Monetary Policy under Sudden Stops

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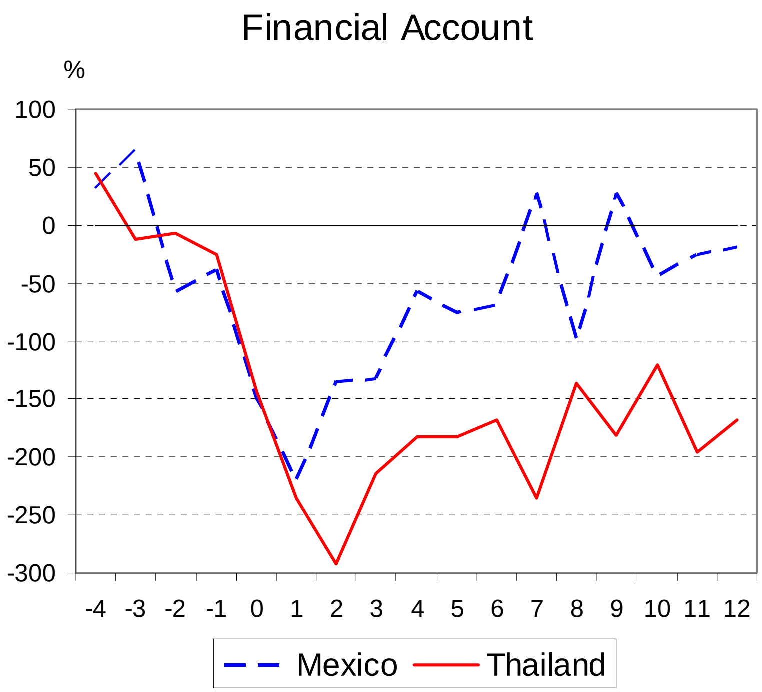
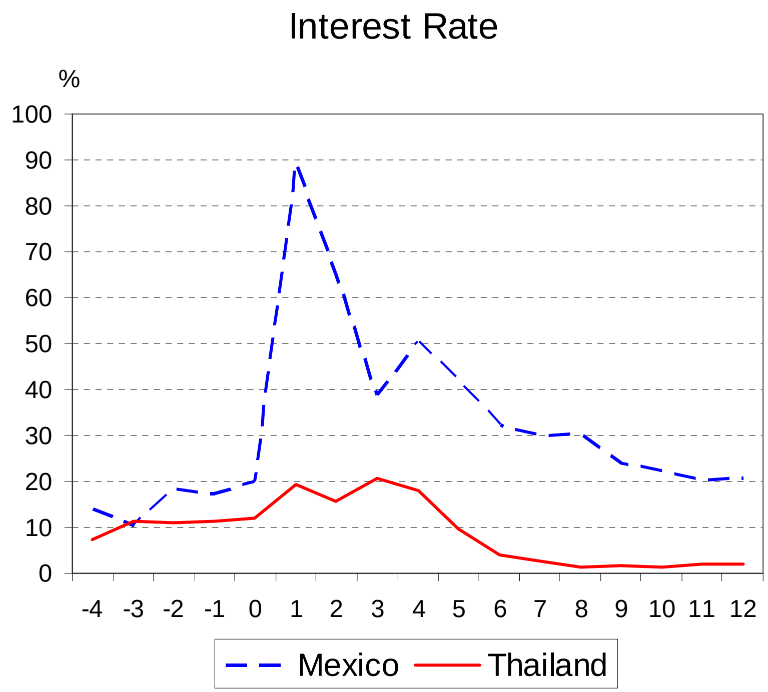
*The views expressed are those of the author and are not necessarily reflective of views at the Federal Reserve Bank of New York or the Federal Reserve System.

