Alternative Monetary-Policy Instruments and Limited Credibility: An Exploration

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[1]The views and conclusions in this paper are exclusively those of the authors and do not necessarily reflect the position of the Central Bank of Argentina or its Board members.

Introduction

- Most studies on policy rules: interest rate as the instrument + rational expectations (RE).
- RE implies high degree of credibility. If credibility is limited, should other instruments be considered?
- Studies departing from RE mainly focus on interest-rate rules also. Mostly closed economies, what is the FX's role?

- Model-based analysis of alternative instruments $\Rightarrow$ Simple rules.
- What are the relevant trade-offs?

Introduction

- What do we do?
  - SOE model with nominal rigidities and banks.
  - Limited credibility (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).
    - Constant money supply (M).
    - Crawling peg (S).
- Preview of results:
  - RE: Trade-off between R and M rules: M insulates activity from the contraction, but increases inflationary effects. S rule generates a larger recession, no clear advantage in inflation.
  - LC if only inflation surprises affect long-run expectations: similar trade-offs, differences are exacerbated (more persistence).
  - LC if FX surprises also affect long run expectations: less insulation with M Rule and more inflation. Potential role for FX stabilization.

Model Overview

- Main ingredients:
  - SOE, free capital mobility, incomplete financial markets.
  - Households: Consumption (habits), labor, cash and deposits, foreign and domestic bonds.
  - Final goods: Combine home and foreign goods. Calvo prices, indexation.
  - Home goods: Produced using labor and capital.
  - Calvo sticky wages, indexation.
  - Capital accumulation: loans are required to buy new capital goods. Adjustment costs.
  - Banks: returns-to-scale technology, subject to reserve requirements.
- Where are inflation-related expectations relevant?
  - Phillips curves (prices and wages).
  - Inter-temporal choices (consumption, investment, etc.): $R_t^i - E_{t+1}\{\pi_{t+1}\}$.

Alternative policy rules:

- Interest rate:

$$\left(\frac{R_t}{R}\right) = \left(\frac{R_{t-1}}{R}\right)^{\rho_R} \left[\left(\frac{\pi_t}{\pi}\right)^{\alpha_\pi} \left(\frac{y_t}{y_{t-1}}\right)^{\alpha_y}\right]^{1-\rho_R}.$$

  Calibration: $\rho_R = 0.8$, $\alpha_\pi = 1.5$, $\alpha_y = 0.05$.

- Monetary base:

$$\Delta MB_t = \frac{MB_t}{MB_{t-1}} = \pi.$$

- Nominal depreciation:

$$\Delta S_t = \pi/\pi^*.$$

Imperfectly anchored expectations

- Price- and wage-inflation expectations determined by empirical model, that also includes the exchange rate.
- Let $x_t \equiv [\pi_t, \Delta W_t, \Delta S_t]'$ (in logs), the empirical model is

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

  where 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 (steady-state gain).
- Forecast: $E_t\{x_{t+1}\} = (I - \Phi) Z \bar{\alpha}_{t-1} + \Phi x_t$.

