An Evaluation of Reserve Requirements

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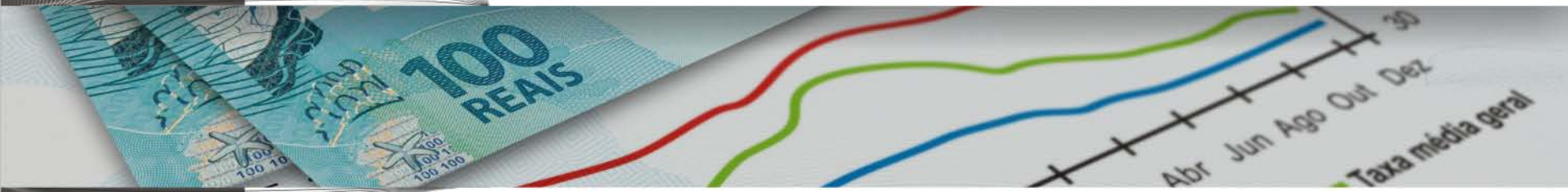

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The results presented here are model dependent

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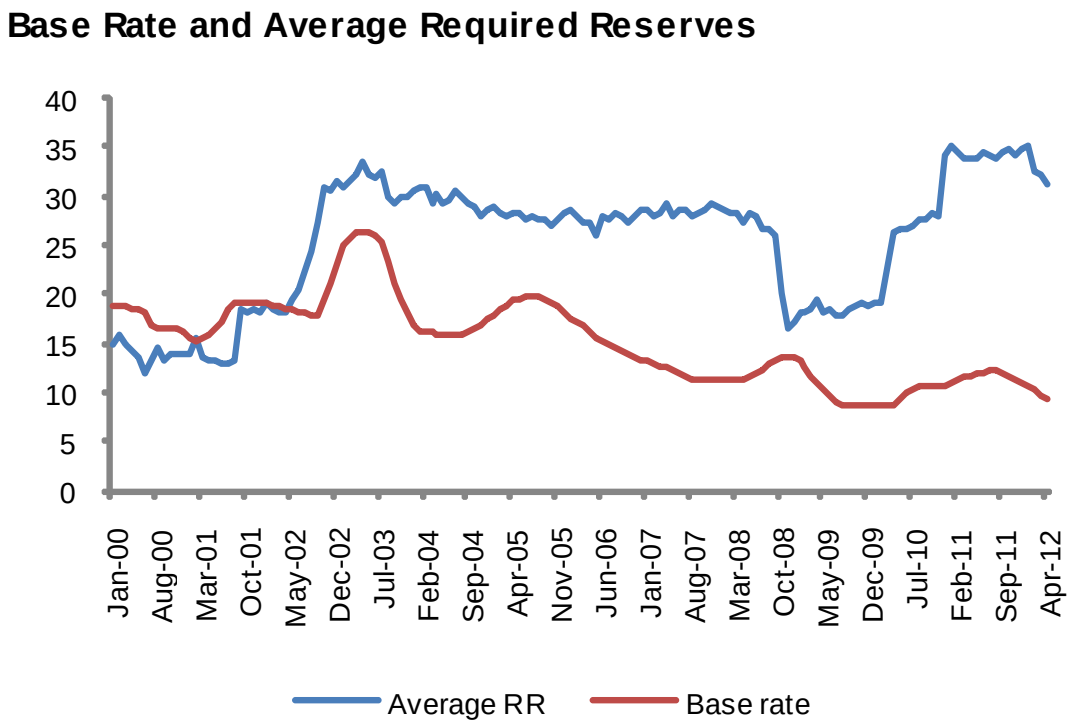
- The main objective of RR has varied across countries and over time
  - China has used RR to tackle inflation
  - Russia, India, Indonesia, Peru… as the main instrument for financial stability, with a secondary role for price stability
  - Brazil has used RR to offset liquidity constraints in the financial system

Introduction



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- Main Question
  - Can a central bank achieve a better outcome, from a economic stability perspective, by setting a RR rule along with a Taylor rule than by employing a Taylor rule alone?

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  - Can a central bank achieve a better outcome, from a economic stability perspective, by setting a RR rule along with a Taylor rule than by employing a Taylor rule alone?
    - Output, price and **credit stability**
  - Does RR have a macroprudential role?

Introduction

- Macroprudential policies
  - From a *narrow* perspective, the goal of macroprudential policy is to avoid episodes of system-wide financial distress.
  - From a *broader* point of view, macroprudential policy should aim at avoiding large changes in financial variables, in order to prevent sharp fluctuations in real variables.

Introduction

- Related studies include
  - Glocker and Towbin (2012)
    - DSGE
  - Sámano (2011)
    - Semi-structural model (capital adequacy ratio)

Model

- A standard semi-structural macro model for a small economy with a financial sector

- The model has four blocks
  - Aggregate demand
  - Aggregate supply
  - Monetary policy
  - Financial sector

Model

- Aggregate demand
  - A modified IS equation to include lending spreads

$$h_t = \delta_{h,0} + \sum_{k>0} \delta_{h,k} h_{t-k} + \sum_{k\geq 0} \vartheta_{h,k} r_{t-k} + \sum_{k\geq 0} \rho_{h,k} spread_{t-k} + \varepsilon_{h,t}$$