Sudden stops

- Two stories



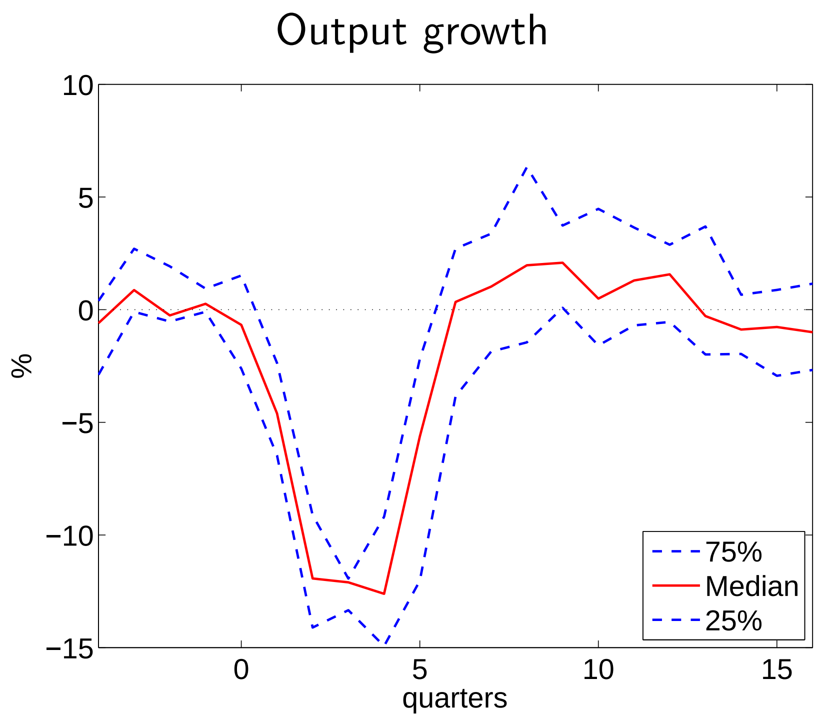


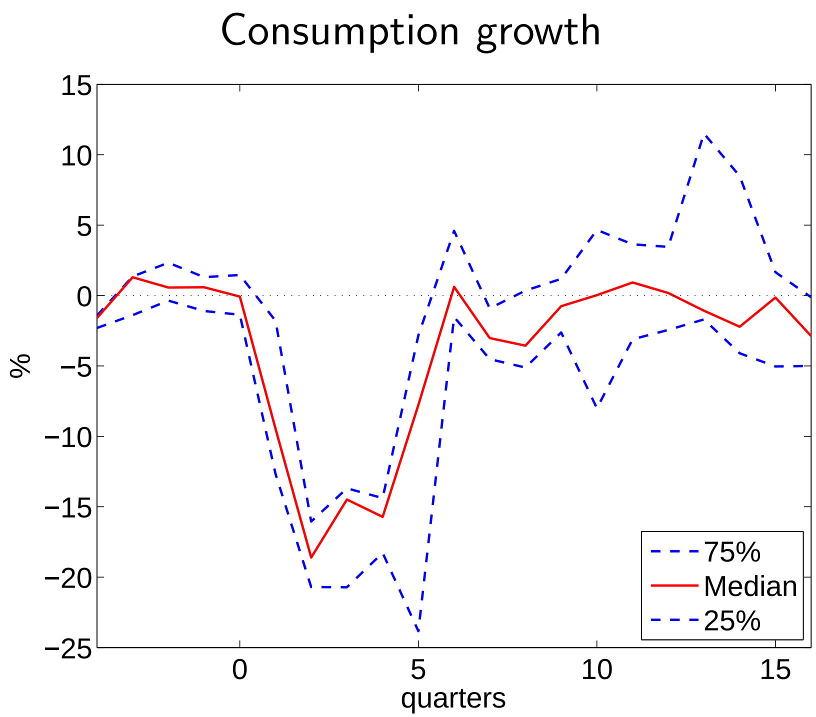
Monetary policy under sudden stops

- Facts
- A model for emerging markets
  - trade-offs created by sudden stops
  - allows the evaluation of monetary policy
- Responses to a sudden stop under alternative policies
  - Importance of the demand side
  - Peg more contractionary than flexible exchange rates
  - Relevance of monetary policy stance