Imperfectly anchored expectations

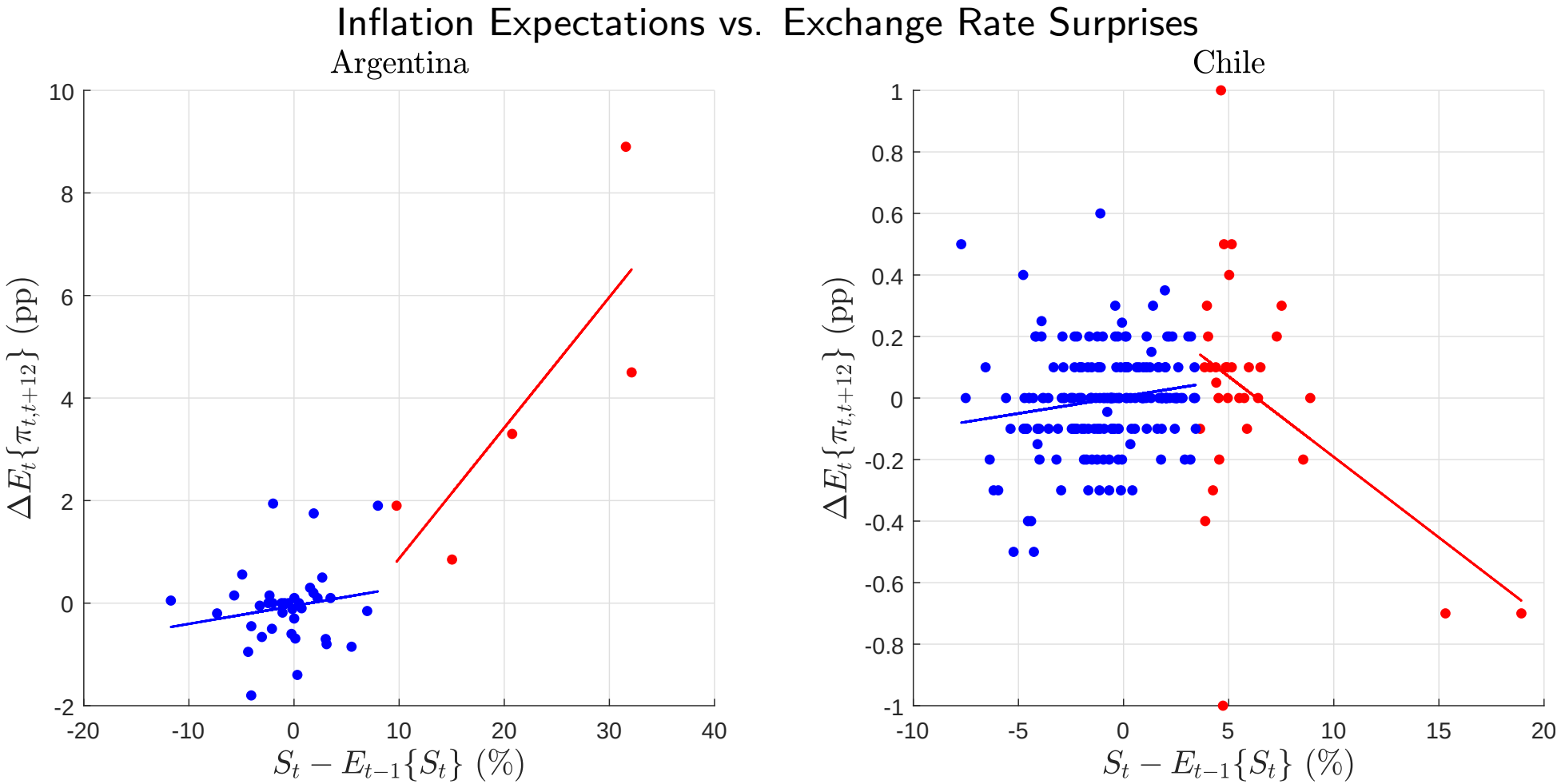
- Estimation of forecasting model: Argentina and Chile. Observables:
  - Core inflation, Nominal wage growth, FX depreciation.
  - One-year-ahead market expectations of inflation and FX depreciation.
  - Sample: 2004-2019 (gap in expectations data for Argentina).
- Results:

Estimated Learning Parameters

	Argentina			Chile		
Parameter	Mean	90% C.B.		Mean	90% C.B.	
$100 \times \frac{V(\alpha_t)}{V(\pi_t)}$	13.8	8.1	21.9	2.9	2.0	3.8
K_π	0.20	0.1	0.3	0.14	0.1	0.2
K_W	0.23	0.1	0.4	0.04	0.0	0.1
K_S	-0.02	-0.05	0.01	0.00	0.00	0.00

