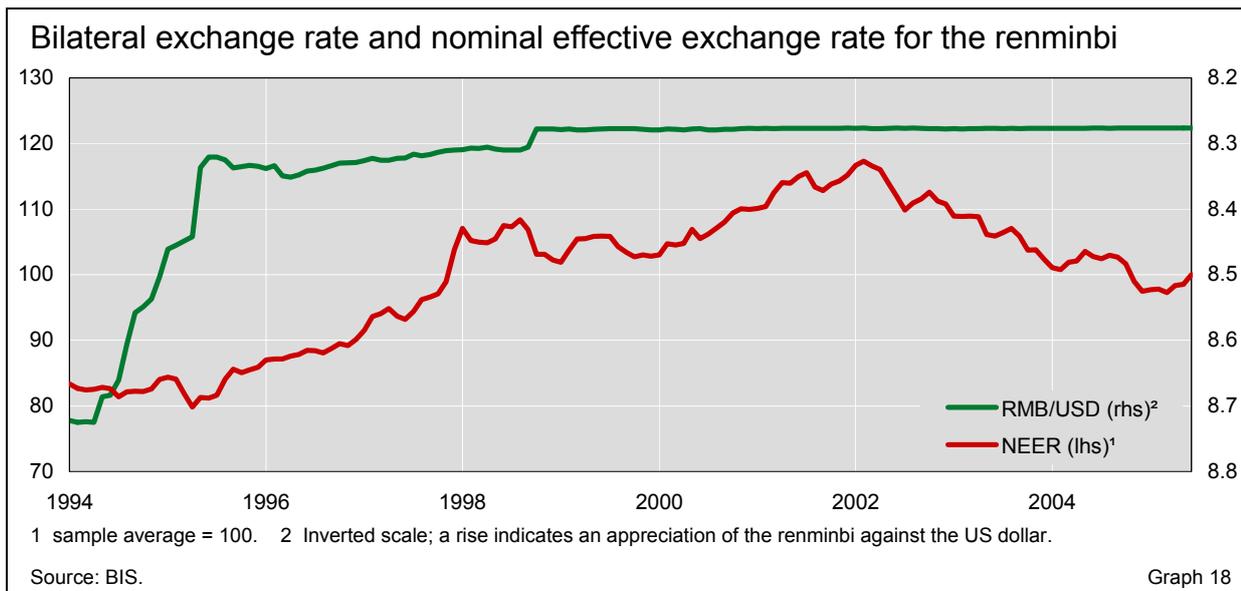
McKinnon (2005) argues that the East Asian dollar standard has the benefit of providing for stability of exchange rates within Asia. McKinnon's point can be illustrated by reference to the rate of exchange between the Malaysian ringgit and the renminbi in the period from September 1998 to July 2005 (Graph 17). Clearly, the separate dollar pegs of the ringgit and renminbi sufficed to achieve the stability of their bilateral exchange rate.



Ito, Ogawa, and Sasaki (1998) and Ogawa and Ito (2002) argued that the disadvantage of such a route to East Asian exchange rate stability is the destabilisation of the nominal effective exchange rate.<sup>10</sup> These authors emphasised the loss of external competitiveness in the lead-up to the Asian financial crisis. One can also lodge a monetary objection. As the dollar rose from 1995-2002, the renminbi appreciated in effective terms (Graph 18). Like other dollar-linked economies like Hong Kong, Panama and Saudi Arabia, it experienced deflating prices as the dollar peaked. Subsequent to the decline of the US dollar, inflation re-appeared in such economies with varying degrees of severity.

<sup>9</sup> We do not consider here the possibility of Asia's following the European approach step-by step, though the proposals for an Asian Monetary Unit or Asian Currency Unit do borrow from the ECU. See Wyplosz (2001), Mundell (2003), Padoa-Schioppa (2004), Kenen and Meade (2007) and Park and Wyplosz (2008).

