

## ASSESSING THE COMPOSITION OF THE CHINESE CURRENCY BASKET

September 2005

The change in China's exchange rate regime on July 22, 2005, has been the major and long-awaited / speculated event of this summer. Although details on the mechanics of this new regime and the contents of the CNY basket have been officially released by the PBoC, the weight of each currency in this basket remains a major unknown. Only few specialists have formally tried to assess these weights.

Officially, the main criterion that is used to select anchor currencies is the importance of the current account transactions. Governor Zhou also cited the currency composition of China's external debt and the origins of FDIs as two important items to be considered as well. Therefore, the officially released list of currencies entering into this basket is the following:

**Table 1. RMB official currency basket**

	Symbol	Name
Main currencies	USD	U.S. Dollar
	EUR	Euro
	JPY	Japanese Yen
	KRW	Korean Won
Secondary currencies	SGD	Singapore Dollar
	MYR	Malaysian Ringgit
	AUD	Australian Dollar
	CAD	Canadian Dollar
	RUB	Russian Rouble
	THB	Thai Baht

TAC's research team has decided to try to estimate the weights of each currency using three different methods. The first method is to estimate the weights by measuring the relative shares of Chinese trade with his partners. This methodology is consistent with the official message but does not give any answer about the 'true weights' empirically observed over the period considered. Consequently, the second method that we decided to use is to estimate these weights on the basis of an econometric model of the relationship between the exchange rates. Finally, we used a refinement of this econometric model by estimating different cointegrating vectors between the main currencies, in order to find the different possible assumptions about the observed weights.

We started this short study on estimating the different weights of the currency basket by taking into account the relative weights of the current account transaction of China and his partners. Focusing on China's main trade partners (both for exports and imports) in 2004, we find that the USD would represent 33% of the basket, the JPY 30%, the KRW 16%, the

EUR 11% and the other currencies around 10%. This simple estimation undoubtedly underweights the share of the USD, since most of the transactions in China's current and capital accounts are denominated in this currency, whatever the partner country. Therefore, a more refined assessment is needed to provide more realistic measures.

We first simply regressed - using the ordinary least squares (OLS) estimator - an index of the daily exchange rate of the CNY against the U.S. dollar (with spots from July 22, 2005 to September 6, 2005) on indices of daily exchange rates (basis 100 on July 22, 2005, still against the USD) of all the currencies forming the basket presented on table 1. Only the coefficients associated to the EUR, the JPY and the KRW were significantly different from zero. Therefore, a first conclusion is that the daily fluctuations of the yuan are essentially explained by the evolutions of the main currencies and only marginally by secondary currencies.

We made a second regression, including only the previously significant currencies. From this estimation, two very interesting conclusions can be derived:

- ❖ The best fit is obtained with a lag of one day. It means that the Chinese authorities take one day to adjust the exchanging rate of the yuan to the fluctuations of these currencies.
- ❖ The  $R^2$  of the estimation is 90%. Apart from the outstanding statistical quality of the regression, it may indicate that the variations of the "secondary" currencies explain only 10% of the daily variations of the yuan<sup>1</sup>.

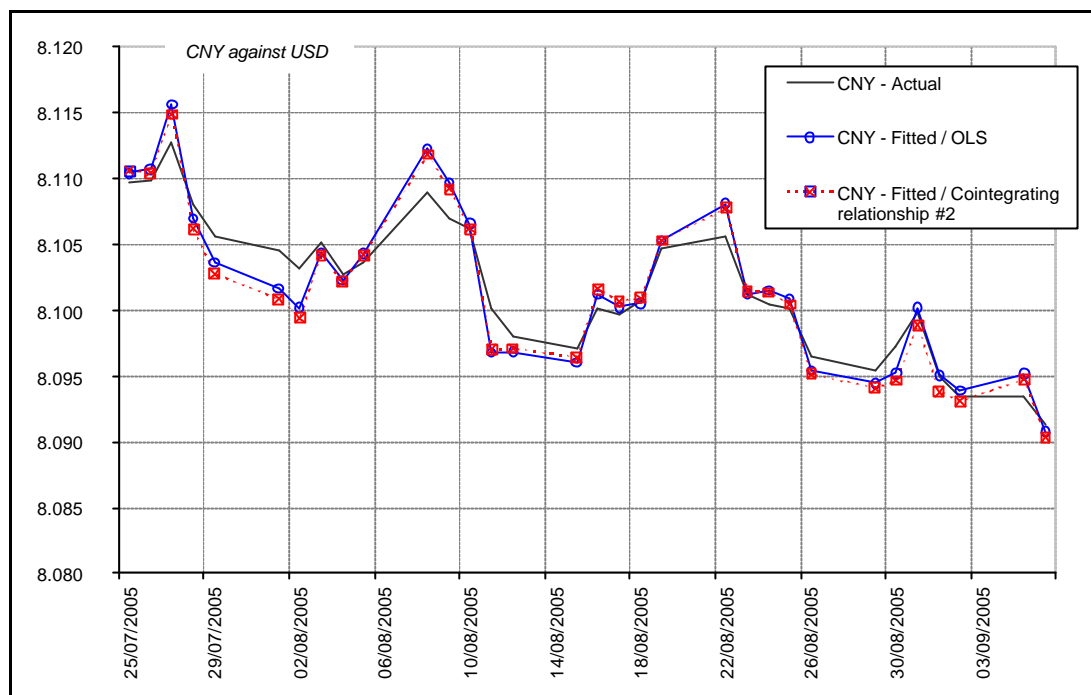
As all the time series of this group are non-stationary<sup>2</sup>, we were interested in determining whether these series were cointegrated, and in identifying all the possible relations between the currencies (to be able to test different possibilities of currency baskets). We identified two relationships using a Johansen's cointegration procedure. According to the long-run equilibrium relation considered, the weight of the USD ranges from 62% to 81%. It does not necessarily mean that the weight of the dollar in the currency basket is so high, but that the consequence of the official weights to other currencies is equivalent to an anchor of more than 80% to the dollar (this is a consequence of the cross correlation of the other currencies to the USD).