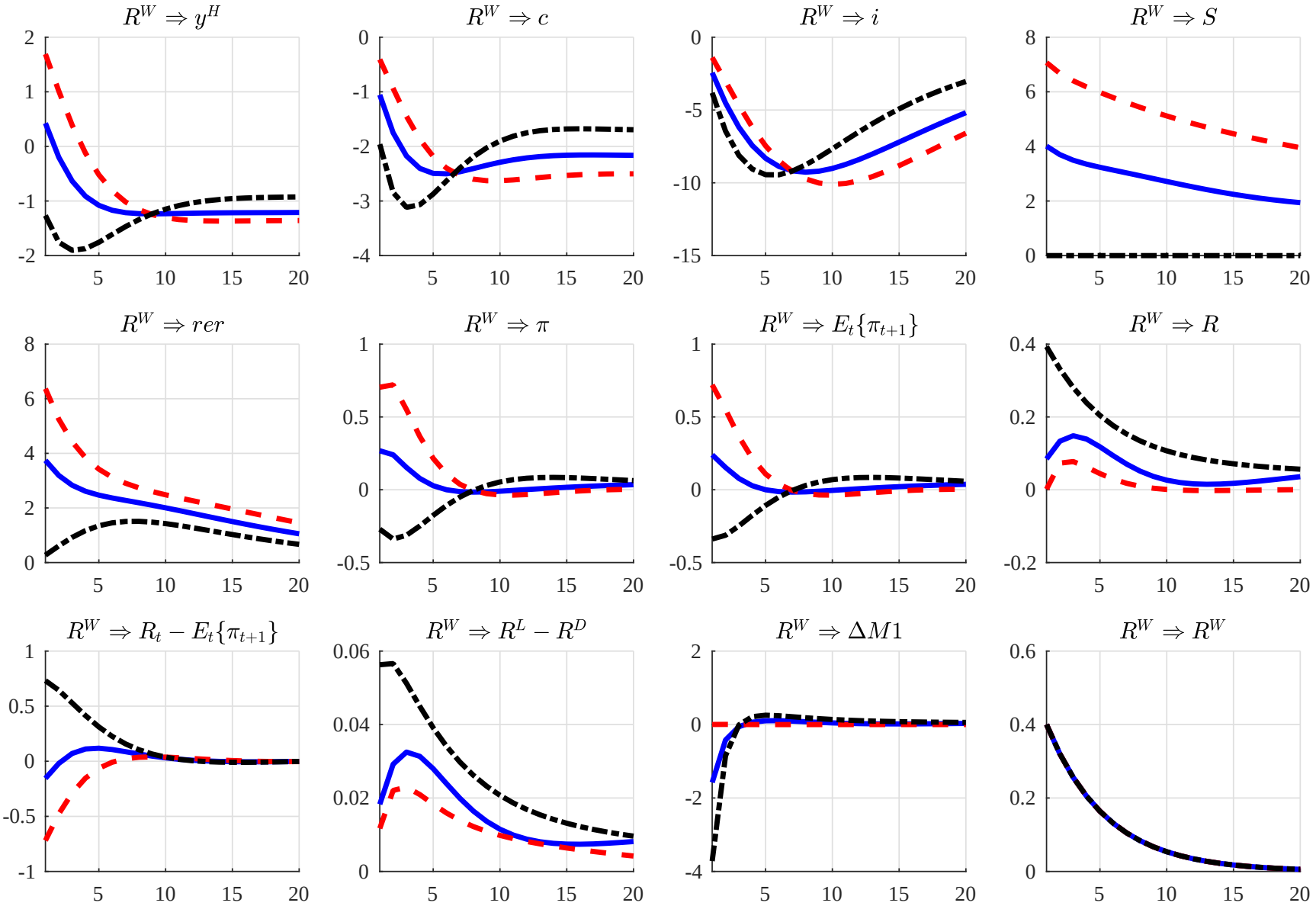
Imperfectly anchored expectations

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



