Alternative Monetary-Policy Instruments and Limited Credibility: An Exploration

Javier García-Cicco

Universidad del CEMA

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:

% over 183 countries (excluding EMU members)				
	IT	Money Target	FX anchor	Other
Total	23	12	49	15
Low Income & Emerging	17	12	42	14
FX management	4	11	49	14

▶ 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:

% over 183 countries (excluding EMU members)

	IT	Money Target	FX anchor	Other
Total	23	12	49	15
Low Income & Emerging	17	12	42	14
FX management	4	11	49	14

▶ RE implies high degree of credibility (agents forecast knowing the policy rule that will be implemented in the future); which cannot be taken from granted in Low Income & Emerging countries.
▶ Can limited credibility (LC) influence the choice of policy instrument?

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).

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.

Model Overview

- ▶ 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

▶ 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.

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

Model Overview

▶ 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.

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

▶ Shock to be analyzed: World interest rate / country premium (R^W).
  - ▶ Size: $+280$ a.b.p.
  - ▶ AR(1) persistence: 0.7 (half-life 5 quarters).

▶ Price- and wage-inflation expectations determined by empirical model. Let $x_t \equiv [\widehat{\pi}_t, \Delta\widehat{W}_t, \Delta\widehat{S}_t]'$, the forecasting model is

$$x_t = (I - \Phi)Z\alpha_t + \Phi x_{t-1} + \varepsilon_t, \quad \varepsilon_t \sim \mathcal{N}(0, H)$$
$$\alpha_t = \alpha_{t-1} + \eta_t, \qquad \eta_t \sim \mathcal{N}(0, \sigma_\eta^2)$$

α_t is a **scalar** $\Rightarrow$ VAR with a **common** time-varying long-run trend.

▶ Price- and wage-inflation expectations determined by empirical model. Let $x_t \equiv [\widehat{\pi}_t, \Delta\widehat{W}_t, \Delta\widehat{S}_t]'$, the forecasting model is

$$x_t = (I - \Phi)Z\alpha_t + \Phi x_{t-1} + \varepsilon_t, \quad \varepsilon_t \sim \mathcal{N}(0, H)$$
$$\alpha_t = \alpha_{t-1} + \eta_t, \qquad \eta_t \sim \mathcal{N}(0, \sigma_\eta^2)$$

α_t is a **scalar** $\Rightarrow$ VAR with a **common** time-varying long-run trend.

▶ Inference about $\bar{\alpha}_t \equiv E_t\{\alpha_t\}$: Constant-gain filter,

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

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

▶ Two channels:
  ▶ Persistence (emphasized elsewhere, mostly closed economy models).
  ▶ FX movements can affect long-run inflation expectations

Limited Credibility / Imperfectly Anchored Expectations

- Estimation of forecasting model: Argentina and Chile. Observables:
  - Core inflation, Nominal wage growth, FX depreciation.
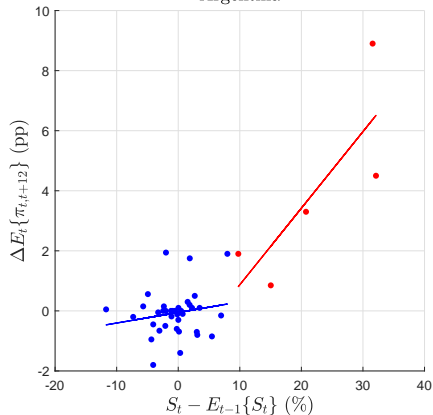 - One-year-ahead market expectations of inflation and FX depreciation.
  - Sample: 2004-2019.

- Some estimation results:

Parameter	Argentina	Chile
$100 \times \frac{V(\alpha_t)}{V(\pi_t)}$	13.8	2.9
K_π	0.20	0.14
K_W	0.23	0.04
K_S	-0.02	0.00