Facts

- Collapse of domestic production and domestic demand

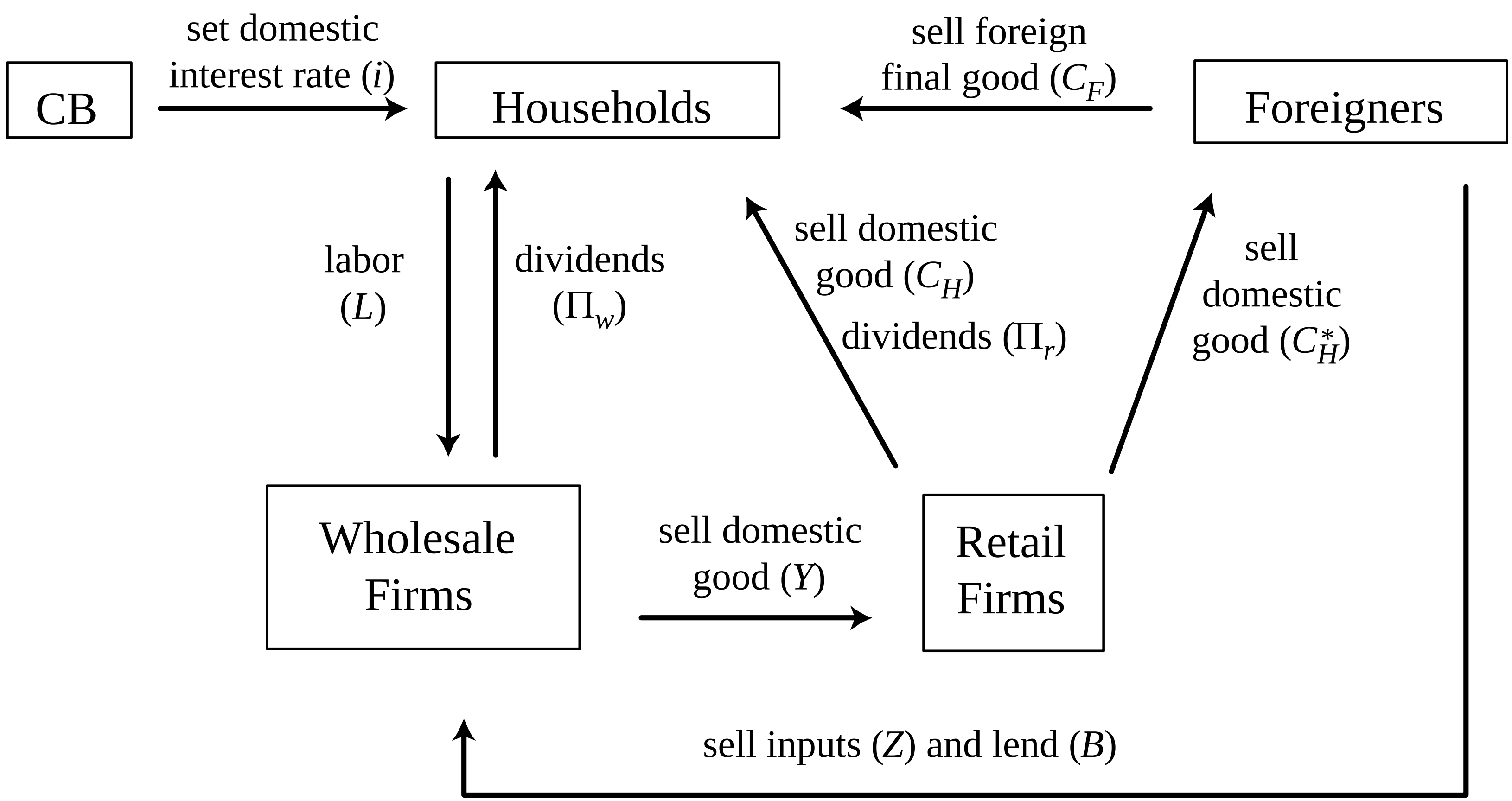




A model for emerging markets

- Balance sheet effects
- Debt denominated in foreign currency: the "original sin"
- Imported inputs