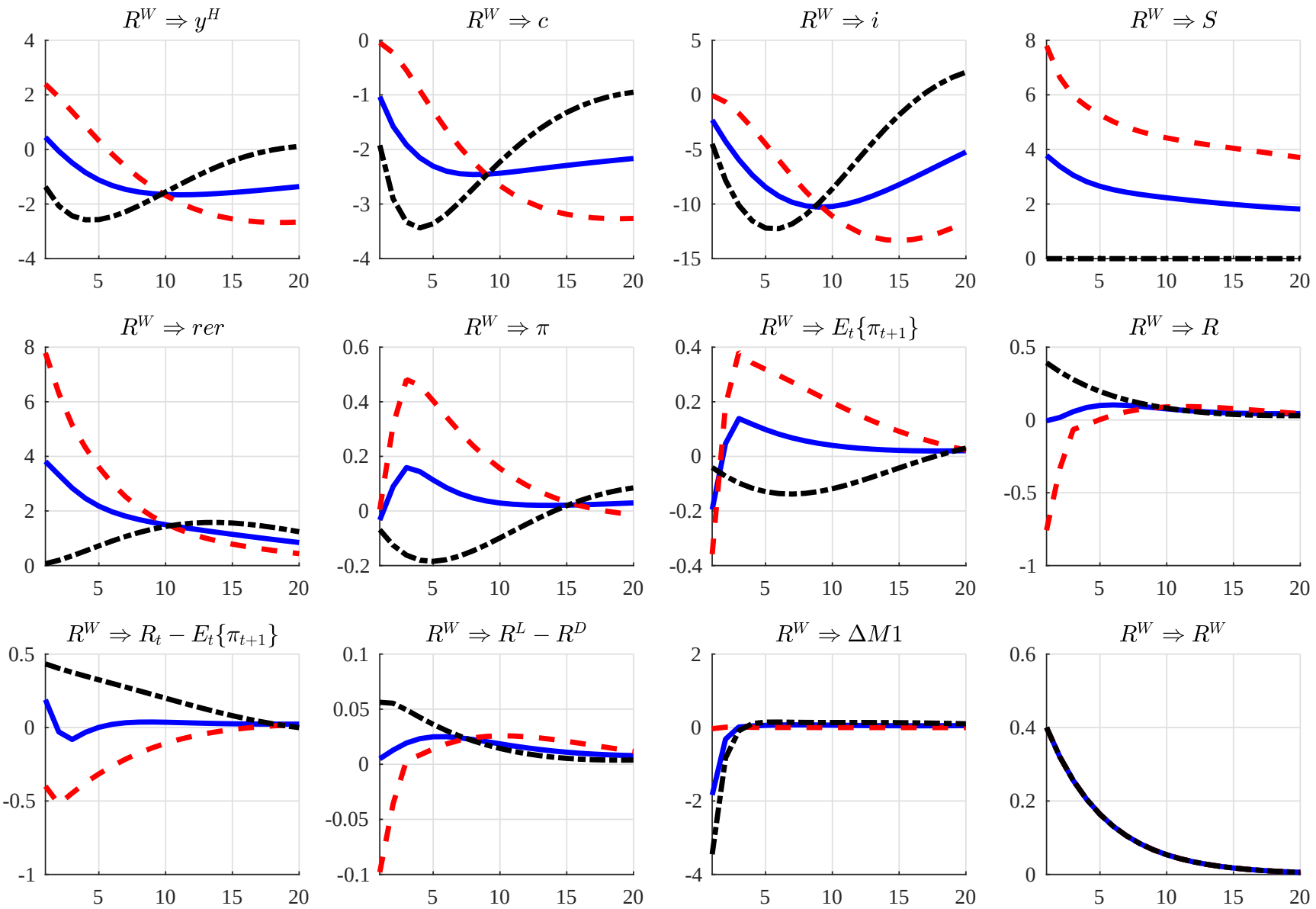
$\Rightarrow$ 2 Calibrations: $K_S = 0$, $K_\pi = K_W = 0.2$; and $K_S = K_\pi = K_W = 0.2$.