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- Aggregate supply
  - A Phillips curve

$$\pi_t = \alpha_{\pi,0} + \sum_{k>0} \beta_{\pi,k} \pi_{t-k} + \sum_{k>0} \alpha_{\pi,k} E_t \pi_{t+k} + \sum_{k\geq 0} \theta_{\pi,k} \pi^*_{t-k} + \sum_{k\geq 0} \gamma_{\pi,k} h_{t-k} + \varepsilon_{\pi,t}$$

Model

- Monetary Policy
  - A forward looking Taylor-rule

$$i_t = \lambda i_{t-1} + (1-\lambda)\left(\varpi_1 (E_t \pi_{t+1} - \pi^{target})\right) + \varpi_2 h_t$$

Model

- Financial sector
  - An equation for lending spreads

$$spread_t = \omega_{spr,0} + \sum_{k>0} \mu_{spr,k} spread_{t-k} + \sum_{k\geq 0} \tau_{spr,k} rr_{t-k} + \varepsilon_{spr,t}$$

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  - An equation for the "credit gap"

$$cg_t = \upsilon_{hc,0} + \sum_{k>0} \xi_{hc,k} cg_{t-k} + \sum_{k\geq 0} \varsigma_{hc,k} spread_{t-k} + \sum_{k\geq 0} \lambda_{hc,k} h_{t-k} + \varepsilon_{hc,t}$$

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  - A "rule" for reserve requirements

$$rr_t = \alpha_{co,0} + \alpha_{co} rr_{t-1} + \beta_{co} var_t + \varepsilon_{co,t}$$

Model

- The model is estimated for the Brazilian economy
  - Equation by equation with two-stage least squares (2SLS) or ordinary least squares (OLS)
  - Sample data: quarterly observations from 2000Q4 to 2011Q2

Results

- The paper computes optimized rules for interest rate and RR

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- Loss function used to optimize coefficients on instruments' rules:

$$L_1 \equiv \phi\sigma_h + \sigma_\pi$$

$$L_2 \equiv \sigma_h + \sigma_\pi + \phi\sigma_{cg}$$

Results

- Rule 1. Taylor rule
- Rule 2. Taylor rule and RR rule with output gap
- Rule 3. Taylor rule and RR rule with inflation gap
- Rule 4. Taylor rule and RR rule with credit gap (Macroprudential instrument)

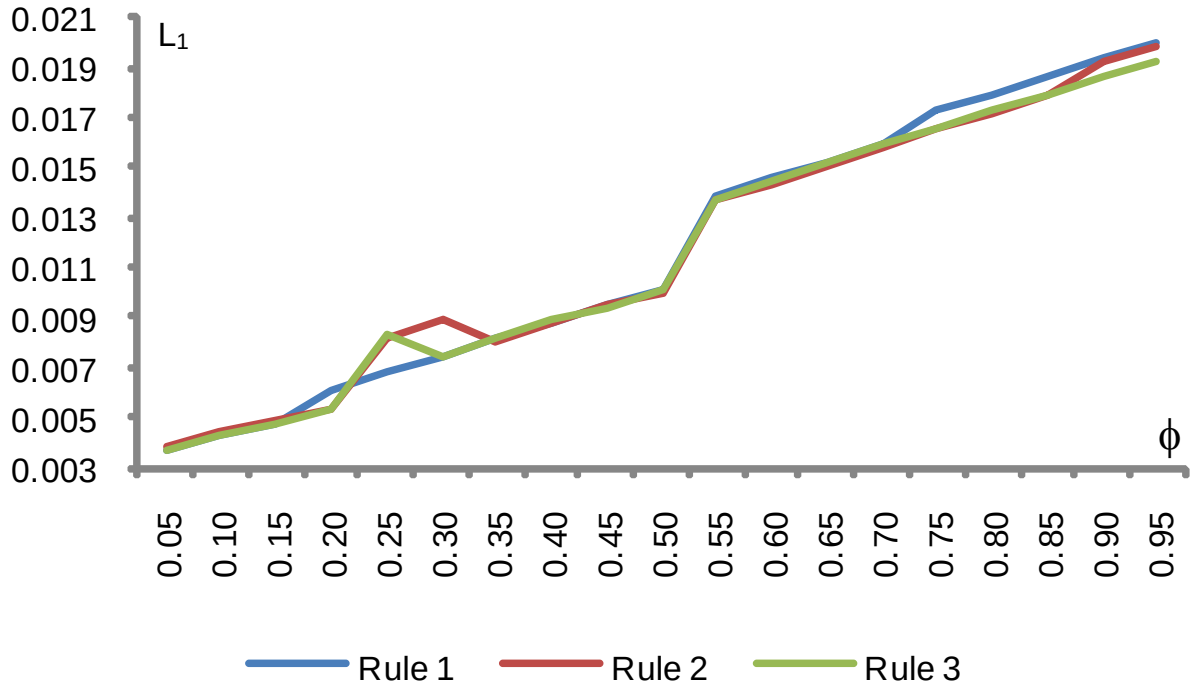
Results

Loss Functions and Standard Deviations under Different Rules

	Rule 1	Rule 2	Rule 3	Rule 4
Output gap std.dev.(1)	0.014	0.014	0.014	0.014
Inflation std.dev. (2)	0.007	0.006	0.006	0.005
Credit gap std.dev. (3)	0.059			0.046
Loss function L_1: (1)+(2)	0.021	0.020	0.020	0.019
Loss function L_2: (1)+(2)+(3)	0.080			0.065
Corr(base rate, RR)		0.873	0.668	0.381

Results

"Robustness check"



Results

"Robustness check"