A model for emerging markets



Wholesale firms

- Technology for firm j

$$Y_t(j) = A_t \left\{ \alpha^{\frac{1}{\phi}} L_t(j)^{\frac{\phi-1}{\phi}} + (1-\alpha)^{\frac{1}{\phi}} \left[\omega_t(j) Z_{t-1}(j) \right]^{\frac{\phi-1}{\phi}} \right\}^{\frac{\phi}{\phi-1}}$$

with

$$\omega_t(j) \equiv \text{idiosyncratic shock to productivity of imported input}$$

$$E_t\left[\omega_{t+1}(j)\right] = 1$$

Returns on imported inputs

- Return on imported input defined as:

$$R_{Z,t+1}(j) \equiv \frac{P_{w,t+1} Y_Z\left(L_{t+1}(j), Z_t(j)\right)}{S_t P^*_{Z,t}}$$

- Given idiosyncratic shock and CES assumption, can write

$$R_{Z,t+1}(j) = \omega_{t+1}(j) R_{Z,t+1}$$

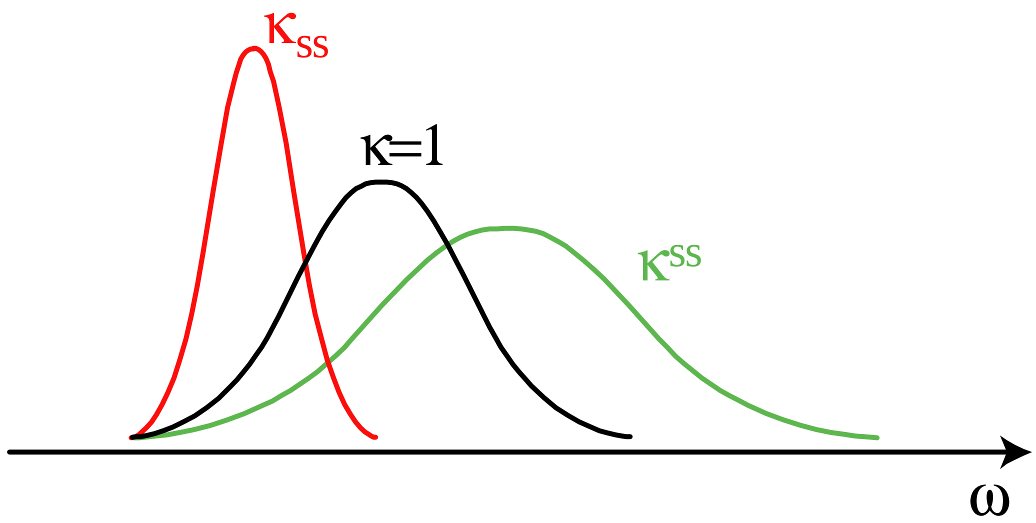
Foreign lenders

- Foreigners perceptions

$$\omega^*_{t+1}(j) = \omega_{t+1}(j)\,\kappa_t$$

with

$$\kappa_t : \begin{cases} \text{normal times } (\mathcal{S}_t = \mathcal{N}) \Rightarrow \kappa_t = 1 \\ \text{sudden stop } (\mathcal{S}_t = \mathcal{U}) \Rightarrow \kappa_t \in [\kappa_{ss}, \kappa^{ss}] \end{cases}$$