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<sup>1</sup> We tried to find an econometric relation that explain the different weights of the 'secondary currencies' in the 'unexplained residuals' (that account for 10% of the dynamic of the yuan), but this research did not find any meaningful result.

<sup>2</sup> A stationary time series is a time series having stable statistical properties and occurs when the mean value of the series remains constant over the time. A stricter definition of stationarity also requires that the variance remains homogenous for the series.

Graph 1. The following graph shows the actual and fitted values of the USD/CNY.



Finally, the table 2 compares the TAC estimated weights of the Chinese currency basket using all the estimation procedures used by the research team. The table indicates that the second cointegrating relationship is the most plausible and consistent with an official 'reasonable basket' and with other estimates (with a weight of the U.S. dollar quite higher than what is thought by Morgan Stanley<sup>3</sup>).

Table 2. Trade data, OLS and Johansen Cointegration Procedure

	OLS estimation	Cointegrating relationship #1	<b>Cointegrating relationship #2</b>	T-A-C estimation on trade data	Morgan Stanley
USD	81%	81%	<b>62%</b>	33%	43%
EUR	3%	3%	<b>10%</b>	11%	14%
JPY	2%	3%	<b>15%</b>	30%	18%
KRW	4%	3%	<b>3%</b>	16%	
Others	10%	10%	<b>10%</b>	10%	25%

By using the estimated econometric relations presented on table 2 and the Consensus Forecasts available for each of the currencies included in the currency basket on August 2005 for end-August 2006, we are able to forecast different spot exchange rates for the USD/CNY.

<sup>3</sup> Source: Stephen L Jen, 'A Yuan a Dozen: On China's Wide Currency Basket', Morgan Stanley, London, August 12, 2005.

**Table 3. USD/CNY forecasts for end-August 2006**  
(spot rate on September 12, 2005: 8.09)

	Consensus			T-A-C
	USD/EUR	USD/JPY	USD/KRW	USD/CNY
max	0.714	90.0	937.5	7.91
average	0.796	103.3	1 007.0	7.99
min	0.909	122.4	1 130.0	8.11

The table 3 presents the different results obtained on the forecasted spot exchange rates and calculated under the extremes and mean average assumptions of the Consensus Forecast. The OLS estimations and the first cointegration relation results are quite similar (with an average USD/CNY around 8.08), but in the case of the second cointegration relation, the estimated USD/CNY is quite higher (around 7.99, i.e. a yearly 1.2% appreciation) and with a wider range of possible values.

However, these estimates of the possible future value of the yuan exchange rate assume that the flexibility created by the new regime is not used at all, i.e. that the Chinese authorities want to keep the CNY stable against their basket of currencies.

But the new regime is indeed a significant and structural change in China's foreign exchange policy. Even though we are not surprised that China is not using such a flexibility in the short run in order to discourage currency speculation, we also doubt that this will remain so for a very long period of time. Indeed, the need to engineer a gradual but substantial appreciation of the currency appears more and more convincing, because it would allow import prices to decline or stabilize, therefore helping Chinese firms to avoid the continuous compression of operating margins; it would also naturally help the monetary management of the country by progressively limiting the current account surplus and reducing speculative capital flows; it would not dent too much the growth engines of the country but would strongly encourage a substitution of exports by domestic consumption, a key goal of the current Chinese leadership.

In the table below, we illustrate the magnitude of the flexibility introduced by the new regime, by looking at possible values of the USD/CNY exchange rate in one year according to different (arbitrary) assumptions about the use of the  $\pm 0.3\%$  daily fluctuations that are authorized.

**Table 4. Use of the exchange rate flexibility by the PBoC and possible values of the CNY on a 12-month horizon**

Intervention pace	Max	Average	Min	Appreciation (% - average against spot rate on 09/12/05)
-0.15% / day	5.36	5.41	5.49	33.1
-0.05% / day	6.95	7.02	7.12	13.3
-0.3% / week	6.77	6.84	6.93	15.5
Result of eq. #2 (unchanged against the basket)	7.91	7.99	8.11	1.2

If we take the extreme assumption that the CNY would appreciate by a daily 0.15% (half the maximum fluctuation authorized), the yuan value would increase by a massive 33% over one year ; with more plausible assumptions of either a 0.05% per day or 0.3% per week, the CNY would be, in 12 month, somewhere in a large band of 6.77 - 7.12. Taking the average values (computed from the average forecast for the main currencies in the basket against the USD), the range would be a narrower 6.84 - 7.02 against the USD (about 14% appreciation against the value on September 12).

Even though such a message may not be precise enough, this analysis would point towards a very likely range for the CNY of 6.85 - 7.99 in one year time, our preferred bet being right in the middle of the range, i.e. about 7.5 against the USD in September 2006, a 7.3% appreciation compared to the current value. However, everybody should be fully aware that the appreciation of the Yuan is still considered by the Chinese authorities as a bargaining instrument in the current international trade debate. Therefore, the likelihood of the appreciation, as we describe it here, is fundamentally dependent on successful trade negotiations between China and its main trading partners. A much clearer assessment of potential changes in the exchange rate will have thus to wait until the next WTO Ministerial meeting in Hong Kong next December.