Comparing different rules: RE



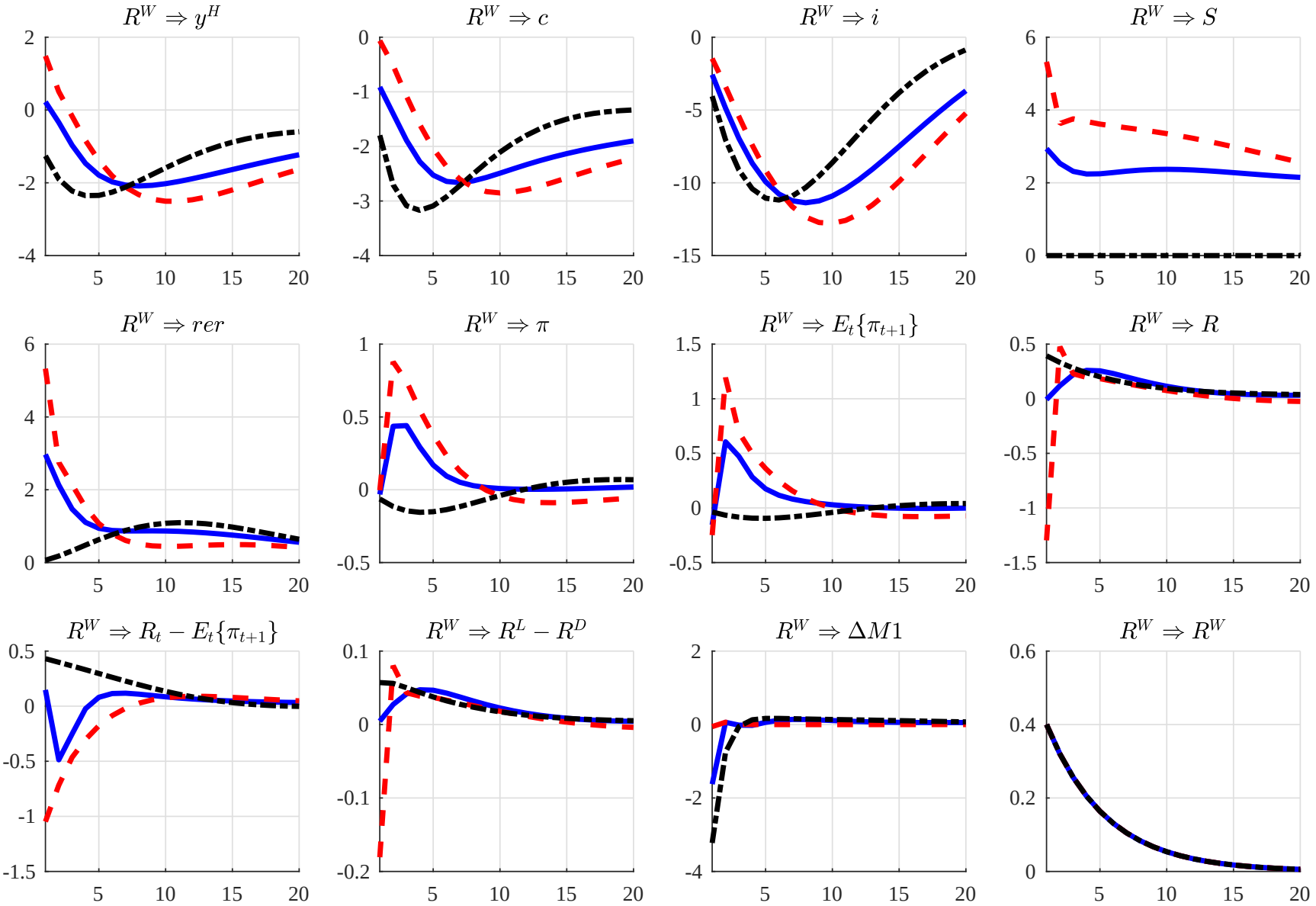
Legends: — R Rule; – – MB Rule; –•– S Rule.

Comparing different rules: LC, $K_S = 0$



Legends: — R Rule; – – MB Rule; –•– S Rule.