A spread shock

↑Spread

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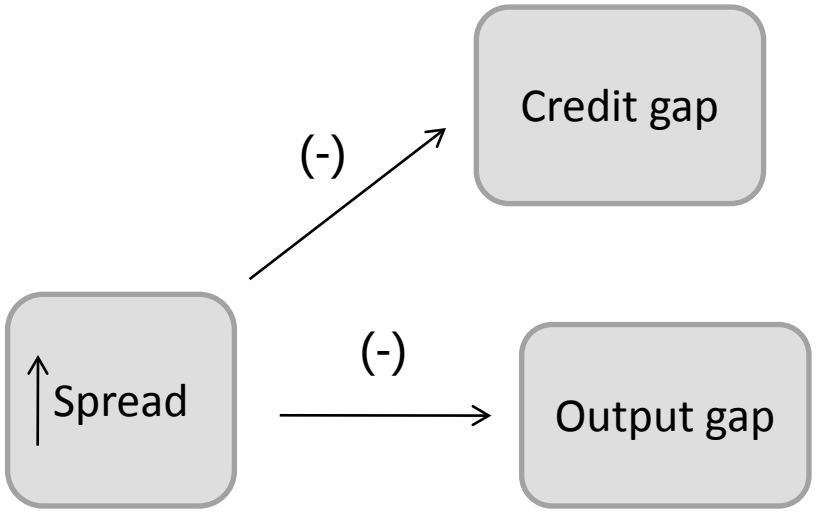
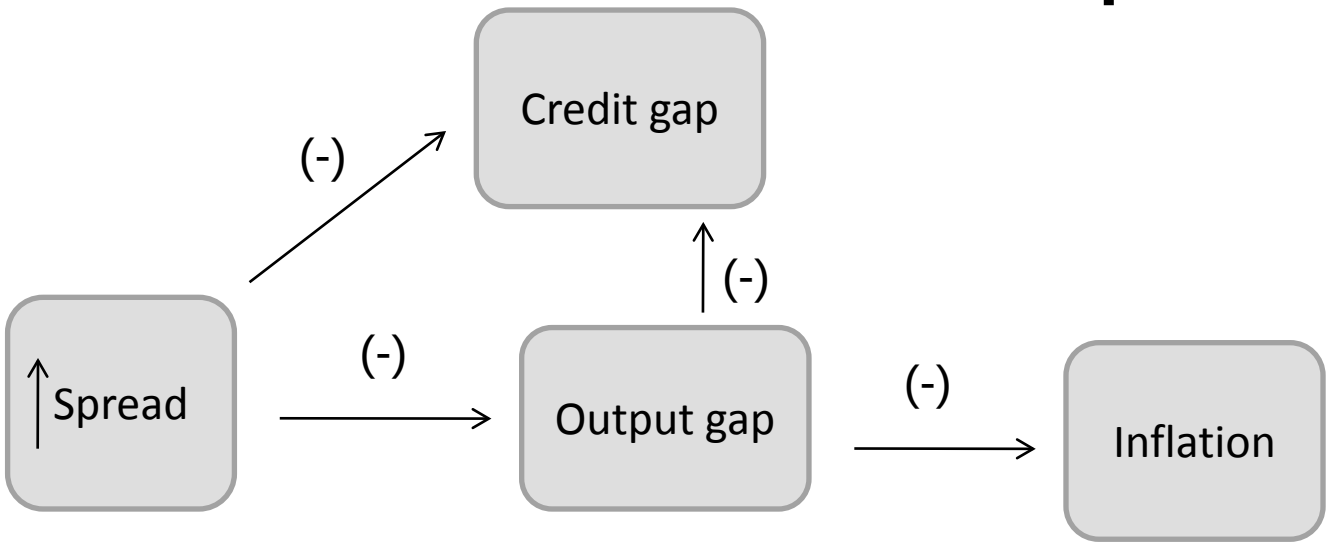