<sup>10</sup> See also Mundell (2003, p 2): "The low yen shut off Japanese foreign direct investment in South East Asia and closed down its engine of growth. At the same time the rising dollar appreciated *pari passu* the currencies of South East Asia to overvalued positions that made them sitting ducks for speculators. Thailand, Malaysia, Indonesia, and S. Korea were all caught up in the same boat. It was the instability of the dollar-yen exchange rates that brought about the crisis".



In view of this disadvantage to the East Asian dollar standard, the proposal of Williamson (1999), Dornbusch and Park (1999), Ogawa and Ito (2002), Kuroda (2003) Kuroda and Kawai (2003) and Ito (2006, 2008) for a common basket peg would have the advantage of stabilising not only bilateral rates within Asia, but also the effective exchange rates of the economies participating. Again, a common basket peg is a sufficient condition for intra-Asian exchange rate stability.

This proposal raises difficult questions, both in principle and in practice. Should the basket be composed of “outside” or “inside” currencies (Kenen and Meade (2007))? In the original formulation, the common basket would be based on just the G3 currencies, the dollar, the euro and the yen. An alternative would be just inside currencies, possibly with the participating currencies combined into an Asian Currency Unit (ACU), analogous to the ECU used in Europe.<sup>11</sup> It should be noted that neither of these alternatives would build on the example of the Singapore dollar, the basket for which is widely taken to be a combination of outside and inside currencies—as would be standard calculations of effective exchange rates like those produced by the BIS.<sup>12</sup> If the choice between outside, inside or both can be made, the common weights would have to be decided.

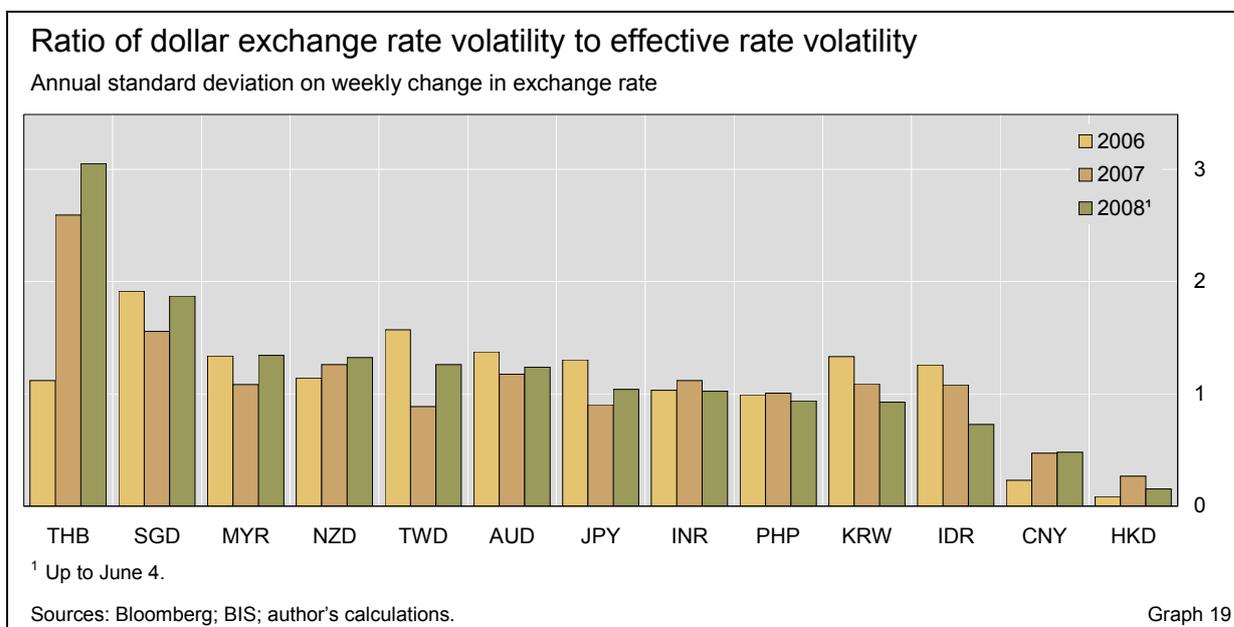
All of these choices would be a matter of negotiation. Some hint of the difficulty of such negotiations is given by the controversy that has attached to the Asian Development Bank’s producing an Asian Currency Unit.

