Alternative Monetary-Policy Instruments and Limited Credibility: An Exploration

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November, 2021
Most studies on policy rules heavily influenced by IT:
- Interest rate as the instrument + rational expectations (RE).
- Even those relaxing RE still focus on interest rate rules.

IMF AREAER database 2019:

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<th>% over 183 countries (excluding EMU members)</th>
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RE implies high degree of credibility (agents forecast knowing the policy rule that will be implemented in the future); which cannot be taken for granted in Low Income & Emerging countries.

Can limited credibility (LC) influence the choice of policy instrument?
Introduction

What do we do?

- Use a NK-SOE DSGE model as a laboratory.
- LC: Adaptive learning for inflation-related variables.
  - VAR with time-varying long-run inflation expectations (anchoring).
  - Surprises in inflation and FX can shift long-run expectations.
- Study dynamics after a world-interest-rate shock under 3 alternatives:
  - Taylor rule for the interest rate ($R$), calibration based on Chile.
  - Constant money supply ($M$).
  - Crawling peg ($S$).

Preview of results:

- RE: Trade-off between $R$ and $M$: $M$ insulates activity, but is more inflationary. Larger recession with $S$ rule, no clear inflation advantage.
- LC if only inflation surprises affect long-run expectations: qualitatively similar trade-offs, differences are exacerbated (more persistence).
- LC if FX surprises also affect long-run expectations: less insulation and more inflation with $M$. Potential role for FX stabilization.
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Main ingredients:

- SOE, free capital mobility, incomplete financial markets.
- Households: Consumption (habits), labor supply, money demand, foreign and domestic bonds.
- Home goods: Produced using labor and capital.
- Final goods: Combine home and foreign goods. Calvo prices, indexation.
- Dominant currency pricing (limited expenditure switching).
- Calvo sticky wages, indexation.
- Capital accumulation, adjustment costs.
Model Overview

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- **Inflation-related expectations are relevant for...**
  - Phillips curves (prices and wages).
  - Inter-temporal choices (consumption, investment, etc.): $\hat{R}_t - E_t\{\hat{\pi}_{t+1}\}$. 
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- Inflation-related expectations are relevant for...
  - Phillips curves (prices and wages).
  - Inter-temporal choices (consumption, investment, etc.): \( \hat{R}_t - E_t[\hat{\pi}_{t+1}] \).

- Shock to be analyzed: World interest rate / country premium (\( R^W \)).
  - AR(1) persistence: 0.7 (half-life 5 quarters).
Price- and wage-inflation expectations determined by empirical model. Let $x_t \equiv [\hat{\pi}_t, \Delta \hat{W}_t, \Delta \hat{S}_t]'$, the forecasting model is

$$x_t = (I - \Phi)Z\alpha_t + \Phi x_{t-1} + \varepsilon_t, \quad \varepsilon_t \sim \mathcal{N}(0, H)$$

$$\alpha_t = \alpha_{t-1} + \eta_t, \quad \eta_t \sim \mathcal{N}(0, \sigma^2_\eta)$$

$\alpha_t$ is a scalar $\Rightarrow$ VAR with a common time-varying long-run trend.
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Inference about $\bar{\alpha}_t \equiv E_t\{\alpha_t\}$: Constant-gain filter,

$$\bar{\alpha}_t = \bar{\alpha}_{t-1} + K [x_t - \Phi x_{t-1} - (I - \Phi)Z \bar{\alpha}_{t-1}],$$

where $K = [K_\pi, K_W, K_S]$ is a function of $H$ and $\sigma^2_\eta$.

Two channels:

- Persistence (emphasized elsewhere, mostly closed economy models).
- FX movements can affect long-run inflation expectations
Estimation of forecasting model: Argentina and Chile. Observables:
- Core inflation, Nominal wage growth, FX depreciation.
- One-year-ahead market expectations of inflation and FX depreciation.