Comparing different rules: LC, $K_S = 0.2$



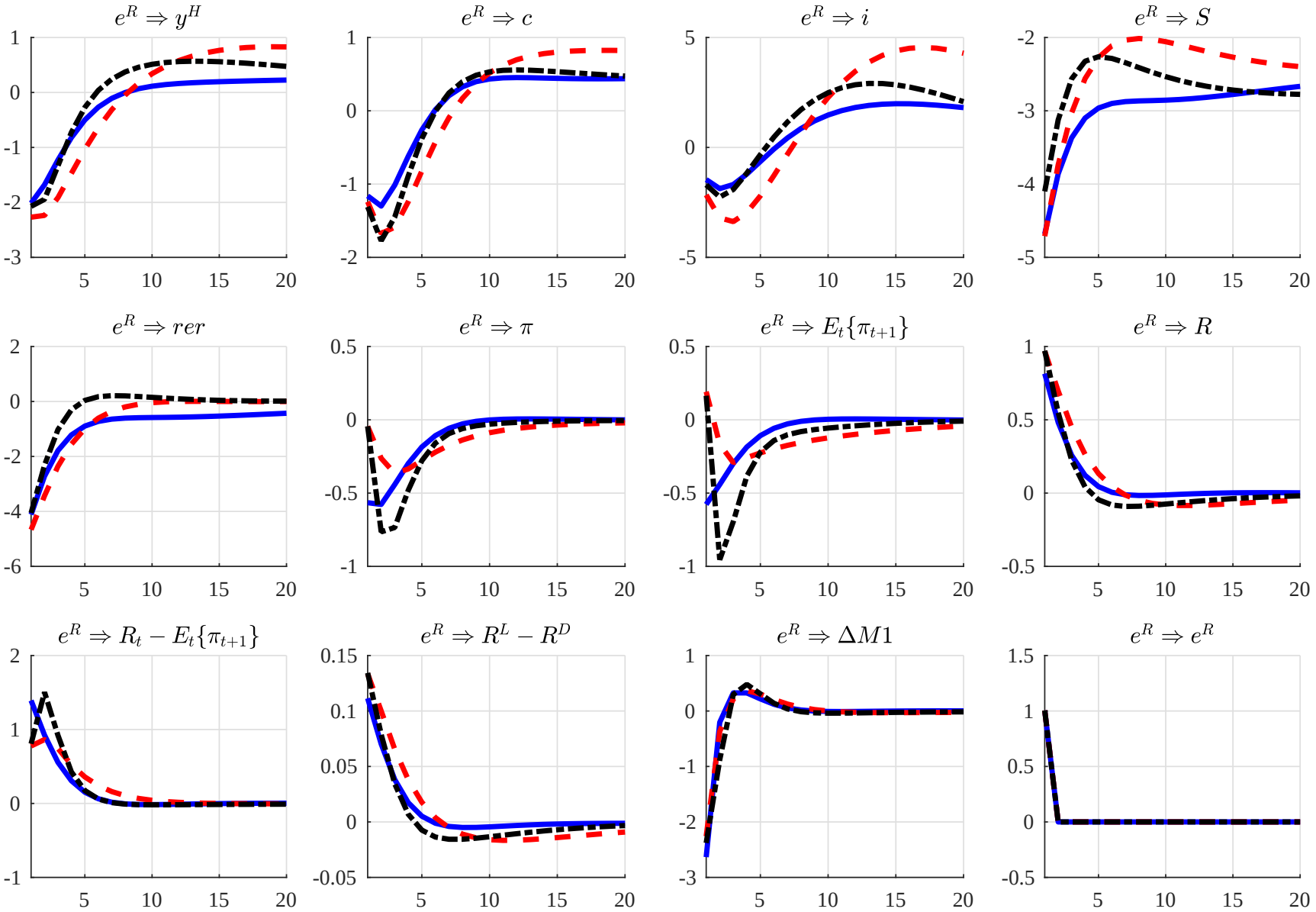
Legends: — R Rule; – – MB Rule; –•– S Rule.

Conclusions

- 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. Not 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.
- Future Research:
  - In open economies, non-trivial link between anchoring and exchange rate dynamics; possible nonlinearities. More evidence is needed.
  - Optimal simple rules with different instruments; hybrid rules.
  - No "monetary aggregates abandoned us" here: noise in money demand.

