Assessing China’s Exchange Rate Regime

Jeffrey A. Frankel
Kennedy School of Government, Harvard University
Drawing on joint work with Shang-Jin Wei

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Timeline

• 1978  – IMF Article IV revised, requiring members “avoid manipulating exchange rates…to prevent effective balance of payments adjustment or to gain an unfair competitive advantage.”
• 1988 – US Congress mandates biannual Treasury reports on exchange rate manipulation; aimed at NICs, esp. Korea & Taiwan.
• 1994 -  China devalues/unifies exchange rate
• 1997 -  Currency begins 8 years fixed at 8.28 RMB/$
• Sep. 2003 - US Treasury begins calling for flexibility
• Oct. 2003 - Biannual Treasury report: RMB merits concern & talks
• Feb. 2005  Senators Schumer & Graham propose bill threatening 27.5% tariffs if China continues to “manipulate.”
• July 21, 2005 -- China revalues by 2.1% and announces a new “managed floating system,” the RMB to be determined more flexibly “with reference to a basket of currencies.”
• Oct. 2006 -- IMF Article IV consultation finds RMB “undervalued.”
This paper answers econometrically two questions

1. On what do the bi-annual U.S. Treasury reports to Congress base their findings with regard to China and other trading partners’ currencies:
   • “manipulation” in the sense of IMF’s Article IV?
   or, rather,
   • criteria that come from domestic American politics?

2. Did the exchange rate regime that China put into place in July 2005 genuinely depart from the earlier $ peg, a substantial move toward flexibility?
Connections between the two questions

• US political pressure may have been an important factor behind the July 2005 announcement of a regime change.
  – We look for timing connections between US political rhetoric & Chinese steps toward flexibility.

• A finding that China has not in fact changed its de facto pegging policy, as it has its official policy, might provide ammunition for a renewed US campaign.
US political pressure may have played a role in the origin of the entire issue of yuan appreciation.
Analysis of the Treasury Department’s biannual Report to Congress on International Economics and Exchange Rate Policy
Two hypotheses regarding determinants of US Treasury decisions whether partners are manipulating currencies:

• (1) Legitimate economic variables
  – the partner’s overall current account/GDP,
  – its reserve changes,
  – the real overvaluation of its currency; vs.

• (2) Variables suggestive of domestic American political expediency
  – the bilateral trade balance,
  – US unemployment,
  – an election year dummy.
Data on US Treasury findings

• 31 biannual reports, from Oct. 1988 thru Nov. 2005
  [to be updated]

• Observations for 63 US trading partner countries.

• The variable to be explained is ordinal, defined as follows:
  – 0 = country not investigated
  – 1 = examined as a potential manipulator
  – 2 = policy changes recommended / conducting discussions
  – 3 = found to be manipulating its exchange rate.
Explaining findings of Treasury reports

<table>
<thead>
<tr>
<th></th>
<th>Excl. oil exporters</th>
<th>15 Asian economies</th>
</tr>
</thead>
<tbody>
<tr>
<td>US bilateral TB</td>
<td>-0.9245***</td>
<td>-0.9850***</td>
</tr>
<tr>
<td></td>
<td>0.0655</td>
<td>0.1548</td>
</tr>
<tr>
<td>Partner’s CA/GDP</td>
<td>0.0144***</td>
<td>0.0284**</td>
</tr>
<tr>
<td></td>
<td>0.0021</td>
<td>0.0069</td>
</tr>
<tr>
<td>Partner’s RER</td>
<td>-0.1829***</td>
<td>-0.2322**</td>
</tr>
<tr>
<td></td>
<td>0.0291</td>
<td>0.1115</td>
</tr>
<tr>
<td>change in reserves/GDP</td>
<td>0.0032</td>
<td>-0.0117</td>
</tr>
<tr>
<td></td>
<td>0.0034</td>
<td>0.0091</td>
</tr>
<tr>
<td>US unemployment</td>
<td>0.0224**</td>
<td>0.0826**</td>
</tr>
<tr>
<td></td>
<td>0.0102</td>
<td>0.0374</td>
</tr>
</tbody>
</table>
Findings suggest the domestic US variables affect the Treasury decision more than the legitimate global manipulation criteria:

• weak role for partner reserve accumulation,
• very high significance of bilateral balance,
• significance of US unemployment, and
• significant (borderline) extra effect of unemployment in election years.
Implication

If the IMF were interpreting Article IV, rather than the Treasury interpreting the 1988 US law,

– the criterion of consistent uni-directional forex intervention would receive more emphasis,

– and US-specific variables such as the bilateral trade balance would not appear at all.
Some sympathy for the Treasury

• It walks a fine line.