Some estimation results:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Argentina</th>
<th>Chile</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 \times \frac{V(\alpha_t)}{V(\pi_t)}</td>
<td>13.8</td>
<td>2.9</td>
</tr>
<tr>
<td>K_\pi</td>
<td>0.20</td>
<td>0.14</td>
</tr>
<tr>
<td>K_W</td>
<td>0.23</td>
<td>0.04</td>
</tr>
<tr>
<td>K_S</td>
<td>-0.02</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Limited Credibility / Imperfectly Anchored Expectations

Non-linear effect? Large surprises: \( S_t - E_{t-1}\{S_t\} > 1 \text{ St.Dev.} \)

\[ \Delta E_t\{\pi_{t,t+12}\} \text{ vs. } S_t - E_{t-1}\{S_t\} \]

⇒ 2 Calibrations: \( K_S = 0, K_\pi = K_W = 0.2; \) and \( K_S = K_\pi = K_W = 0.2. \)
$R^W_t$ Shock with Alternative Instruments, RE

$R^W_0 \Rightarrow gdpt$

$R^W_0 \Rightarrow c_t$

$R^W_0 \Rightarrow \pi_t$

$R^W_0 \Rightarrow E_t\{\pi_{t+1}\}$

$R^W_0 \Rightarrow St$

$R^W_0 \Rightarrow R_t$

$R^W_0 \Rightarrow \Delta M_t$

---

R-rule; M-rule; S-Rule.

Javier García-Cicco (UCEMA)
\( R^W \) Shock with Alternative Instruments, LC, \( K_S = 0 \)

- \( R_{t}^W \Rightarrow gdpt \)
- \( R_{t}^W \Rightarrow c_t \)
- \( R_{t}^W \Rightarrow \pi_t \)
- \( R_{t}^W \Rightarrow E_t\{\pi_{t+1}\} \)
- \( R_{t}^W \Rightarrow S_t \)
- \( R_{t}^W \Rightarrow R_t \)
- \( R_{t}^W \Rightarrow \Delta M_t \)

- **R-rule;** --- **M-rule;** --- **S-Rule.**
$R^W$ Shock with Alternative Instruments, LC, $K_S = 0.2$

$R^W_0 \Rightarrow gdp_t$

$R^W_0 \Rightarrow c_t$

$R^W_0 \Rightarrow i_t$

$R^W_0 \Rightarrow \pi_t$

$R^W_0 \Rightarrow E_t\{\pi_{t+1}\}$

$R^W_0 \Rightarrow R_t - E_t\{\pi_{t+1}\}$

$R^W_0 \Rightarrow S_t$

$R^W_0 \Rightarrow R_t$

$R^W_0 \Rightarrow \Delta M_t$

---

R-rule; M-rule; S-Rule.
## Welfare Evaluation

### Welfare Equivalent Comparison

<table>
<thead>
<tr>
<th>Rules</th>
<th>( \Lambda )</th>
<th>Rational Expectations</th>
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<tr>
<td>( M ) vs ( R )</td>
<td>-0.17</td>
<td></td>
</tr>
<tr>
<td>( S ) vs ( R )</td>
<td>0.94</td>
<td></td>
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<td>( \textit{Limited Credibility, } K_S = 0 )</td>
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<td></td>
</tr>
<tr>
<td>( S ) vs ( R )</td>
<td>0.46</td>
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Notes: \( \Lambda \) is the welfare-equivalent-consumption compensation relative to the \( R \)-rule case (in %).
Robustness in the Paper

Sensitivity analysis:

- Financial Frictions + Liability Dollar.: Smaller cost of peg if $K_S > 0$.
- Limited Expenditure Switching (good-level habits): Similar to baseline.
- Domestic Banks: Smaller cost of peg if $K_S > 0$.
- Restricted Access to Financial Markets (TANK): some disagreement under RE and $K_S = 0$, but similar comparison if $K_S > 0$.
- All combined: Smaller cost of peg if $K_S > 0$. 
Conclusions

- RE: Trade-off (inflation vs. activity) between $M$ and $R$ rules. No clear benefit of $S$ rule.
- LC, $K_S = 0$: Similar to RE, larger differences, more persistence.
- LC, $K_S > 0$: Less obvious advantages of $M$ rule. Potential benefit of stabilizing FX, specially under financial frictions.
Thank You!