In view of the challenges to a common basket, it is interesting to discover to what extent intra-Asian exchange rate stability can arise out of similar, Singapore-style policies. We read the accumulating evidence that considerable intra-Asian exchange rate stability can arise from such similar policies.

<sup>11</sup> Padoa-Schioppa (2004, p 323) concludes: “the European experience with regional monetary arrangements may serve as a point of reference as it has allowed for the coexistence of a certain degree of *fixity inside* and, since the collapse of Bretton Woods, *flexibility outside* the region”. The role of the ECU, especially in private use, in the lead up to the euro is often overstated in Asian discussions. See Dammers and McCauley (2006).

<sup>12</sup> De Brouwer (2002, p 293) argued: “If a country has to target a basket of currencies, it may do better to target a basket peg based on its own rather than common, trade weights”, emphasizing the differences across own weights in the region.

Whether by policy or by market forces, a number of East Asian currencies trade with more volatility against the US dollar than against their trade-weighted indices (Graph 19).<sup>13</sup> It is no surprise that the Singapore dollar shows more volatility against the US dollar than against its target effective exchange rate. In addition, however, many currencies in the region show the same qualitative relationship between bilateral dollar volatility and effective exchange rate volatility (Ito (2008, pp 240-9)). As depicted on Graph 14, the renminbi's ratio is moving up, and one can foresee the day when its dollar volatility rises above its effective volatility.



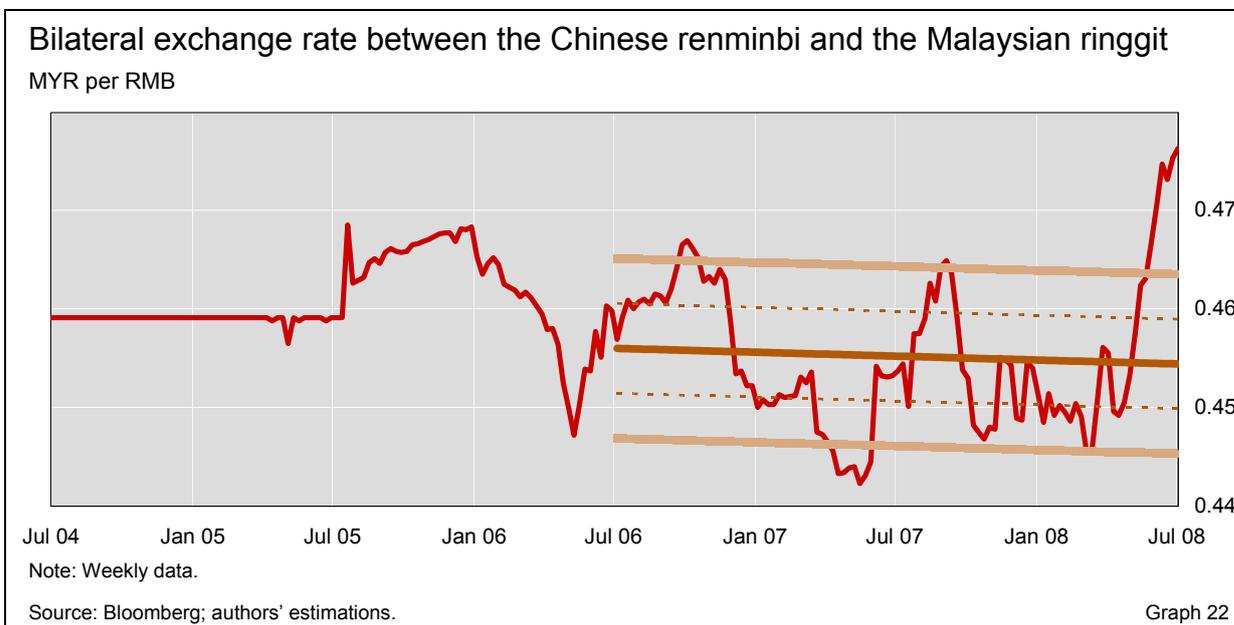
On this measure, the Malaysian ringgit stands third after the Thai baht and the Singapore dollar in the relative stability of its effective exchange rate. Market participants interpret the Bank Negara Malaysia policy in much the same terms as the Monetary Authority of Singapore (Graph 20). In particular, since July 2005, the ringgit is seen as appreciating at a rate of 2% per annum against the currencies of Malaysia's trading partners. Moreover, a 2% band encompasses much of the movement of the ringgit against its basket.<sup>14</sup>

