

# *Exchange rate peg versus inflation targeting prior to a monetary union entry*

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## Presentation outline

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- Objectives
- Model
  - Household
  - Firm
  - Monetary policies
- Preliminary results
  - IRFs
  - Variance ratio plots
- Ongoing research
- Future research

## Objectives

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- Focus on small open economy entering a monetary union
- Examine monetary policy rules:
  - differ across economies:
    - 3 economies: independent, transitory and unified
  - Independent and transitory economy: Inflation (IT) vs. exchange (ET) rate targeting
- Evaluate macroeconomic stability
  - variance of series
- Abandon IT after the announcement of monetary union entry?
- How aggressive will be the response of interest rates to shocks?

## Small open economy model

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- Svensson (2000) framework
  - All goods are tradable
  - Complete markets
  - Nominal rigidities
  - Monopolistically competitive firms
  - Two countries:
    - Home – small economy
    - Foreign – large economy (monetary union)
- Domestic monetary policy rules:
  - independent
  - transitory – no institutional constraints
  - unified – fixed ex. rate

## Small open economy model: Household

- Separable utility function: consumption and labor
- Consumes CES composite good:  $\omega$  share of foreign good
- Expenditures minimization:

$$P_t = [(1 - \omega)(P_t^h)^{1-\theta} + \omega(P_t^f)^{1-\theta}]^{\frac{1}{1-\theta}}$$

- Law of one price holds:  $P_t^f = S_t P_t^{f*}$
- Assume  $P_t^{f*} = P_t^* \Rightarrow$  the real exchange rate is given by  $Q_t = S_t P_t^* / P_t$
- Log-linearization:

$$q_t = p_t^f - p_t = s_t + p_t^* - p_t$$

## Small open economy model: Aggregate demand

- Euler equation:

$$c_t = E_t c_{t+1} - \frac{1}{\sigma} (i_t - E_t \pi_{t+1}^{CPI})$$

- one-period nominal interest rate  $i_t$
- Domestic CPI inflation:  $\pi_t^{CPI} = p_t - p_{t-1}$

- Long term interest rate:

$$\rho_t = \sum_{\tau=0}^{\infty} r_{t+\tau|t} = \sum_{\tau=0}^{\infty} (i_{t+\tau} - \pi_{t+\tau+1|t})$$

- Foreign demand:  $c_t^{*h} = \beta_y y_t^* + \theta^* \omega^* q_t$

- AD:

$$y_{t+1}^d = \beta_y y_t^d + (1 - \beta_y) (-(1 - \omega) \sigma \rho_{t+1|t} - [\omega \theta^* \omega^* - (1 - \omega) (\sigma - \theta) \omega] q_{t+1|t} + \omega \beta_y^* y_{t+1|t}^*) + \eta_{t+1}^d$$

## Small open economy model: Output gap

- Natural output:  $y_{t+1}^n = \gamma_y^n y_t^n + \eta_{t+1}^n$
- Output gap:  $y_t = y_t^d - y_t^n$

$$\begin{aligned} y_{t+1} &= \beta_y y_t - (1 - \beta_y)(1 - \omega)\sigma\rho_{t+1|t} \\ &\quad + (1 - \beta_y)[\omega\theta^*\omega^* - (1 - \omega)(\sigma - \theta)\omega]q_{t+1|t} \\ &\quad + (1 - \beta_y)\omega\beta_y^* y_{t+1|t}^* - (\gamma_y^n - \beta_y)y_t^n + \eta_{t+1}^d - \eta_{t+1}^n \end{aligned}$$

## Small open economy model: Firm

- Continuum of domestic goods
- CRS technology
- labor supplied by households at composite price
- Dixit-Stiglitz aggregate of domestic with elasticity of substitution  $\nu > 1$

- Domestic good demand:  $Y_t^j = Y_t^d \left( \frac{\tilde{P}_t^j}{P_t^h} \right)^{-\nu}$

- Calvo (1983): reset price with probability  $\alpha$

- Philips curve:

$$\pi_t = \alpha_\pi \pi_{t-1} + (1 - \alpha_\pi) \pi_{t+1|t} + \alpha_y y_t + \alpha_q q_t + \epsilon_t$$



## Foreign economy

- Interest parity condition:  $i_t - i_t^* = s_{t+1|t} - s_t + \phi_t$
- Large economy
  - AR(1) process:
    - foreign inflation
    - foreign exchange risk premium
    - foreign output