A spread shock



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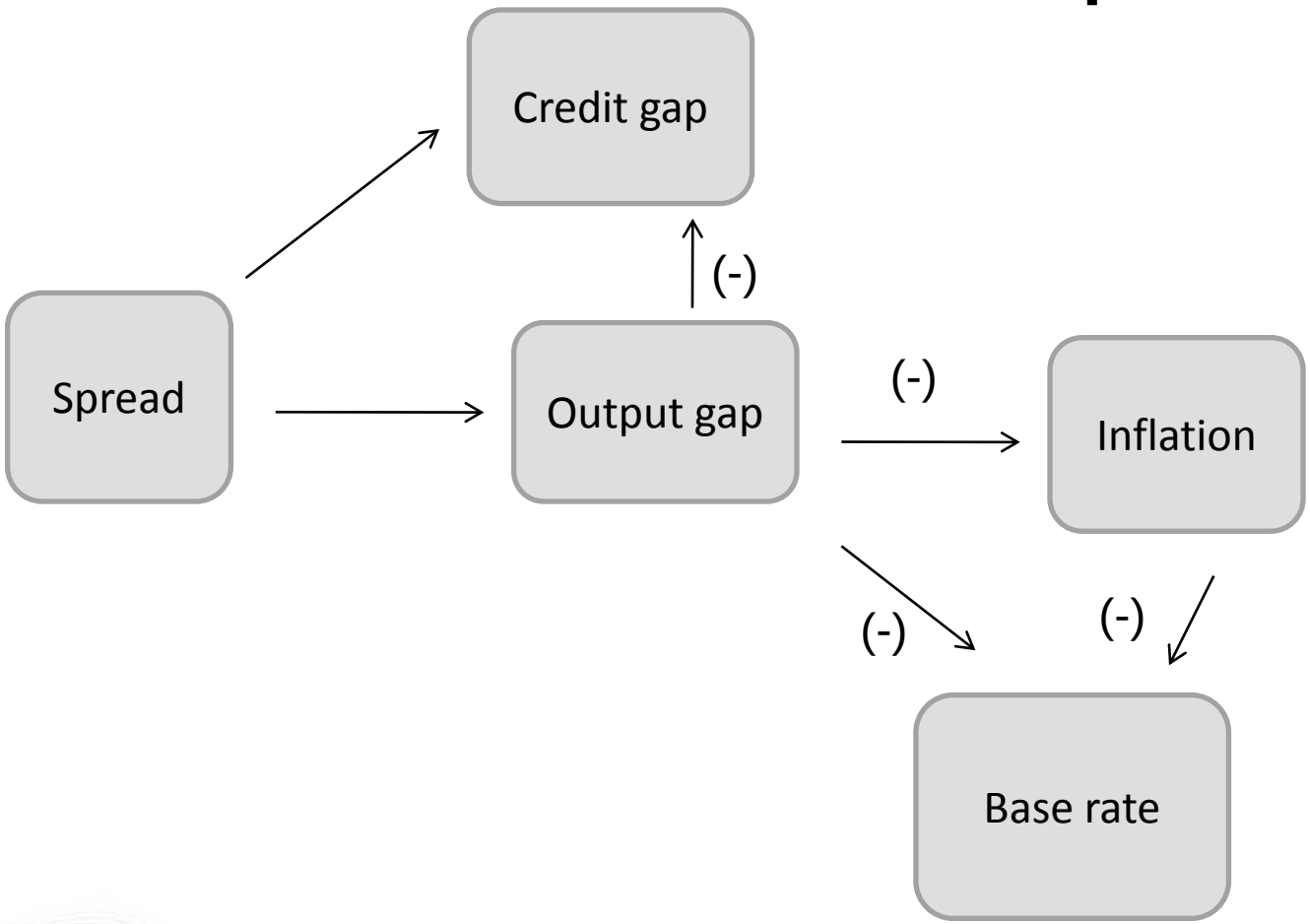

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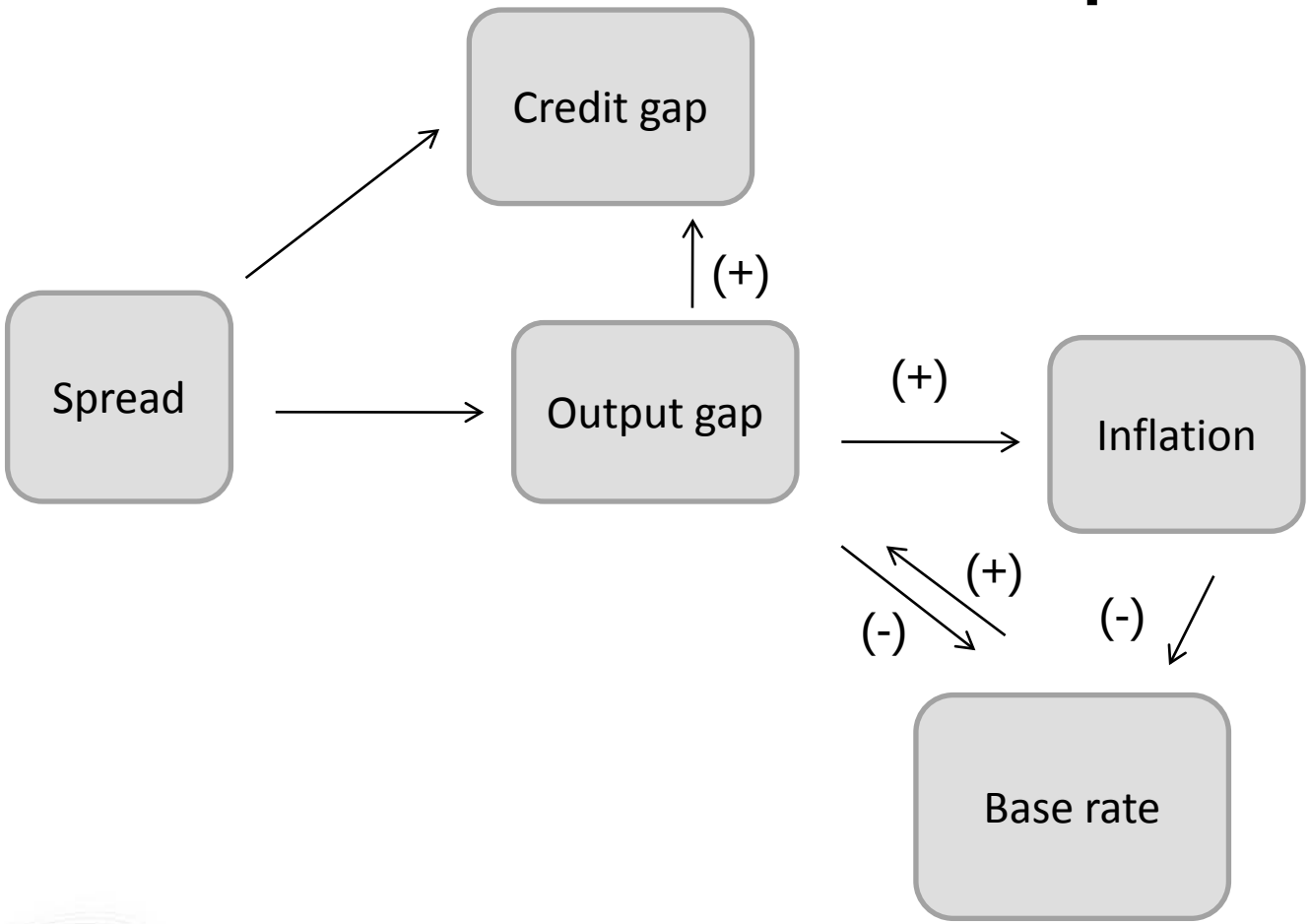