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

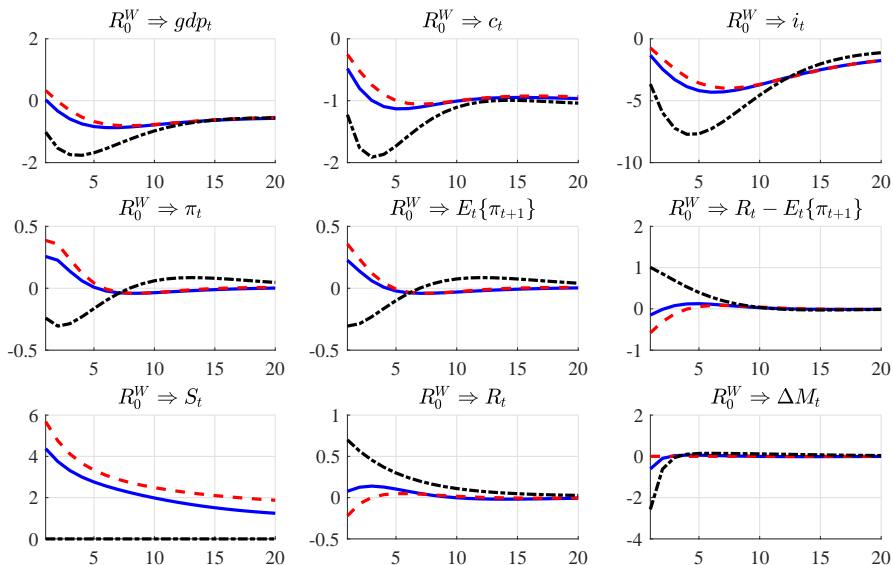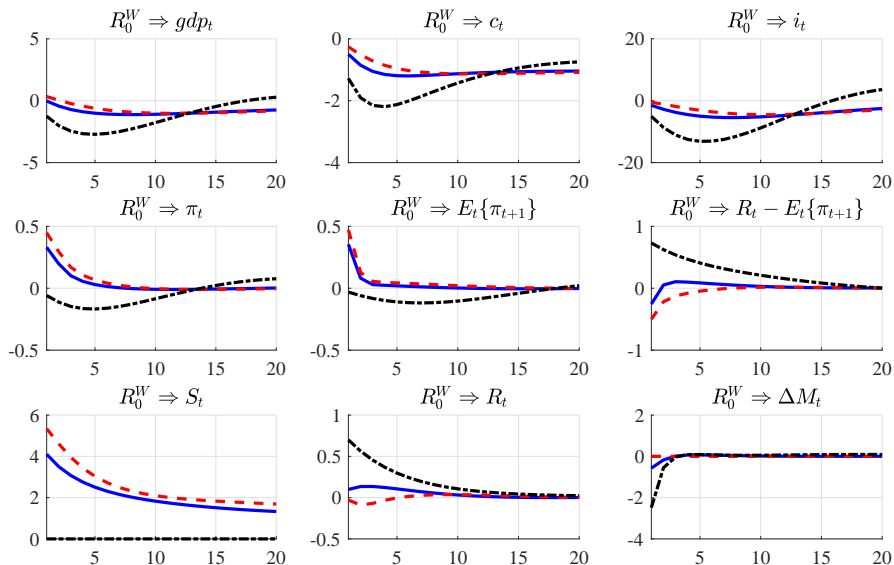$$\Delta E_t\{\pi_{t,t+12}\} \text{ vs. } S_t - E_{t-1}\{S_t\}$$
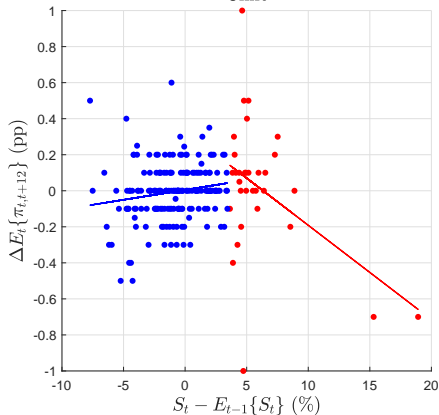
$\Rightarrow$ 2 Calibrations: $K_S = 0$, $K_\pi = K_W = 0.2$; and $K_S = K_\pi = K_W = 0.2$.

R-rule; — — M-rule; —·— S-Rule.
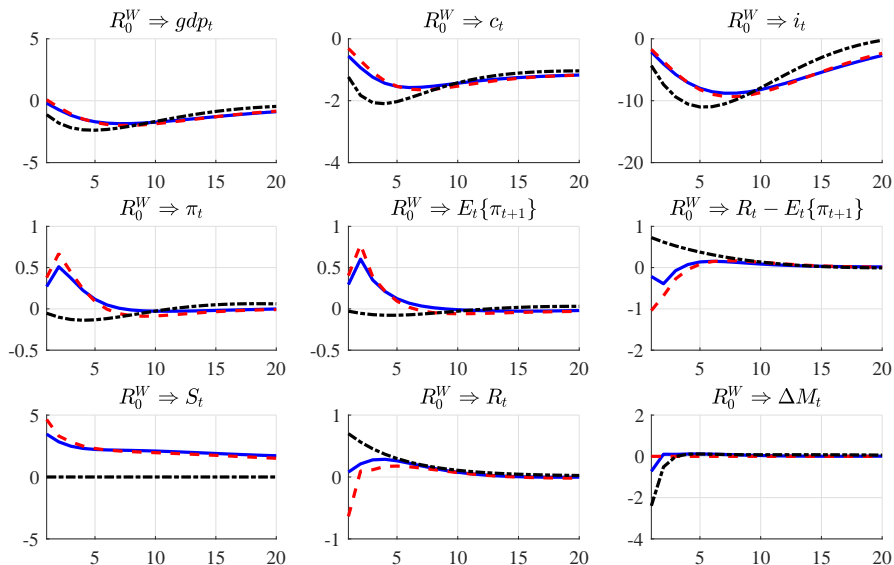
R-rule; − − M-rule; −·− S-Rule.

R-rule; — — M-rule; —·— S-Rule.

Welfare Equivalent Comparison

Rules	Λ
Rational Expectations	
M vs R	-0.17
S vs R	0.94
Limited Credibility, $K_S = 0$	
M vs R	0.23
S vs R	0.95
Limited Credibility, $K_S = 0.2$	
M vs R	0.19
S vs R	0.46

Notes: Λ is the welfare-equivalent-consumption compensation relative to the R-rule case (in %).

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 $K_S > 0$.

- ▶ Model-based analysis of relevant trade-offs in choosing simple rules for alternative monetary-policy instruments.

- ▶ 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!