Re-examining exchange rate regimes in Asia after the global financial crisis

Ila Patnaik  Ajay Shah  Anmol Sethy

NIPFP DEA Research Program

September 16, 2009
Questions
Questions

What happened with Asian exchange rate regimes?

- Was there acute exchange rate inflexibility pre-Asian-crisis?
- After the Asian crisis, did Asia go right back to pre-crisis pegging? (*Fear of Floating*)
- In the years after the Asian crisis, has Asia embarked on a ‘Bretton-Woods-II’ world of USD pegging rooted in competitive exchange rate mercantalism?
- Has Asia shifted away from a USD focus towards either EUR or JPY in exchange rate pegging?
- Has the global financial crisis of 2008 led to modifications in the exchange rate regime in Asia?
Methodology
How might we approach these questions?

1. A database of the *de facto* exchange rate regime
2. Observe how exchange rate flexibility changed over the years.
Problems of measurement

- Some databases exist for the *de facto* exchange rate regime.
- Identification of fixed and float is relatively easy.
- But how to quantify flexibility of intermediate regimes?
- ‘The fine structure of pegged exchange rates’
- How to identify dates when flexibility changed?
- Need for sound statistical inference.
Old workhorse: the exchange rate regression

\[
d \log \left( \frac{\text{INR}}{\text{CHF}} \right) = \beta_1 + \beta_2 d \log \left( \frac{\text{USD}}{\text{CHF}} \right) + \beta_3 d \log \left( \frac{\text{JPY}}{\text{CHF}} \right) \\
+ \beta_4 d \log \left( \frac{\text{DEM}}{\text{CHF}} \right) + \epsilon
\]

Interpretation:
- Hong Kong: $\beta_2 = 1, \beta_3 = \beta_4 = 0, R^2 = 1$
- Floating rate: $R^2 \approx 0.4$
Recent advances

Zeileis, Shah, Patnaik, 2008:

1. Extend the econometrics of structural change for OLS (Perron & Bai)

2. An estimation strategy for identifying dates of structural breaks in the exchange rate regression

3. For each country, this yields: a set of dates, and a measure of the exchange rate flexibility then prevalent.
## Example: Korea

<table>
<thead>
<tr>
<th>Start</th>
<th>End</th>
<th>USD</th>
<th>DUR</th>
<th>GBP</th>
<th>JPY</th>
<th>$\sigma_e^2$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-01-11</td>
<td>1997-10-17</td>
<td>1.05</td>
<td>-0.04</td>
<td>-0.01</td>
<td>0.03</td>
<td>0.15</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.28</td>
<td>-1.73</td>
<td>-0.55</td>
<td>1.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997-10-24</td>
<td>1999-01-08</td>
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<td>0.01</td>
<td>0.42</td>
<td>0.28</td>
<td>4.20</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.18</td>
<td>0.08</td>
<td>1.03</td>
<td>2.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999-01-15</td>
<td>2008-03-28</td>
<td>0.66</td>
<td>0.28</td>
<td>0.09</td>
<td>0.26</td>
<td>0.72</td>
<td>0.70</td>
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<tr>
<td></td>
<td></td>
<td>16.87</td>
<td>3.25</td>
<td>1.96</td>
<td>8.25</td>
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<tr>
<td>2008-04-04</td>
<td>2009-05-29</td>
<td>0.33</td>
<td>0.46</td>
<td>0.18</td>
<td>-0.26</td>
<td>4.10</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.43</td>
<td>1.44</td>
<td>1.28</td>
<td>-1.54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Example: India

<table>
<thead>
<tr>
<th>Start</th>
<th>End</th>
<th>USD</th>
<th>DUR</th>
<th>GBP</th>
<th>JPY</th>
<th>$\sigma^2$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-01-11</td>
<td>1998-08-21</td>
<td>0.90</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.46</td>
<td>0.79</td>
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<td>11.43</td>
<td>-0.34</td>
<td>0.71</td>
<td>0.81</td>
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</tr>
<tr>
<td>1998-08-28</td>
<td>2004-03-19</td>
<td>1.00</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.08</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
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<td>59.13</td>
<td>0.47</td>
<td>0.70</td>
<td>0.84</td>
<td></td>
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</tr>
<tr>
<td>2004-03-26</td>
<td>2009-05-29</td>
<td>0.70</td>
<td>0.31</td>
<td>0.13</td>
<td>0.00</td>
<td>0.65</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14.88</td>
<td>3.67</td>
<td>2.94</td>
<td>0.06</td>
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<td></td>
</tr>
</tbody>
</table>
The key idea: time-series of $R^2$ across structural change
Data resources

The 16 countries that we examine:

- India
- Pakistan
- Sri Lanka
- Nepal
- Bangladesh
- Bhutan
- China
- Taiwan
- Hong Kong
- Korea
- Thailand
- Vietnam
- Malaysia
- Singapore
- Indonesia
- Philippines

Weekly returns data on currencies, from 1/1/1991 to 31/5/2009 for most currencies, but starts at 1/1/1993 for some countries.
Estimation strategy

1. For each country, apply the method of ZSP to identify break dates.

2. For each point in time, compute summary statistics across the countries of:
   - $R^2$
   - USD coefficient
   - EUR coefficient
   - JPY coefficient.

3. Bootstrap inference for these summary statistics; use adjusted bootstrap percentile method.

We will report location estimators for Asia; of course the stories for individual countries will vary.
Results
Exchange rate flexibility
A shift away from USD pegging?
Rise of the Euro?

Results

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A nascent yen bloc?
Confirm acute incidence of USD pegging pre-Asian-Crisis

After Asian crisis, Asia did return to high inflexibility (*fear of floating*), but not quite the pre-crisis situation.

In the following years, there was a short period with acute inflexibility (*Bretton-Woods-II*).

But after that, exchange rate flexibility has dropped a little. BW-II may have started subsiding.

No shift away from USD: only greater flexibility about a *de facto* peg to the dollar.
Robustness checks

1. GDP weighted instead of equally weighted
2. Alternative location estimators: trimmed mean
3. Do these results for the overall Asia also hold for ASEAN?
Exchange rate flexibility: equal weights vs. GDP weights

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Exchange rate flexibility: trimmed mean vs. ordinary mean
Exchange rate flexibility: ASEAN vs. full Asia
Conclusion
What happened with Asian exchange rate regimes?

- Was there acute exchange rate inflexibility pre-Asian-crisis?

\[ R^2 \approx 0.93 \text{ pre-crisis}. \]

After the Asian crisis, did Asia go right back to pre-crisis pegging? (Fear of Floating)

\[ R^2 \text{ went back up to 0.821 right after the crisis, and to 0.888 in 2004.} \]

In the years after the Asian crisis, has Asia embarked on a BW2? In 2004, \[ R^2 \text{ was 0.888, but since there has been a slow decline to the most recent value of 0.779, which is the lowest ever.} \]

Has Asia shifted away from a USD focus towards EUR or JPY? No. What has happened is greater flexibility with a primarily USD peg.
What happened with Asian exchange rate regimes?

- Was there acute exchange rate inflexibility pre-Asian-crisis?  
  Yes, $\bar{R}^2 \approx 0.93$ pre-crisis.

- After the Asian crisis, did Asia go right back to pre-crisis pegging?  
  *(Fear of Floating)*
What happened with Asian exchange rate regimes?

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Thank you.