## Monetary policy rules

- Independent economy:

$$i_t^I = f_\pi \pi_t + f_y y_t + f_q q_t + f_s s_t$$

- Unified economy:

$$i_t^U = f_\pi^* \pi_t^* + f_y^* y_t^* + f_q q + 10^{14} s_t$$

- Transitory economy:

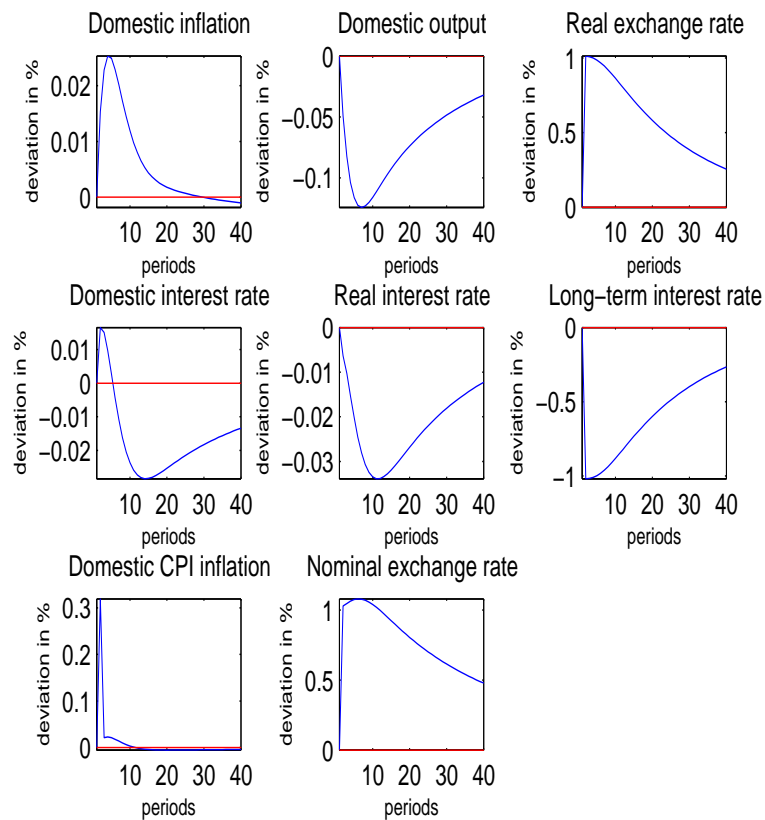
$$i_t^T = \textit{regime} i_t^I + (1 - \textit{regime}) i_t^U$$

- Agents know from the start of the simulation about future exogenous changes
- Compute the rational expectation solution
- Second order approximation of the rule
- Dynare: Future information is added to the state space