• An additional finding:
  Treasury is eager not to single out one country for unique opprobrium.
  – No single country is left exposed on its own.
  – Table 5:
    • the top-ranked country is less likely to be named than if it had some other country to hide behind, while
    • the 2nd- & 3rd-ranked countries are more likely to be moved up, to give the leader company.
Try out the equation as predictor for May 2006 report

• Model suggested China was the most likely to be named a currency manipulator.
  – But the probability was only 33 %.
  – The country with 2nd highest probability of being named a manipulator was Malaysia: 22 %.

• China had a 63 % probability of being recommended for bilateral discussions, short of being named as a currency manipulator.
  – That is what happened.
Estimating
the Implicit Weights
in the Chinese RMB Basket
The new exchange rate regime announced July 2005:

- Minor initial appreciation of 2.1% appreciation.
- RMB to be set with reference to a currency basket, allowing a movement of up to +/- 0.3% in bilateral exchange rates within any given day — (in theory, daily band could cumulate to 6.4% /mo.).
- Governor Zhou revealed 11 currencies (Aug. 2005), though numerical basket weights still unannounced.
The magnitude of daily movements vs. $ increased in the spring of 2006,
but variability nevertheless remains small.

**Fig. 4 Standard deviation**

Std. Dev. of Changes in CNY/USD

Every 20 days over 07/01/05-01/08/07
Estimating the weights

• A problem made-to-order for OLS regression.

• Regress % changes in value of RMB against % changes in values of candidate currencies.

• \[ \Delta \log RMB_t = c + \alpha \Delta \log S_t + \beta_1 \Delta \log \epsilon_t + \beta_2 \Delta \log \gamma_t + \ldots \]

• The coefficients are the basket weights.

• Can impose \[ \alpha + \sum \beta_j = 1. \]
• If China is following a perfect basket peg, the fit should be perfect, a rarity in econometrics (s.e.r. = 0, & $R^2 = 100\%$).

• More likely, the basket peg is not perfect, but one can still estimate weights with fairly tight standard errors.

• The real questions:
  – How wide is the band?
  – How strong is the trend term ($c$), and
  – How great is the estimated weight on non-$\$currencies$?
In terms of what numeraire is “value” defined?

• It doesn’t matter, if basket peg holds well.
• Previous authors have chosen:
  the SDR, Swiss franc, dollar, purchasing power over a consumer basket of domestic goods, a GDP-weighted basket of major currencies, & Canadian dollar.
• We here use the SDR as numeraire, & the price of gold as a robustness check.
References for the technique

• “Pioneered” by Frankel (1993), Frankel & Wei (1994, 95).

• Used by others, including Benassy-Quere (1999), Ohno (1999), Frankel, Schmukler & Servén (2000), and Benassy-Quere, Coeure & Mignon (2004).

## Implicit weights in RMB basket

**Table 11  7/22/05-1/8/07**

<table>
<thead>
<tr>
<th>Currency</th>
<th>Estimate</th>
<th>(standard error)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Dollar</td>
<td>0.904**</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Euro</td>
<td>-0.006</td>
<td>(0.014)</td>
</tr>
<tr>
<td>Japanese Yen</td>
<td>0.008</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Korean Won</td>
<td>0.002</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Singapore $</td>
<td>-0.018</td>
<td>(0.021)</td>
</tr>
<tr>
<td>British Pound</td>
<td>-0.004</td>
<td>(0.011)</td>
</tr>
<tr>
<td>Malaysia Ringgit</td>
<td>0.053**</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Russia Ruble</td>
<td>-0.018</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Australian Dollar</td>
<td>-0.003</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Thailand Baht</td>
<td>0.006</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Canadian Dollar</td>
<td>0.003</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Trend</td>
<td>.00009**</td>
<td>(.00003)</td>
</tr>
</tbody>
</table>

**Note:** **significant at 5%;** Change in the log value of RMB (in terms of SDRs) is regressed on changes in log values of other currencies.
Estimation in sub-periods

• 6 sub-periods:
  – Tables 11 – 17 report results.