Balance sheet

- Balance sheet:

$$S_t B_t(j) = S_t P^*_{Z,t} Z_t(j) - N_t(j)$$

- Debt contract satisfies:

$$\bar{\omega}_{t+1}(j) \frac{R_{Z,t+1} S_t P^*_{Z,t} Z_t(j)}{S_{t+1}} = R_{B,t}(j) B_t(j)$$

and

$$\begin{aligned}(1+i^*_t) B_t(j) &= E_t\left[(1-F^*(\bar{\omega}_{t+1}(j))) R_{B,t}(j) B_t(j)\right] \\ &\quad + (1-\mu) E_t\left[\int_0^{\bar{\omega}_{t+1}(j)} \omega^* \frac{R_{Z,t+1} S_t P^*_{Z,t} Z_t(j)}{S_{t+1}} dF^*(\omega^*)\right]\end{aligned}$$

Wholesale firms FOC

- Firms choose $Z_t(j)$, $\bar{\omega}_t(j)$, $R_{B,t}(j)$ and $N_t(j)$

- All firms take the same decisions regarding these variables

- Uncovered Interest Parity (UIP) relation:

$$(1+i_t)\, E_t\left[\frac{C_{t+1}^{-\sigma}}{P_{t+1}}\right] = (1+i_t^*)\, E_t\left[\frac{C_{t+1}^{-\sigma}}{P_{t+1}}\frac{S_{t+1}}{S_t}\lambda_{t+1}\right]$$

- Return on imported inputs' risk premium relation:

$$E_t\left[\frac{C_{t+1}^{-\sigma}}{P_{t+1}}\Upsilon_{t+1}R_{Z,t+1}\right] = (1+i_t^*)\, E_t\left[\frac{C_{t+1}^{-\sigma}}{P_{t+1}}\frac{S_{t+1}}{S_t}\lambda_{t+1}\right]$$

Risk premia

- Different risk premia:

$SP_Z^* Z$	$N + \Pi_w$
$\Rightarrow R_Z$	$\Rightarrow (1 + i)$
	SB
	$\Rightarrow \tilde{R}_B$

- The return on imported inputs is the weighted average of capital costs

$$R_Z = (1 - b)(1 + i) + b\tilde{R}_B$$

with

$$b \equiv \frac{B}{P_Z^* Z}$$

The transmission mechanism

- Change in perceptions $\Rightarrow$ foreigners demand higher risk premium

- Firms
  - reduce new purchases of the imported input
  - reduce debt and increase net worth (to reduce risk premium)
    $\Rightarrow$ dividends are then reduced

- Households face tighter budget constraint due to lower dividends
  - cut consumption $\Rightarrow$ lower domestic demand

- Firms face lower domestic demand
  - output falls
  - cut on labor $\Rightarrow$ real wages fall $\Rightarrow$ further constrains households' budget

- Balance of payments equilibrium implies real devaluation
  - expands foreign demand for the domestic good
    $\Rightarrow$ dampens the impact on the total demand for the domestic good
  - contracts domestic demand for foreign good
  - higher cost of purchasing imported input

The transmission mechanism

- Three main effects:
  - cost-push shock (cost of purchasing and financing the imported input)
  - contraction of domestic demand
  - expansion of foreign demand