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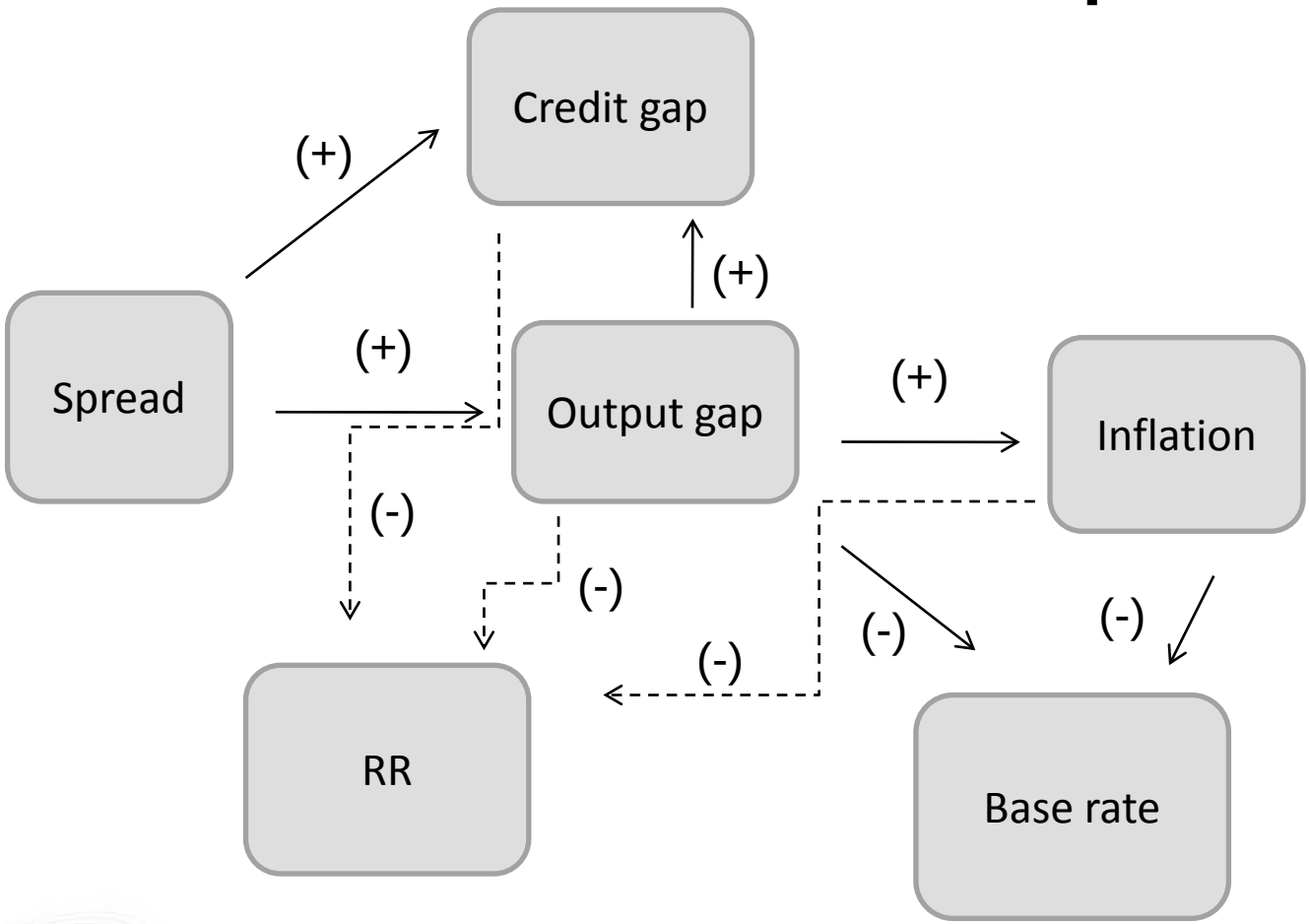