• In 1st 2 sub-samples, regime is a US $ peg.
  – Weight on $ & R² virtually 1.0. As tight as Hong Kong $!

• After Jan.2006, however, $ weight falls.
  – In Feb.-April, 2006, est. weight on $ only 0.7.
  – Ringgit, won, ruble, & baht receive positive weights.
  – Surprisingly, ¥ & € continue to receive no positive weight.

• Over last 8 months, $ weight ≈ .9
  – Significant trend appreciation = .0002 / day => 5.2 % /yr.
Extensions

• Basic results robust with respect to:
  – using another numeraire (gold price) Tbs.11A-17A
  – constraining weights to sum to 1,
    • Table 20 => won estimate sharper
  – Method of moments

• We allowed for accelerating trend, but found no sign of it.
Evolution during the course of the sample period

Downward trend in basket’s weight on $:

- Highly significant if assumed linear - Table 18
  - Trend in level still significant as well, but only .0001 appreciation/day, or 2.5 %/yr., against basket

- But we need to specify the time pattern of the weights non-linearly, so they won’t go <0 or >1.
Full specification of weights $w(j)$ on currency values $X(j)$

- $\Delta \log RMB_t = f(t) + \sum w(j) \Delta X(j)_t$
- To impose the constraint $\sum w(j) = 1$,
  - Let € = 1st currency: $w(€) = 1 - \sum w(j) => \[
  [\Delta \log RMB_t - \Delta \log €_t ] = f(t) + \sum w(j) (\Delta X(j)_t - \Delta \log €_t) \\
  - where 0 < w(j) < 1.$
- Now let the weights $w(j)$ depend on time, using exponential form.
- Specification 2:
  let $w(j) = b_0(j) + b_1(j) \cdot [1 - \exp(-d t)]$, and $f(t) = c_0 + c_1 \cdot t.$
Estimation of nonlinear evolution of weights
7/22/05-1/8/07 in Table 22

• Confirms
  – significant downward trend in $ weight
  – Of non-$ currencies, upward trend in the ringgit weight is the strongest statistically.

• Strikingly, no more statistical significance to the trend of appreciation against the basket,
  – let alone to acceleration in that trend.
  – Rather, action comes from falling weight on $.
But the estimated shift away from $ is painfully slow: starting at .98 in 2005, $ weight falls only to .87 over 5 yrs.
We also looked at intra-daily movements

- Some evidence that intra-daily pattern differs from inter-daily pattern, itself consistent with declared regime.

- On purely intra-daily data, there is less sign of a downward trend in the very high weight on the dollar.
Has US pressure pushed the pace of increased flexibility?

- We searched an electronic database of news reports (FACTIVA/NewsPlus), recording the number of US news reports of US officials asking China to speed up RMB flexibility/revaluation.

- Two separate time series on the cumulative numbers of complaints
  - from US Treasury and
  - from officials of other government agencies (e.g. the White House, Congress and Fed)
We added # complaints as a regressor

(Table 19)

• No evidence that U.S. official complaints are associated with RMB appreciation relative to the currency basket.

• There is evidence that cumulative complaints are associated with a reduction in the RMB’s weight on the US dollar.
Policy conclusions

• The increase in flexibility since July 2005:
  – has taken the form of gradually shifting weight to other currencies, esp. won & ringgit
  – not of a gradually accelerating appreciation trend against the basket, as often thought.
  – Has been extremely slow.

• US politicians won’t be satisfied

• Adds to the onus on the IMF to deal with the RMB/$ question.