Monetary policy

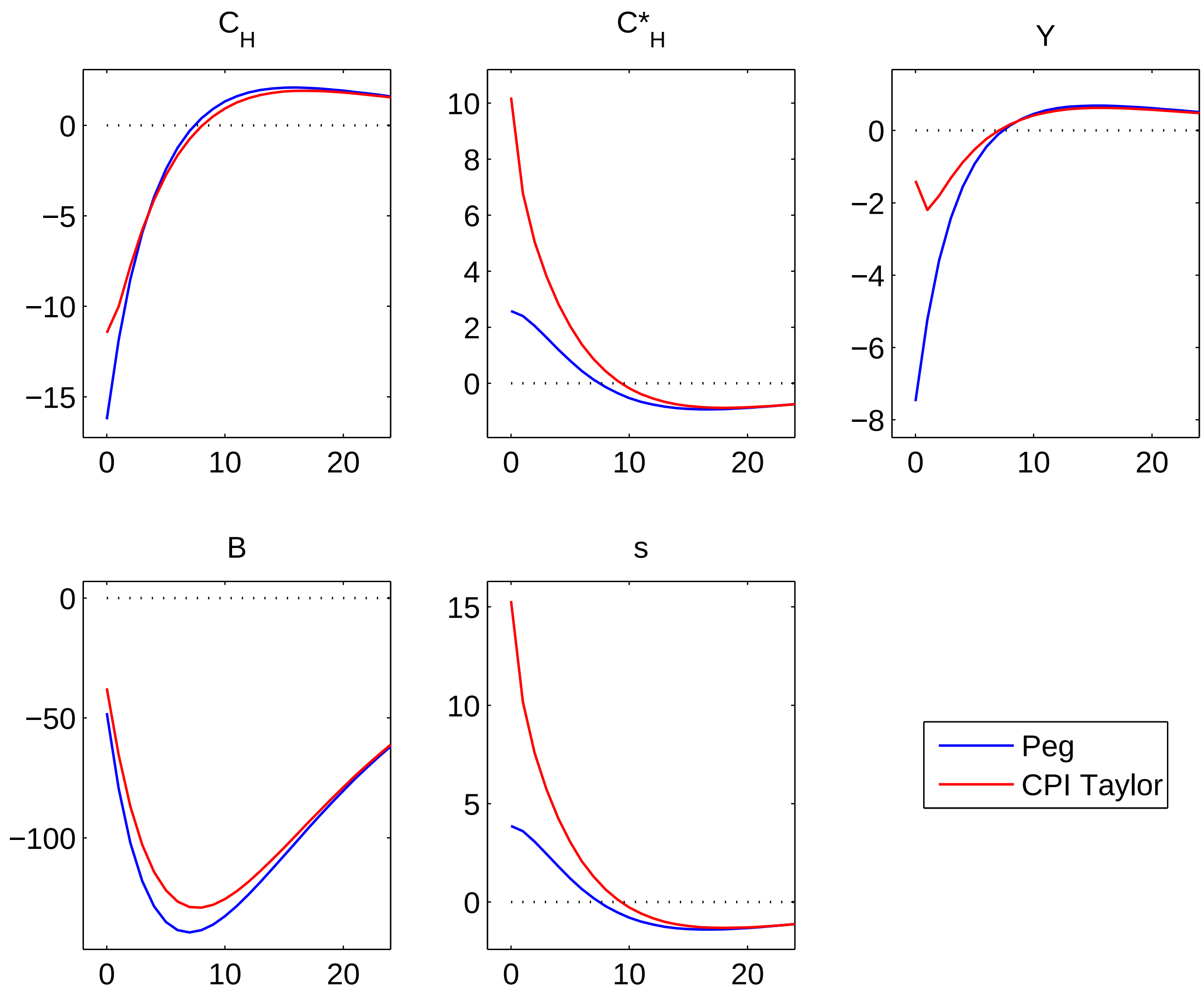
- Monetary policy controls the interest rate using a simple rule:

$$\frac{1+i_t}{1+i} = \left(\frac{P_t}{P_{t-1}}\right)^{\phi_{CPI}} \left(\frac{P_{H,t}}{P_{H,t-1}}\right)^{\phi_{DPI}} \left(\frac{Y_t}{Y}\right)^{\frac{\phi_Y}{4}} \left(\frac{S_t}{S_{t-1}}\right)^{\phi_S}$$

with

	ϕ_{CPI}	ϕ_{DPI}	ϕ_Y	ϕ_S
Peg	0	0	0	∞
Taylor rule (CPI)	3	0	0.75	0
Taylor rule (DPI)	0	3	0.75	0
Inflation stabilization (CPI)	∞	0	0	0
Inflation stabilization (DPI)	0	∞	0	0

