"Choices of optimal policy instruments under the floating and the basket-peg regimes"

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Outline of the presentation

1. Motivations
2. Major implications of the paper
3. Model
4. Rules for policy instruments
5. Quantitative analysis
   - Impulse responses
   - Comparison of the cumulative losses
6. Conclusion

The floating regime is the other alternative for East Asian countries. (1) the floating regime with inflation targeting: Adams and Semblat (2004) (2) the floating is also one of desirable options in static analysis: Yoshino, Kaji, and Suzuki (2004) and Yoshino, Kaji and Asonuma (2004)

There still remains a question whether adopting the basket-peg or the floating regime is optimal for E.A. countries.
Motivations (cont.)

- Trade-off under the basket-peg regime
  - Optimality based on consideration of the capital movements across countries v.s. practical usefulness
    - 1. If we consider a simple rule such as committing to trade weight, it is not optimal (neglecting impacts of capital movements).
    - 2. It is very hard to implement optimal weight derived from a complicated equation with many variables.

- Can we propose a simple rule which is sub-optimal, but practically useful?
  - rule similar to the Taylor rule (relates to inflation rate and output gap)
  - it is sub-optimal, but the monetary authority is able to efficiently minimize the loss which it targets.
We obtain a simple rule of basket weight.

- it is sub-optimal, but practically easy to implement.
- The monetary authority is able to minimize the cumulative loss with this basket weight rule.

We show the relative superiority of basket weight rule compared to other instrument rules.

- By implementing basket weight rule, the monetary authority is able to minimize the impacts on output gap and inflation rate through exchange rate channel.
- For a small open economy exposed to several shocks (including oil price shocks), it will be better off to reduce the negative impacts associated with exchange rate fluctuation.
Model

- Extended version of Clarida, Gali and Gertler (2002) - micro foundations of households and firms
- Commitment of instrument rule by the monetary authority
- Rational expectation of the private sector
  - the private sector anticipates that the monetary authority commits to instrument rules in the future.
Model (cont.)

- Firms serving domestic market

\[ Y_t(z) = F_t L_t(z)^{\alpha} (H_t(z))^{1-\alpha} \]

Assuming the Calvo-type price adjustments

\[ \pi_t^C = \beta E_t \pi_{t+1}^C + \lambda_H \kappa \tilde{m}_t - \beta \lambda_J \left( E_t e_t^{B/Y} - e_t^{B/Y} \right) \]
\[ - \beta \lambda_{US} \left( E_t e_{t+1}^{B/\$} - e_t^{B/\$} \right) + \lambda_J \left( e_t^{B/Y} - e_{t-1}^{B/Y} \right) \]
\[ + \lambda_{US} \left( e_t^{B/\$} - e_{t-1}^{B/\$} \right) \]

- Exporting firms

\[ Y_{t,EX}(z) = F_t \left( L_{t,EX}(z) \right)^{\alpha'} \left( H_{t,EX}(z) \right)^{1-\alpha'} \]

Assuming they adjust the price every periods

\[ p_t^H = \alpha' w_t + (1 - \alpha') q_t - f_t \]
Open-economy AS curve (where $A_1 = [1 - \kappa(\alpha\lambda_H - 1)]$)

$$
\pi^C_t = \frac{\beta}{A_1} E_t \pi^C_{t+1} + \frac{\lambda_H \kappa \alpha (\eta + \sigma)}{A_1} x_t + \frac{\lambda_H \kappa (1 - \alpha)}{A_1} \hat{q}_t
$$

$$
+ \frac{(1 - \beta + \kappa)}{A_1} \left[ \lambda_J \hat{e}^B/Y_t + \lambda_{US} \hat{e}^B/$$

$$
- \frac{\beta}{A_1} \left[ \lambda_J E_t \hat{e}^B/Y_{t+1} + \lambda_{US} E_t \hat{e}^B/$$

Open-economy IS curve

$$
x_t = E_t x_{t+1} + \frac{1}{A_2} \left( \frac{1}{\sigma} + \alpha' - \frac{1}{\lambda_H} \right) E_t \pi^C_{t+1} - \frac{1}{\sigma A_2} (i_t - i^o_t)
$$

$$
+ \frac{(1 - \lambda_H) \theta (1 - \alpha')}{A_2} (E_t \hat{q}_{t+1} - \hat{q}_t) + \frac{(1 - \lambda_H)}{\sigma} E_t \hat{\psi}_{t+1}
$$

$$
+ \frac{A_3}{A_2} \left[ \lambda_J (E_t \hat{e}^B/Y_{t+1} - \hat{e}^B/Y_t) + \lambda_{US} (E_t \hat{e}^B/$$
Model (cont.)