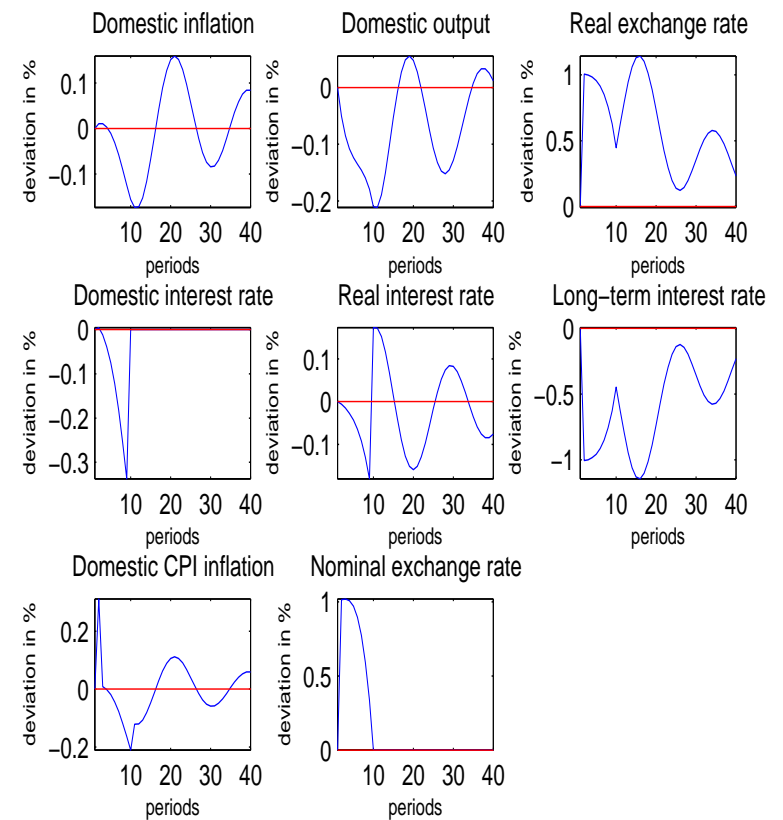
# IRFs Comparison: Inflation targeting

- 1% deviation in natural output

## Independent economy



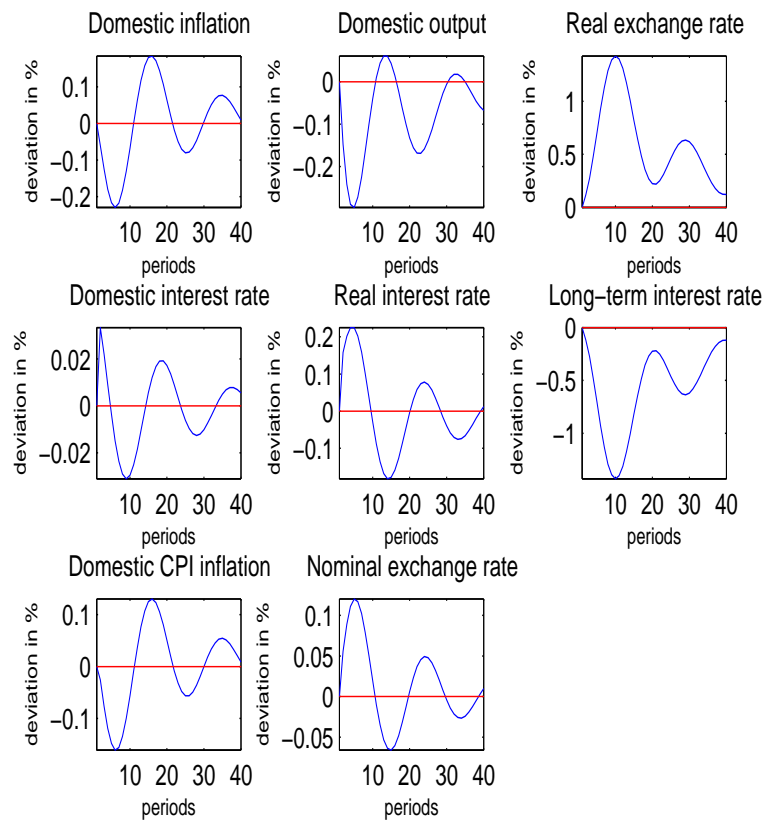
## Transitory economy



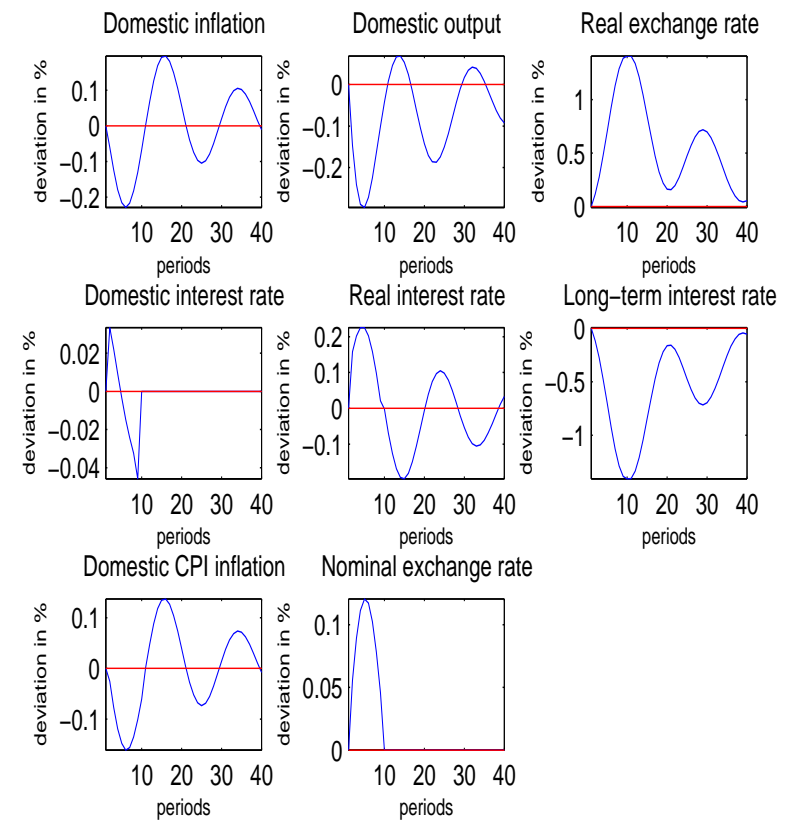
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## Independent economy