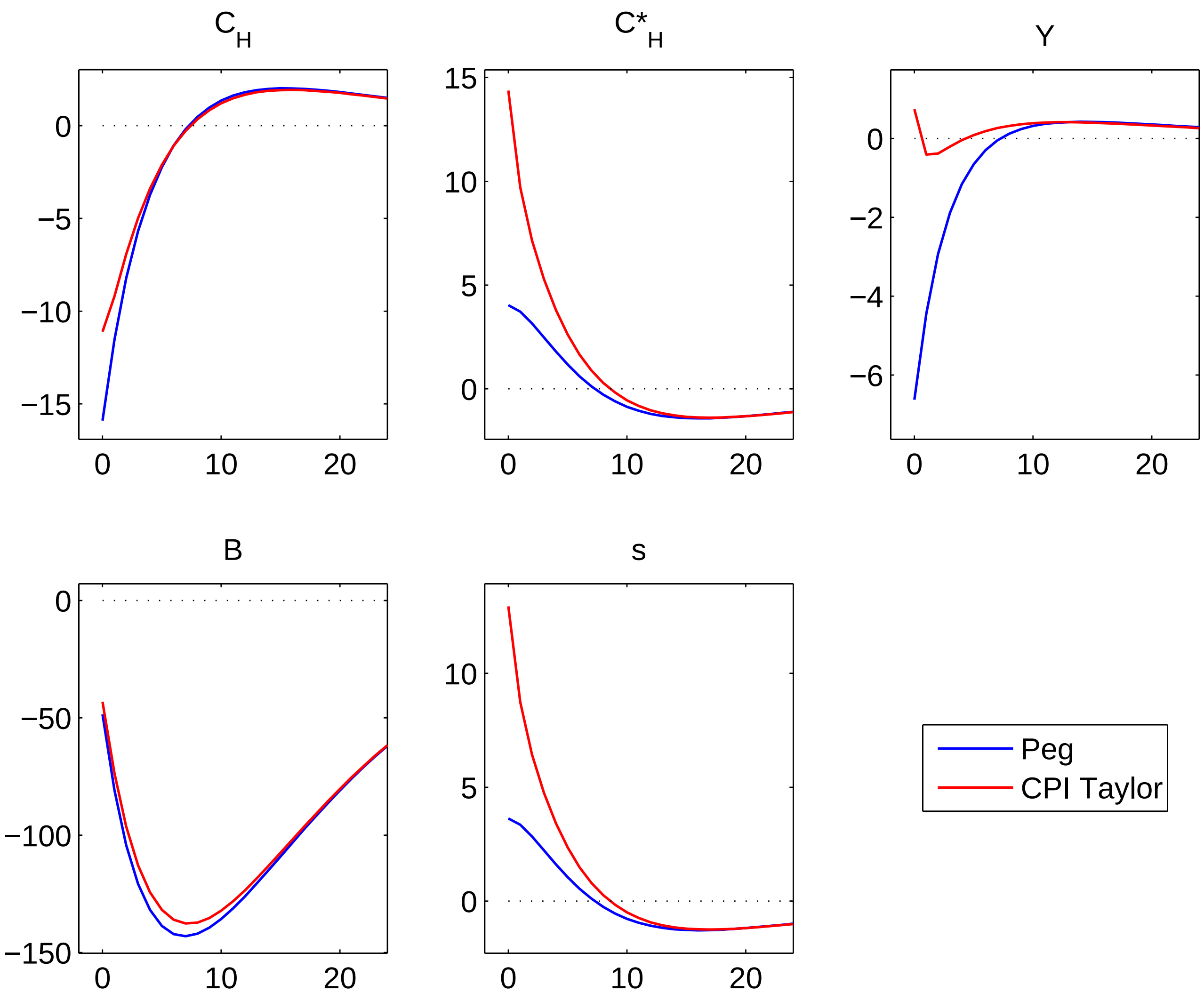
Responses to a sudden stop: Peg vs. CPI Taylor