- Money market equation

\[
(m_t - m_t^o) = \frac{\sigma}{b\lambda_H} x_t + \left[ 1 + \frac{\sigma\theta}{b\lambda_H} \frac{(1 - \lambda_H)}{\lambda_H} \right] \pi_t^C \\
- \frac{2\sigma\theta}{b\lambda_H} \left( \lambda_J \hat{e}_t^B/Y + \lambda_{US} \hat{e}_t^B/\$ \right) - \frac{1}{b} (i_t - i_t^o)
\]

- Central Bank's balance sheet

\[
B_t^c + S_t^{R/\$} B_t^{US,c} = M_t
\]

- Basket equation

\[
(1 - \nu) e_t^B/Y + \nu e_t^B/\$ = 0
\]

- Objective function of the monetary authority

\[
L_t = E_t \sum_{i=0}^{\infty} \beta^i \left[ \left( \pi_{t+i}^C \right)^2 + \omega (x_{t+i})^2 \right]
\]

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Instrument rules (based on Thai quarterly data from 1997Q3-2006Q2)

- **Interest rate rule**
  
  $$ (i_t - i_t^o) = 1.317_{(0.298)} x_t - 1.002_{(0.220)} \pi_t $$

- **Money supply rule**
  
  $$ (m_t - m_t^o) = -0.632_{(0.241)} x_t - 0.483_{(0.142)} \pi_t $$

- **Basket weight rule**
  
  $$ \nu^* \Lambda_t = 1.134_{(0.667)} \pi_t + 5.948_{(1.074)} x_t $$

- **Trade weight rule**
  
  $$ \nu^* = \frac{1}{TR_{US}} $$

- **Fixed rate rule (Dollar-peg regime)**
  
  $$ \nu^* = 1 $$
Quantitative analysis

- **Parameter values**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>0.99</td>
<td>$\sigma$</td>
<td>2</td>
</tr>
<tr>
<td>$\eta$</td>
<td>1.5</td>
<td>$b$</td>
<td>0.67</td>
</tr>
<tr>
<td>$\mu$</td>
<td>6</td>
<td>$\theta$</td>
<td>2</td>
</tr>
<tr>
<td>$\omega$</td>
<td>0.75</td>
<td>$\kappa$</td>
<td>0.086</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>0.8</td>
<td>$\alpha'$</td>
<td>0.6</td>
</tr>
<tr>
<td>$\varpi$</td>
<td>0.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\rho_{eB/$}$</td>
<td>0.34</td>
<td>$\rho_{eB/Y}$</td>
<td>0.42</td>
</tr>
<tr>
<td>$\rho_{\psi}$</td>
<td>0.23</td>
<td>$\rho_q$</td>
<td>0.44</td>
</tr>
</tbody>
</table>

- Unit root tests (DF-GLS unit root tests)
  - Inflation rate and output gap are stationary at the first difference.

- Co-integration test
  - No co-integration relationship
Impulse responses under interest rate rule

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Impulse responses under money supply rule

Baht-Yen exchange rate shock

Foreign interest rate shock

Oil price shock

Baht-dollar exchange rate shock

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Impulse responses under basket-weight rule

- Baht-Yen exchange rate shock
  - Output gap
  - Inflation

- Foreign interest rate shock
  - Output gap
  - Inflation

- Oil price shock
  - Output gap
  - Inflation
Impulse responses under trade-weight rule

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Impulse responses under fixed rate rule

Baht-Yen exchange rate shock

Foreign interest rate shock

Oil price shock

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Implementing basket weight rule is desirable compared with other rules. The M.O. is able to minimize the negative impacts of exchange rates on inflation rate.

Fixed rate rule (the dollar-peg regime) is not optimal consistent with Yoshino, Kaji, and Asonuma (2009).

Table 5: Discounted cumulative loss values

<table>
<thead>
<tr>
<th>Regime</th>
<th>Policy rule</th>
<th>Output gap</th>
<th>Inflation</th>
<th>Total cumulative loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floating</td>
<td>Interest rate</td>
<td>0.0124</td>
<td>0.0043</td>
<td>0.0167</td>
</tr>
<tr>
<td>Money supply</td>
<td></td>
<td>0.0574</td>
<td>0.0011</td>
<td>0.0585</td>
</tr>
<tr>
<td>Basket peg</td>
<td>Basket weight</td>
<td>0.0048</td>
<td>0.0001</td>
<td>0.0050</td>
</tr>
<tr>
<td></td>
<td>Trade weight</td>
<td>0.0324</td>
<td>0.0355</td>
<td>0.0679</td>
</tr>
<tr>
<td>Dollar peg</td>
<td>Fixed rate</td>
<td>0.0812</td>
<td>0.0088</td>
<td>0.0900</td>
</tr>
</tbody>
</table>
We obtain a simple rule of basket weight.

- it is sub-optimal, but practically easy to implement.
- The monetary authority is able to minimize the cumulative loss with this basket weight rule.

We show the relative superiority of basket weight rule compared to other instrument rules.

- The advantage of the basket weight rule is that the monetary authority is able to minimize efficiently the impacts on inflation rate through exchange rate channel. (which is missing under the interest rate rule.)
- For a small open economy exposed to several shocks (including oil price shocks), the monetary authority puts priority on reducing the negative impacts associated with exchange rate fluctuation.