<sup>13</sup> See Ho et al (2005).

<sup>14</sup> Malaysia's capital account is more open than that of China and foreign investors invest freely in the local money and bond markets. The policy of guiding the effective exchange rate is thought to lean heavily on sterilised intervention. Even with such intervention, can the authorities sustain both policy targets? The straight red line on the right of Graph 20 plots the forward effective exchange rate, as implied by uncovered interest rate parity. It crosses the weak side of the inferred bands in short order: Malaysian interest rates are too high to be consistent with a fully credible crawling peg as inferred by market participants (Svensson (1991)). In this case, this lack of credibility means precisely that Malaysia retains two policy targets.

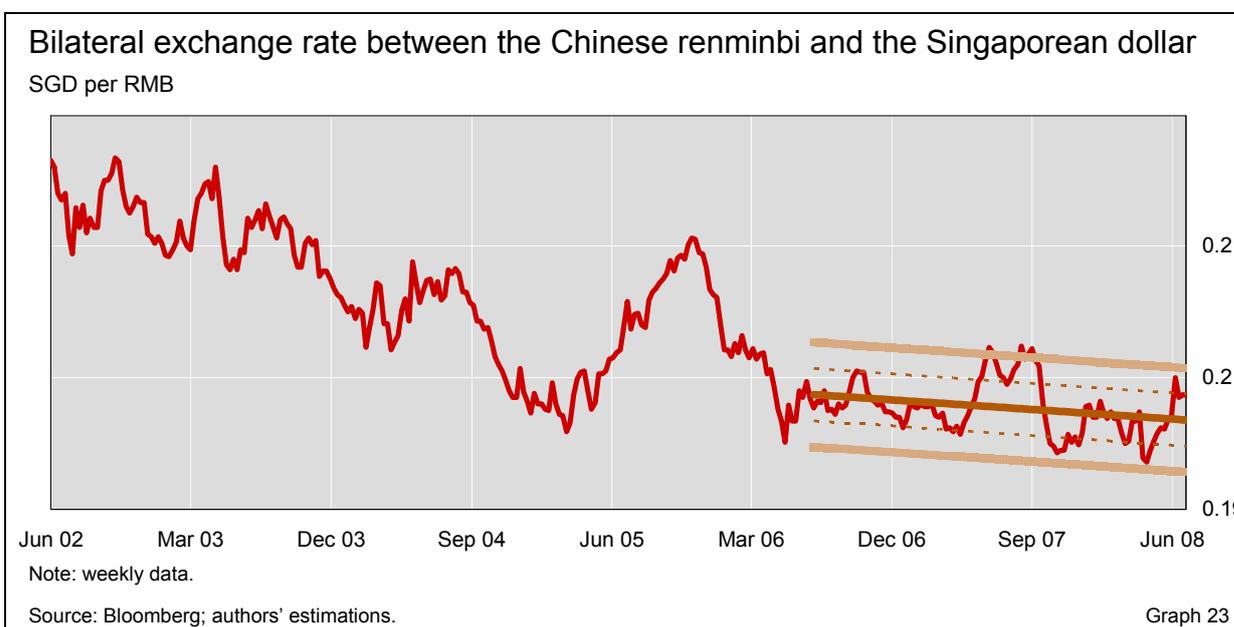


22). At first blush, it may look like it moving around quite a bit, but a range of two Malaysian cents around a rate near 50 Malaysian cents is scant variation. Again plotting the least squares line and placing bands of +/- 2% around it, the overwhelming share of observations fall within the bands.