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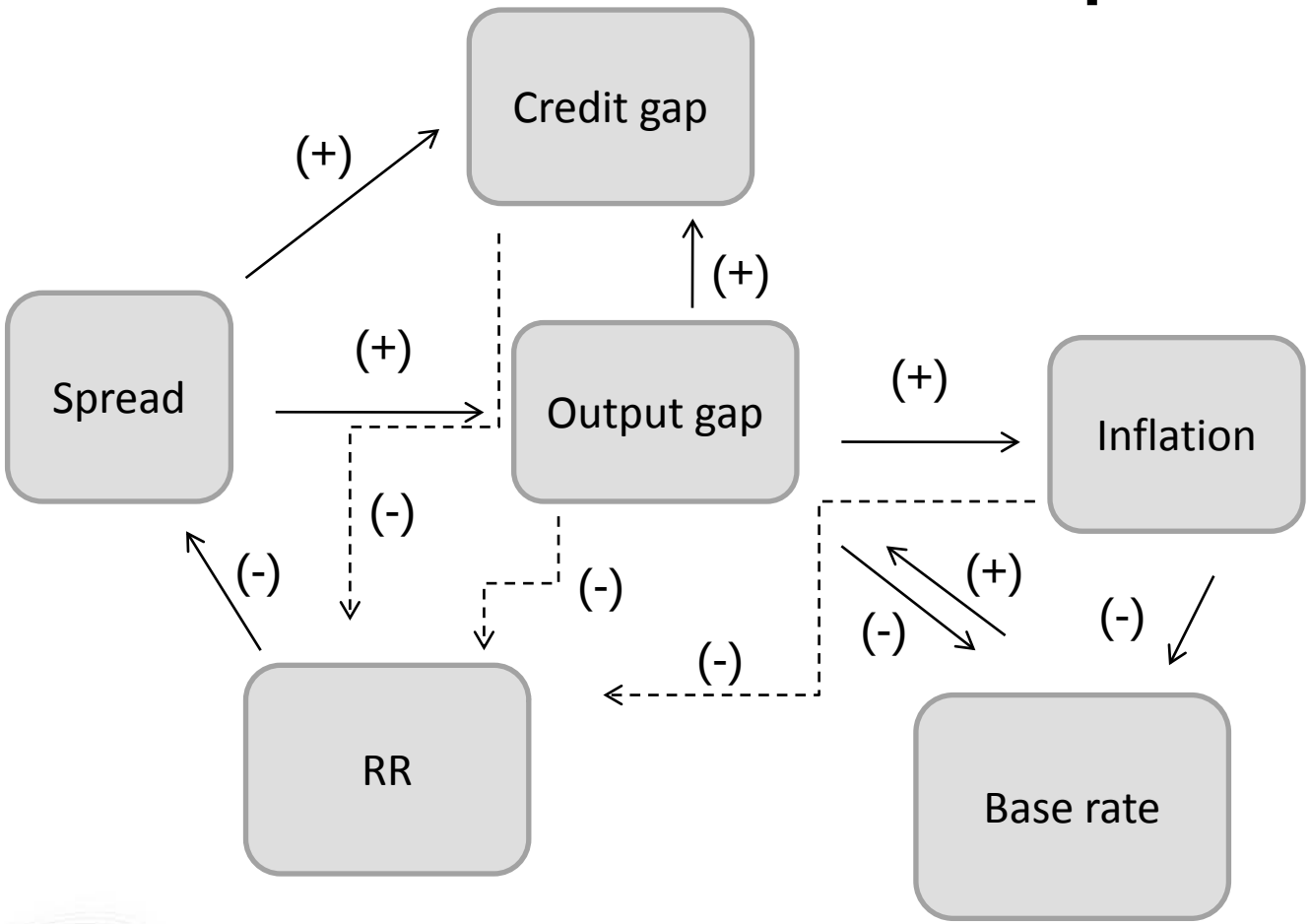