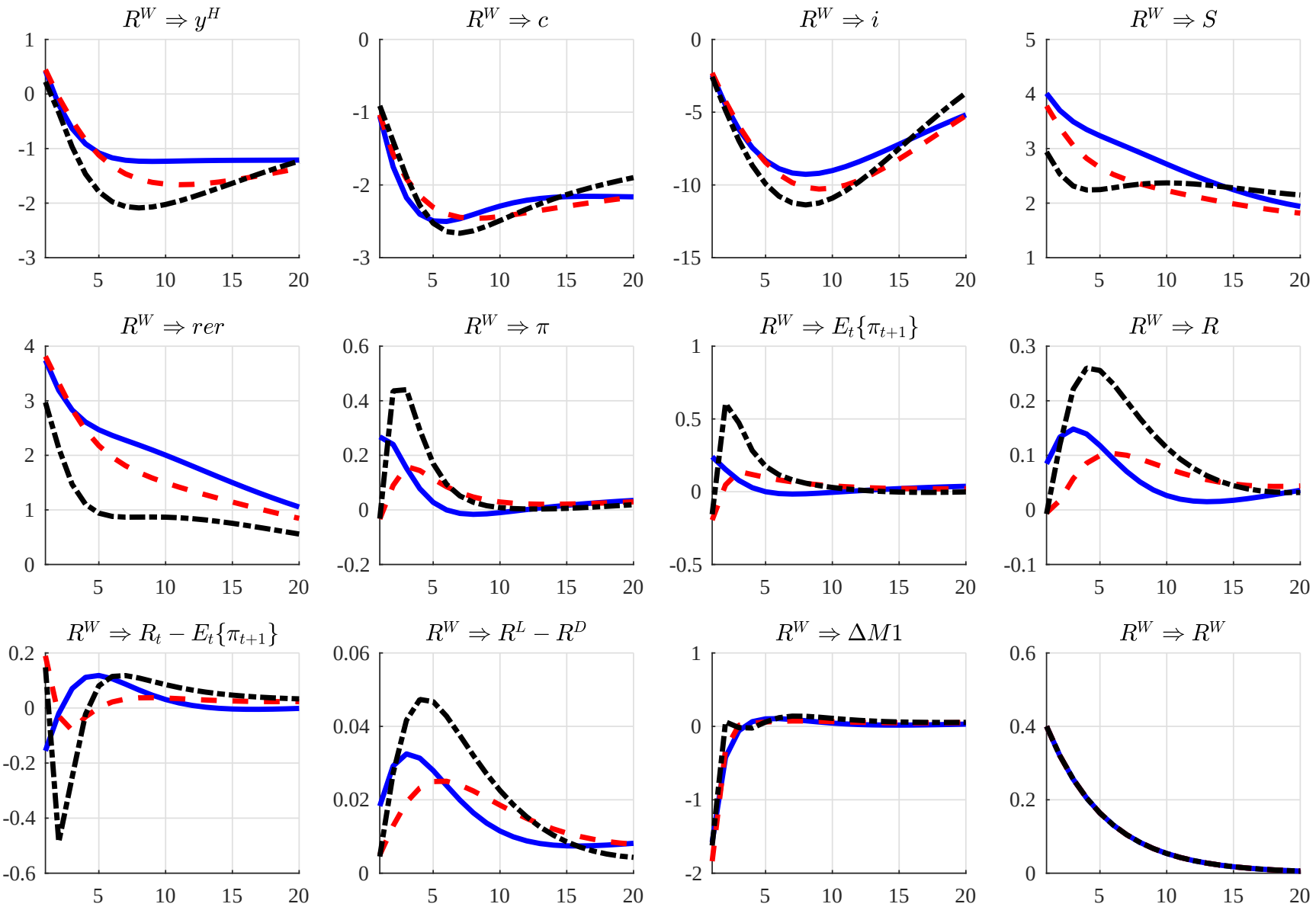
Extras

Policy shock, R rule, RE vs LC



Legends: — RE; – – LC, $K_{\pi^S} = 0$; –•– LC, $K_{\pi^S} = 0.2$.

External shock, R rule, RE vs LC



Legends: — RE; – – LC, $K_{\pi^S} = 0$; –•– LC, $K_{\pi^S} = 0.2$.