Defending against speculative attacks – it is risky, but it can pay off

Christian Alexander Bernhard Bauer* Erler** Herz**

*Trier University **Bayreuth University

Emerging Markets Finance Conference
20-21 December, 2013
Currency crises and real growth: India
Currency crises and real growth: India
Currency crises and real growth: India
Currency crises: actors and outcomes

stable initial environment

trader's decision

attack

central banks's decision

no attack

immediate depreciation

defense

unsuccessful defense

successful defense

Source: Bauer and Herz (2010)
Currency crises: actors and outcomes

1. Stable initial environment
2. Trader's decision
   - Attack
   - No attack
3. Central bank's decision
   - Immediate depreciation
   - Defense
     - Unsuccessful defense
     - Successful defense

Source: Bauer and Herz (2010)
Main findings

• Currency crises are quite heterogeneous events.

• Central banks play a major role regarding the costs of currency crises \( \rightarrow \) decision: to defend or not.

• Two options to mitigate the costs of speculative attacks
  – immediate depreciation
  – successful defense.

• Unsuccessful defenses \( \rightarrow \) high economic costs
Currency crisis definitions

- Exchange Market Pressure Index
- significant depreciation
  Frankel and Rose (1996), Eichengreen and Rose (2003), Bussière et al. (2010)

\[ EMPI_t = \Delta e_t + \Delta i_t - \Delta r_t \]

- \( \Delta e_t \) significant depreciation
- \( \Delta i_t - \Delta r_t \) significant intervention
The (not so trivial) definition of currency crisis events

- significant intervention & significant depreciation
  - successful defense: significant intervention without a significant devaluation during the subsequent 12 months
  - unsuccessful defense: significant intervention followed by a significant devaluation during the subsequent 12 months
  - immediate devaluation: significant devaluation without a significant intervention during the preceding 12 months

- Separation of events to avoid contamination by nearby events
  - crisis/event in year T
  - no other event in T-1 and T+1
Data

- aggregated to annual data
- 32 emerging market countries between 1960 and 2010
- 163 crisis events can be categorized into the 3 types of crises:
  - 42 immediate depreciations
  - 87 successful interventions
  - 34 unsuccessful interventions
Pre and post crisis real growth (1960 – 2010)

Immediate depreciation  Successful defense  Unsuccessful defense

Pre-crisis real growth
Pre and post crisis real growth (1960 – 2010)

Immediate depreciation
Successful defense
Unsuccessful defense

Pre-crisis real growth
Post-crisis real growth
Pre and post crisis real growth (1960 – 2010)
Pre and post crisis real growth (1960 – 2010)
Empirical Analysis – two approaches

• panel VAR

\[ X_{it} = \Gamma(L)X_{it} + F(L)D_{it} + \omega_i + d_t + \epsilon_{it} \]

• univariate panel autoregressive:

\[ x_{it} = \alpha_i + \omega_t + \sum_{j=1}^{3} \beta_j x_{it-j} + \sum_{k=1}^{3} \sum_{s=1}^{3} \alpha_{ks} D_{kit-s} + \epsilon_{it} \]
Empirical Analysis: panel VAR (I)

Real growth:

Inflation:

Immediate depreciation

Successful defense

Unsuccessful defense
Empirical Analysis: panel VAR (II)

current account

private capital inflows

immediate depreciation  successful defense  unsuccessful defense
Summary

• Not all currency crises are created equal
• Need to differentiate currency crises
• Crisis management matters
• Costs of non-intervention are likely to be overestimated
• Defending is a risky decision!
• Non-intervention as an “intermediate” strategy
Currency crisis definitions (III)

- Significant intervention in $t_0$: no → significant devaluation in $t_0$: no → Immediate depreciation
  yes → Immediate depreciation
  no → No crisis

- Significant devaluation in $t_0$: yes → Immediate depreciation
  no → No crisis

- One or more significant devaluations from $t_0$ through to $t_{11}$: no → Successful defense
  yes → Unsuccessful defense
Empirical Analysis: univariate panel autoregressive