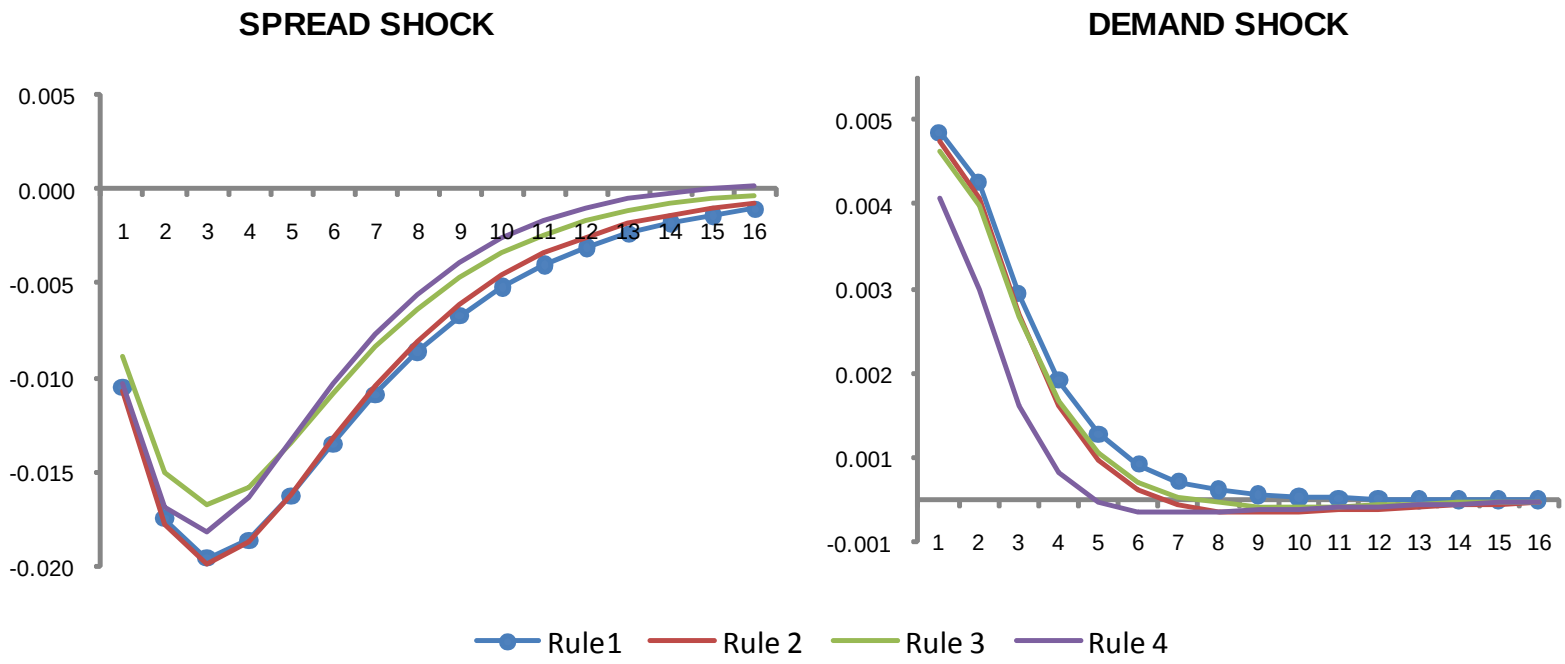
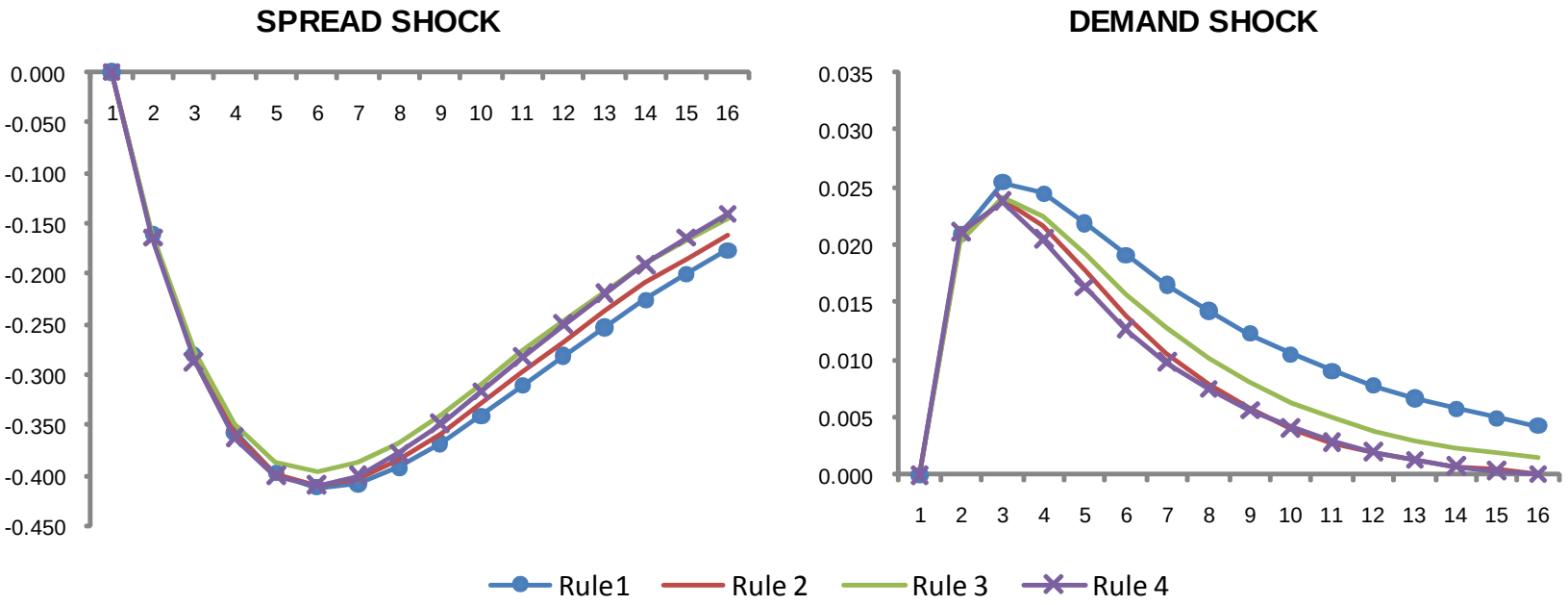