Let us be clear on our interpretation of this graph. It is not that policy-makers in Beijing and/or Kuala Lumpur are managing this cross-rate in particular. Rather, policy-makers are managing their own currencies against their own (not dissimilar) respective baskets and thereby producing the stability observed in this cross-rate. Indeed, the most recent observations lie outside the imputed bands, owing to the combination of an renminbi on the strong side (Graph 12) and a ringgit on the weak side (Graph 20). These observations underscore the point that this cross-rate is not a focus of separate management.

Similarly, the renminbi-Singapore dollar exchange rate has become quite stable in the past two years (Graph 23). With a range of less than a Singapore cent, observations over the past two years fall almost entirely in +/- 2% band.



In summary, a common basket to be used by East Asian authorities to manage their currencies would certainly be a sufficient condition for reducing intra-Asian currency volatility. But coordination is not a necessary condition to reduce such volatility substantially, it turns out. Because the trade patterns are not all that different across the region, each authority's attending to its own effective exchange rate can produce quite stable cross-rates.<sup>15</sup> For both the Malaysian ringgit and the Singapore dollar, the volatility of the ringgit/Singapore dollar cross-rate is lower than that for the other these currencies' other bilateral (Table 2). The plus/minus 2% bands, it should be noted, are narrower than those often recommended on the basis of the European experience (Latter (2005, p 32); Park and Wyplosz (2008))

Bilateral exchange rate volatility <sup>1</sup>														
In per cent														
	EUR	USD	HKD	CNY	IDR	KRW	PHP	INR	JPY	AUD	TWD	NZD	MYR	SGD
USD	6.88													
HKD	6.76	0.59												
CNY	6.52	1.56	1.72											
IDR	7.90	5.88	6.22	6.21										
KRW	8.85	6.96	7.13	7.02	7.38									
PHP	8.99	6.94	7.20	7.16	6.34	8.16								
INR	7.69	5.62	5.55	5.71	6.63	6.76	6.21							
JPY	8.73	8.89	8.81	9.34	12.25	12.97	13.42	11.49						
AUD	8.53	10.43	10.32	10.21	9.46	10.59	10.24	10.49	14.13					
TWD	6.72	4.14	6.04	4.09	7.86	6.55	8.25	7.26	10.28	10.43				
NZD	11.16	13.10	12.98	12.70	11.80	13.02	11.81	12.45	16.65	7.40	12.65			
MYR	6.43	5.21	5.05	4.79	4.93	6.66	6.22	5.41	10.60	8.75	5.32	11.03		
SGD	5.29	3.97	3.92	3.93	5.63	7.12	7.21	5.87	9.25	8.28	4.32	10.91	3.52	
THB	11.16	13.15	11.86	10.93	11.90	12.25	11.24	11.02	13.95	13.12	11.51	14.44	11.05	11.10

<sup>1</sup> Standard deviation of weekly percentage changes, annualised. Sample period is between July 2006 and July 2008. Order is from Graph 19 plus the euro and US dollar.

Sources: Bloomberg; authors' calculations. Table 2

Our empirical findings shed new light on the question of the likely geography of monetary cooperation in Asia. Kenen and Meade (2007) reviewed the prospects for exchange rate

<sup>15</sup> Park and Wyplosz (2008) get to a similar conclusion by a different route. While we compare the weights in the BIS effective exchange rate indices for East Asian currencies, they compare the BIS indices with these currencies' exchange rates against the AMU (Asian Monetary Unit) as proposed by Ogawa (2006) and Ogawa and Shimuzu (2006). In the terminology of Kenen and Meade (2007), the BIS baskets are a hybrid of inside and outside baskets, while the latter is an inside basket including only regional currencies. One might have thought that this difference in principle would make a big difference in practice. Instead, the authors find a remarkable similarity between the BIS effective exchange rate indices and the AMU exchange rates. Park and Wyplosz reason that, if stability against a common inside basket is sufficient for bilateral stability, and currencies' BIS indices track their exchange rates versus the inside basket, then stability against the BIS indices is sufficient for bilateral stability. We reason simply that if stability against a common basket is sufficient for bilateral stability, and the composition of BIS baskets is similar, then stability against the BIS indices is sufficient for bilateral stability.