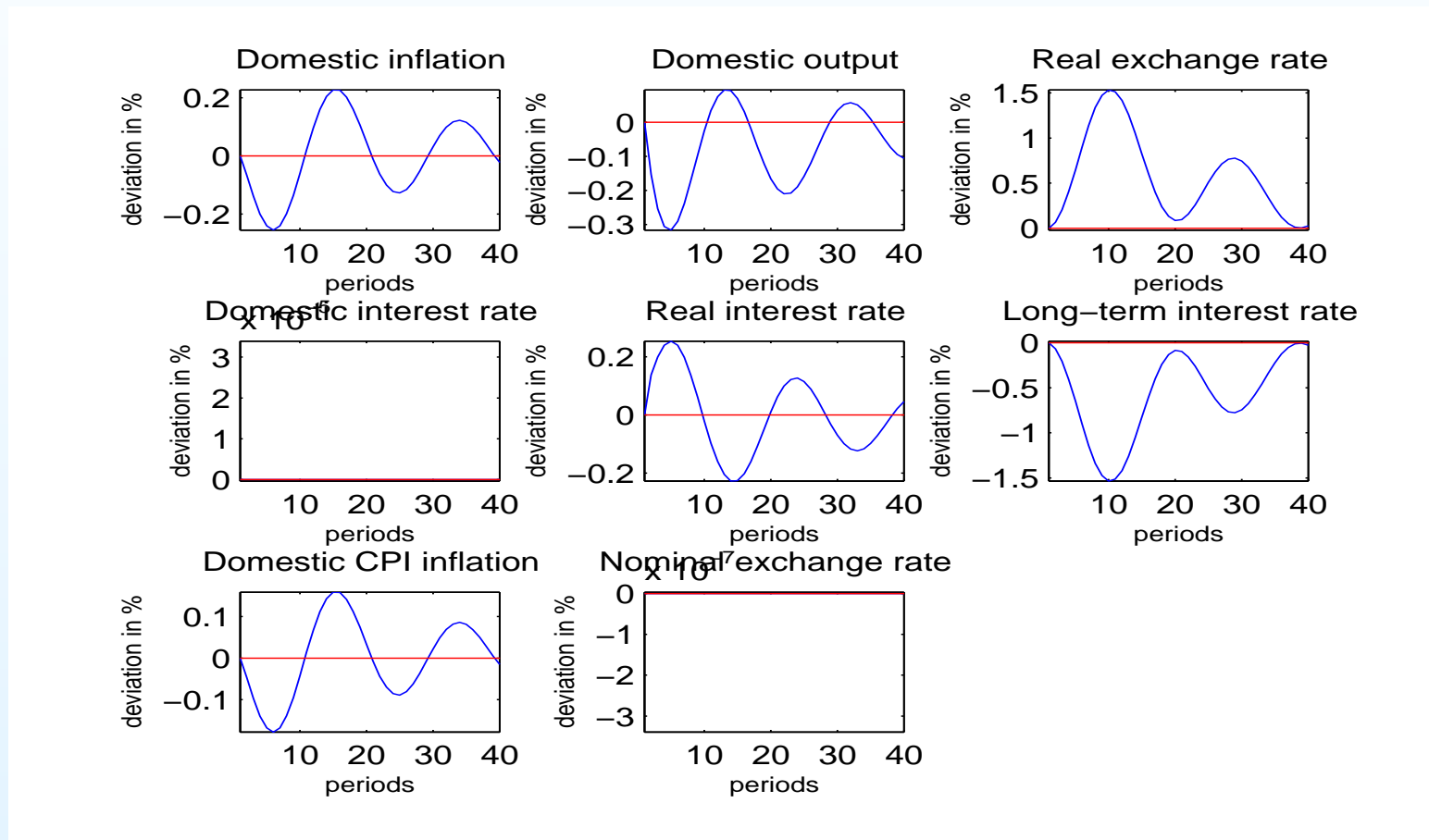


## Transitory economy



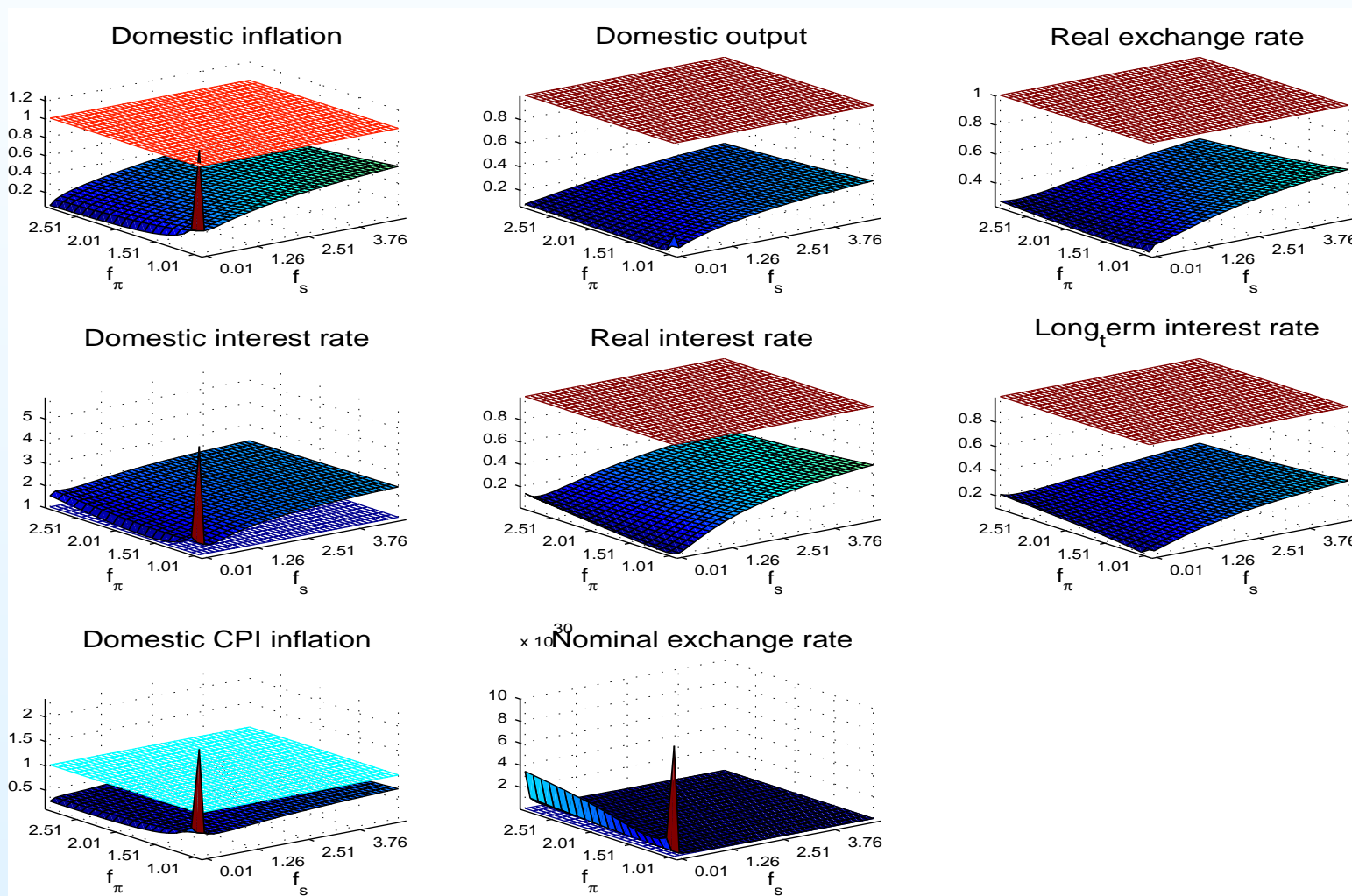
# IRFs: Unified economy

- 1% deviation in natural output



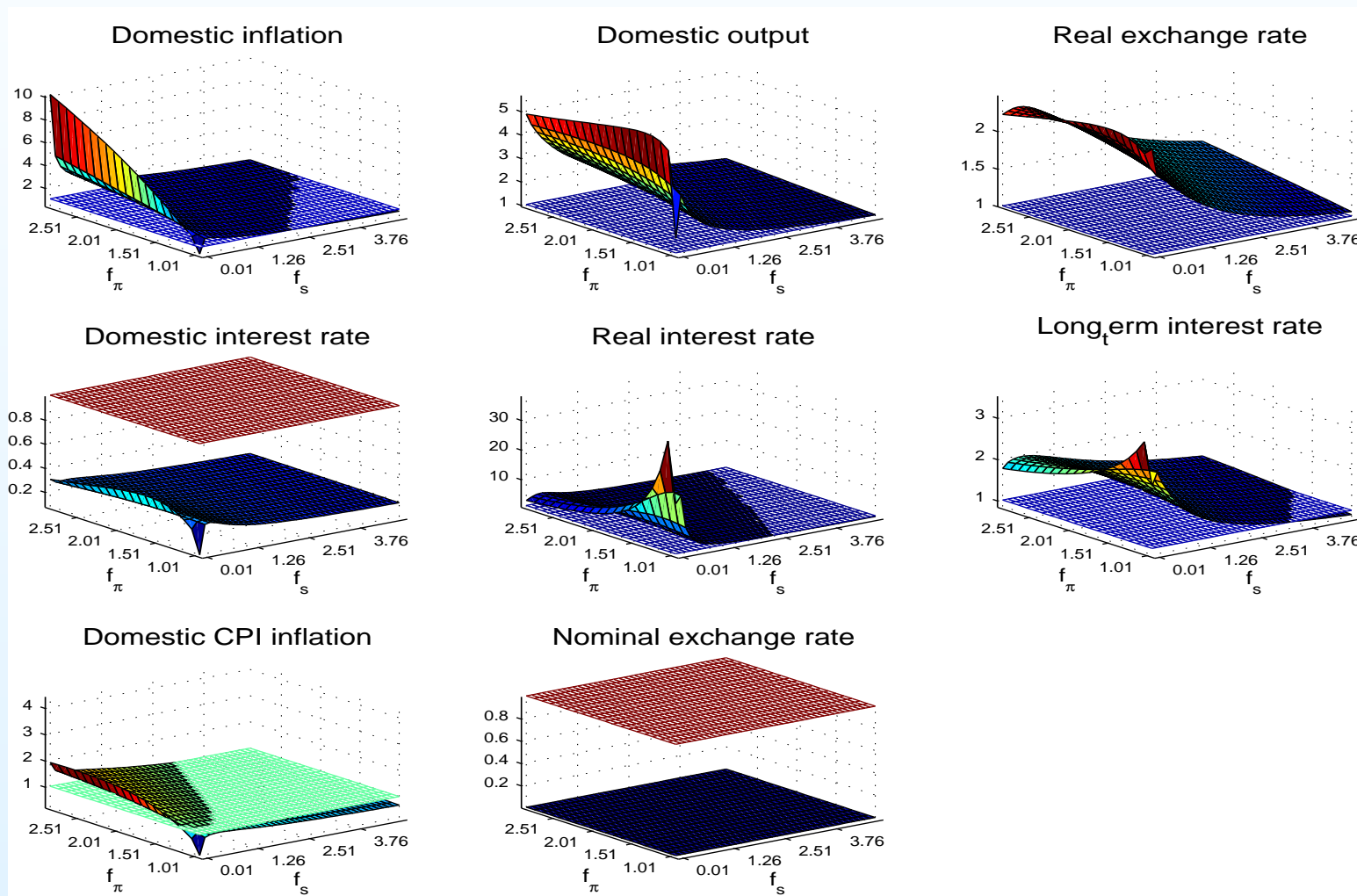
# Results: Variance ratio plots

- Comparison of regimes:  $ratio = \frac{independent}{unified}$



# Results: Variance ratio plots

- Comparison of regimes:  $ratio = \frac{transitory}{independent}$



## Recent work

- Caveats:
  - Order of approximation
  - Conditional vs. unconditional variance
- Focus on announcement–entry period
- Conditional variance computation
- Define loss function for comparison
  - $L = \alpha_1 \pi_t^2 + \alpha_2 y_t^2 + \alpha_3 s_t^2$
  - ad hoc variance weights in loss function



## Future work

- FOCs for model with habit formation and two sectors (tradable/nontradable)
- Full second order approximation
- Derivation of loss function
  - weights implied by the parameters and model
  - Welfare analysis of regime choice in transition period
    - Is ET preferred regime in transition period?
    - Should IT authority switch to ET/fixed ex. rate?