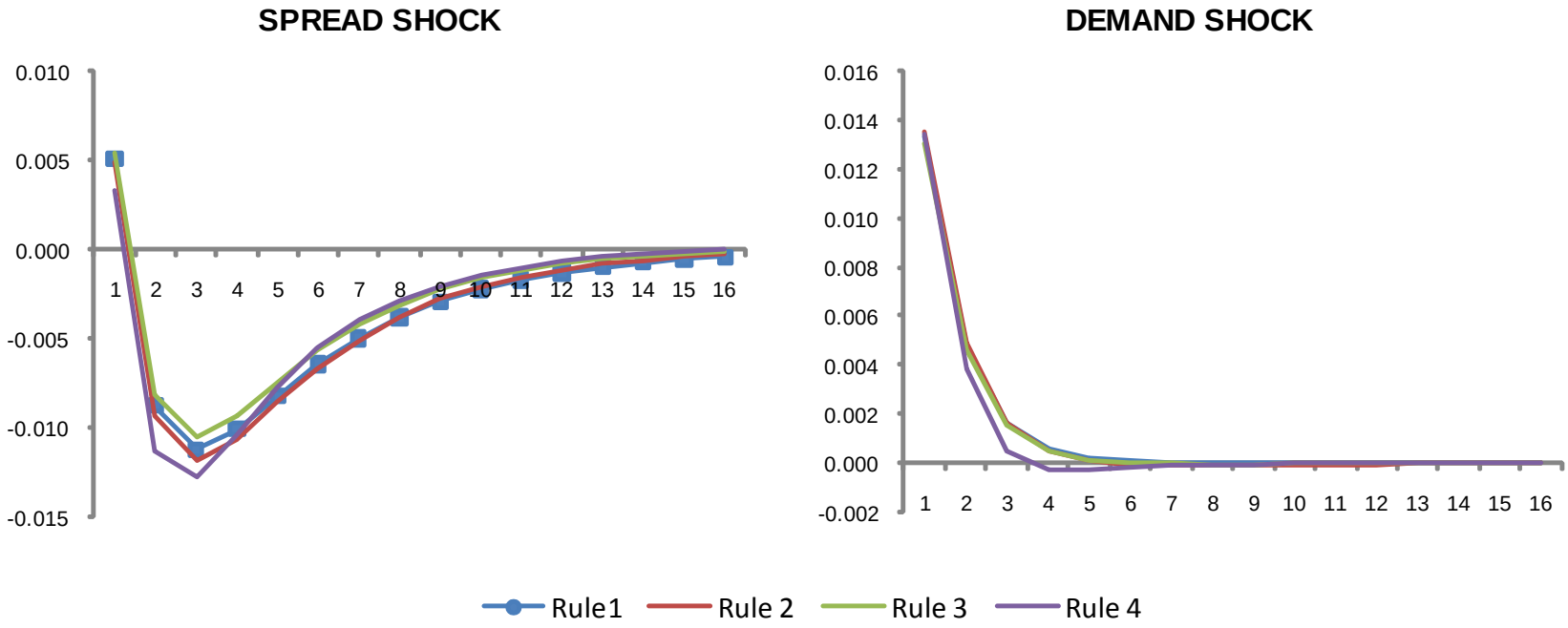
Inflation response



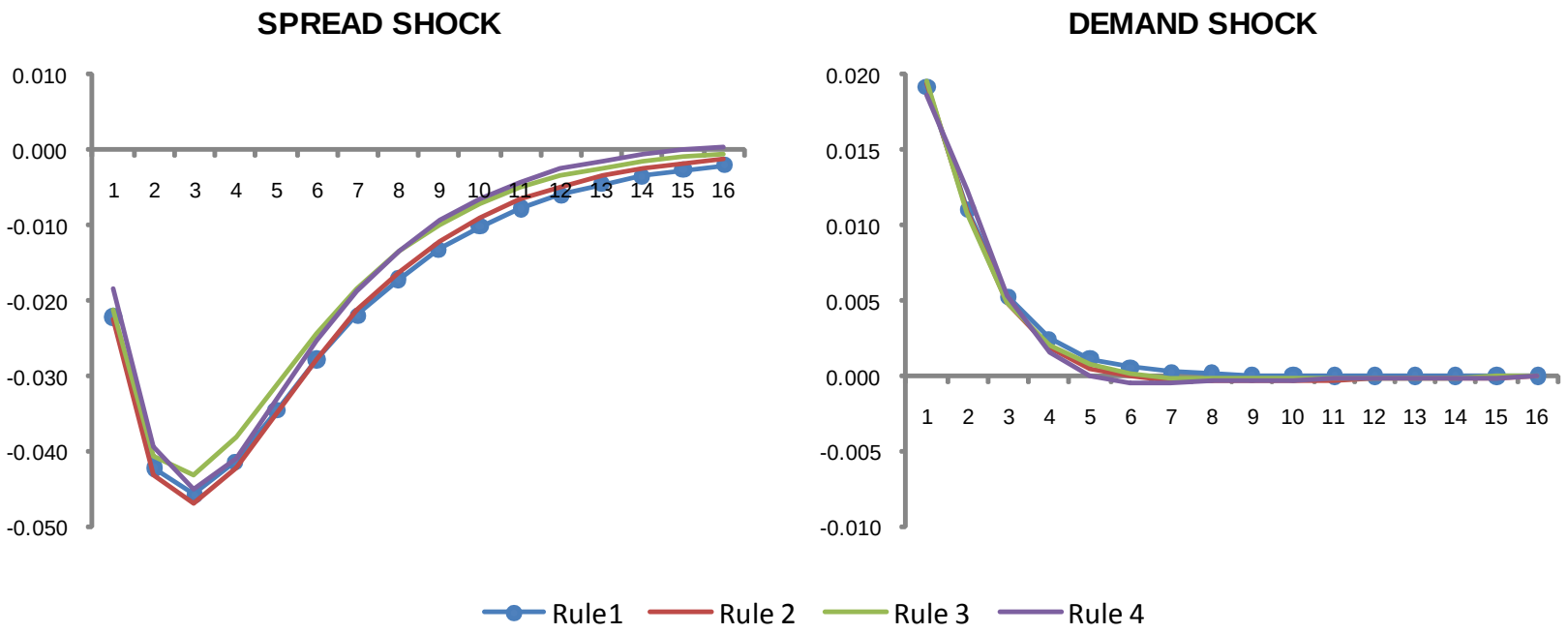
Credit gap response



Output gap response



Base rate response



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- Reserve requirements have a macropudential role
- If the source of macroeconomic disturbances lies in the financial sector, RR seems to play a more relevant role in reducing the impact of the shock

Thank you