Real growth

Inflation

Immediate depreciation

Successful defense

Unsuccessful defense
### Empirical Analysis IV

<table>
<thead>
<tr>
<th>Years after crisis</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consumption growth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate depreciation</td>
<td>0.003</td>
<td>0.005</td>
<td>0.005</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td>Successful defense</td>
<td>0.003</td>
<td>0.007</td>
<td>-0.007</td>
<td>-0.002</td>
<td>0.000</td>
</tr>
<tr>
<td>Unsuccessful defense</td>
<td><strong>-0.041</strong></td>
<td>0.005</td>
<td>0.000</td>
<td>0.002</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Investment growth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate depreciation</td>
<td>-0.033</td>
<td>-0.007</td>
<td>-0.005</td>
<td>0.000</td>
<td>0.001</td>
</tr>
<tr>
<td>Successful defense</td>
<td>-0.006</td>
<td>-0.012</td>
<td>-0.003</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Unsuccessful defense</td>
<td><strong>-0.189</strong></td>
<td>0.011</td>
<td>0.048</td>
<td>0.019</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Export growth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate depreciation</td>
<td><strong>-0.056</strong></td>
<td>-0.008</td>
<td>0.014</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td>Successful defense</td>
<td>-0.006</td>
<td>0.002</td>
<td>0.011</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td>Unsuccessful defense</td>
<td><strong>-0.064</strong></td>
<td>-0.040</td>
<td>0.017</td>
<td>0.002</td>
<td>-0.002</td>
</tr>
<tr>
<td><strong>Import growth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate depreciation</td>
<td><strong>-0.064</strong></td>
<td>0.003</td>
<td>0.007</td>
<td>0.003</td>
<td>-0.001</td>
</tr>
<tr>
<td>Successful defense</td>
<td>-0.016</td>
<td>-0.010</td>
<td>0.007</td>
<td>0.003</td>
<td>0.000</td>
</tr>
<tr>
<td>Unsuccessful defense</td>
<td><strong>-0.185</strong></td>
<td>0.019</td>
<td>0.041</td>
<td>0.009</td>
<td>-0.007</td>
</tr>
<tr>
<td><strong>Debt-to-GDP ratio</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate depreciation</td>
<td><strong>0.020</strong></td>
<td>0.018</td>
<td>0.002</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Successful defense</td>
<td><strong>0.014</strong></td>
<td>0.015</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Unsuccessful defense</td>
<td>0.078</td>
<td>0.068</td>
<td>0.040</td>
<td>0.031</td>
<td>0.026</td>
</tr>
<tr>
<td><strong>Unemployment rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate depreciation</td>
<td>0.007</td>
<td>0.004</td>
<td>-0.001</td>
<td>-0.002</td>
<td>-0.002</td>
</tr>
<tr>
<td>Successful defense</td>
<td>0.000</td>
<td>-0.002</td>
<td>-0.002</td>
<td>-0.001</td>
<td>-0.001</td>
</tr>
<tr>
<td>Unsuccessful defense</td>
<td><strong>0.013</strong></td>
<td><strong>0.010</strong></td>
<td>0.003</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
</tbody>
</table>
Currency Crises and Real GDP

Real GDP: Turkey
## Currency crisis definitions (I)

<table>
<thead>
<tr>
<th>Depression</th>
<th>No crisis</th>
<th>Successful defense</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No crisis</td>
<td>Yes: immediate depreciation</td>
</tr>
<tr>
<td>Yes</td>
<td>successful defense</td>
<td>unsuccessful defense</td>
</tr>
</tbody>
</table>
### 3 Currency Crisis Definitions

<table>
<thead>
<tr>
<th>Devaluation</th>
<th>Defensive action</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
<td>no crisis</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>successful defense</td>
</tr>
<tr>
<td>Yes</td>
<td>immediate devaluation</td>
<td>unsuccessful defense</td>
</tr>
</tbody>
</table>
### 3 Currency Crisis Definitions

<table>
<thead>
<tr>
<th>Devaluation</th>
<th>Defensive action</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
<td>no crisis</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>successful defense</td>
</tr>
<tr>
<td></td>
<td></td>
<td>immediate devaluation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>unsuccessful defense</td>
</tr>
</tbody>
</table>
Deviation from pre crisis growth: all crises (1960 – 2010)
Deviation from pre crisis growth: different types of crises (1960 – 2010)
Pre crisis real growth (1960 – 2010)
Post crisis real growth (1960 – 2010)
Pre and post crisis real growth (1960 – 2010)