cooperation in East Asia and put most weight on the scenario in which the major ASEAN economies cooperate on exchange rates. They discounted the possibility of China's exchange rate management associating the renminbi with such cooperation. Our results point in the direction of a broader cooperation between China and ASEAN, as discussed by Mundell (2003, p 8). Our symmetric monetary interpretation above, however, leads us to resist viewing the renminbi as a prospective "regional anchor currency" (Park (2008, p 266)) with that phrase's inevitable invocation of the asymmetric role of the Deutsche mark in Europe before the euro.

All that said, it must be recognised that this informal approach to currency stability in East Asia faces a challenge from the asymmetric response of capital flows to falling equity markets. The equity market of China is effectively segmented as between the ("H" or "N") shares traded in Hong Kong or New York, on the one hand, and the ("S") shares traded in Shanghai and Shenzhen, on the other (Peng et al (2007)). Non-resident holdings of the latter are strictly limited and therefore any disinvestment cannot generate a large capital outflow. Not so in economies like India, Korea or Malaysia, where non-resident holdings of equity are very large. In these economies, the recent global correction in equity prices is associated with a big capital outflow that puts downward pressure on the currency (Chai-anant and Ho (2008)). Thus, it is not surprising that the Malaysian ringgit was allowed in early September 2008 to fall outside of the imputed lower band (Graph 24). Given the opposite sharp upward move of the renminbi relative to its trade-weighted index discussed above, the renminbi/ringgit exchange rate has lost the stability that was associated with both currencies' gradual appreciation. On 11 September 2008, the renminbi closed at over a half a ringgit (50.69 cents), well outside the range seen since mid-2005 (Graph 22). Singapore, with a long track record and huge reserves, has seen its dollar fall only to the middle of its band. As a result the move against the renminbi has been less extreme, to 20.93 cents on 10 September, a rate last seen during the US dollar's strength in 2005.



## Conclusions

To conclude, it is well known that the renminbi has gradually appreciated against the dollar since July 2005 at varying rates. It has generally escaped the notice of observers, however, that the renminbi's effective exchange rate was confined in the two years to mid-2008 to a fairly narrow band. That is, despite the still narrow range of daily fluctuation of the renminbi against the dollar, the renminbi behaved as if it were managed to appreciate gradually against its trade-weighted basket of partner currencies. As in Singapore, such a gradual appreciation is not just exchange rate policy but also it serves as monetary policy, damping the prices of traded goods. In this role, it serves as a complement to interest rate policy.

East Asia can be seen as taking an evolutionary path toward regional exchange rate stability and monetary cooperation. East Asian currencies managed against their respective trade-weighted currency baskets can show relative stability against each other, owing to the similarity of these baskets. Even without cooperation, a similar policy of managing currencies against their own respective baskets can result in their trading relatively stably against each other. Nevertheless, recent events demonstrate that such convergent policy is challenged when heavy outflows from the region's equity markets affect currencies differently owing to capital controls in China and relatively open markets elsewhere. The possibility of similar policies giving rise to currency stability is not an argument against furthering cooperation in the region. Rather, cooperative efforts might build on the achievements of the evolution witnessed to date.

This paper has not addressed the consequences of the use of currency baskets in Asia for the global financial system. For instance, Blanchard, Giavazzi and Sa (2005) discuss how a floating exchange rate of the renminbi might affect the Asian portfolio allocation across currencies, and thus the euro-dollar exchange rate. It might be possible to say more about the effect of a basket policy, which will have predictable effects on the minimum-variance portfolio using the domestic currency numeraire (Genberg, et al (2005) and McCauley (2008)). More generally, the implication would seem to be that the dollar zone of the global economy, which had remained fairly stable (BIS (2005, p 95)), is shrinking as much of East Asia comes to straddle the dollar, euro and yen zones.

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