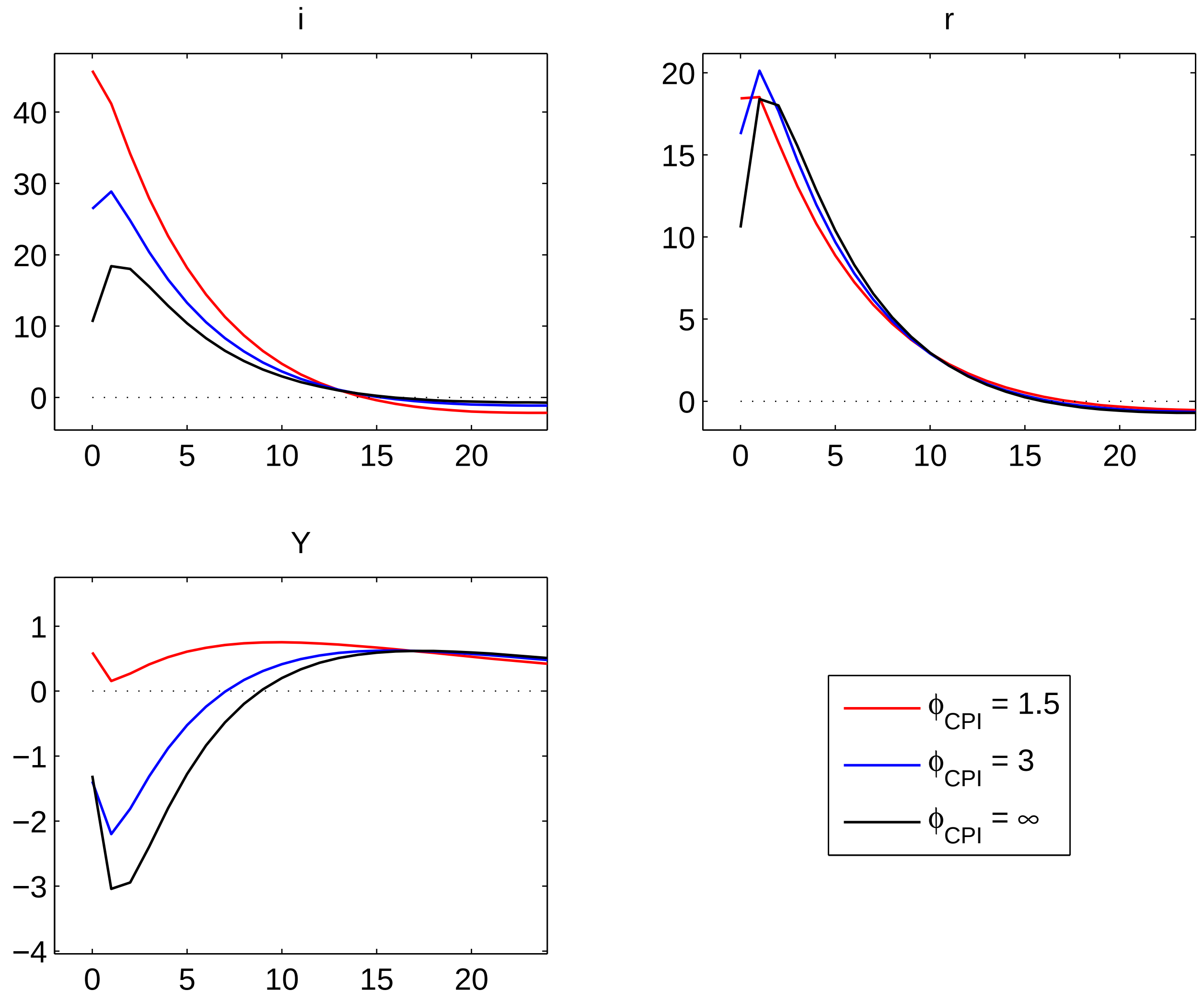
Responses to a sudden stop: comparison to Chari et al

- Chari, Kehoe and McGrattan (2005)
  - sudden stop is equivalent to increase in net exports
  - therefore it leads to an expansion of the output
- In my model
  - that is only one side of the story
  - need to account for the fall in the domestic demand
- Reason for the difference:
  - in their model everything in tradables and foreign demand infinitely elastic

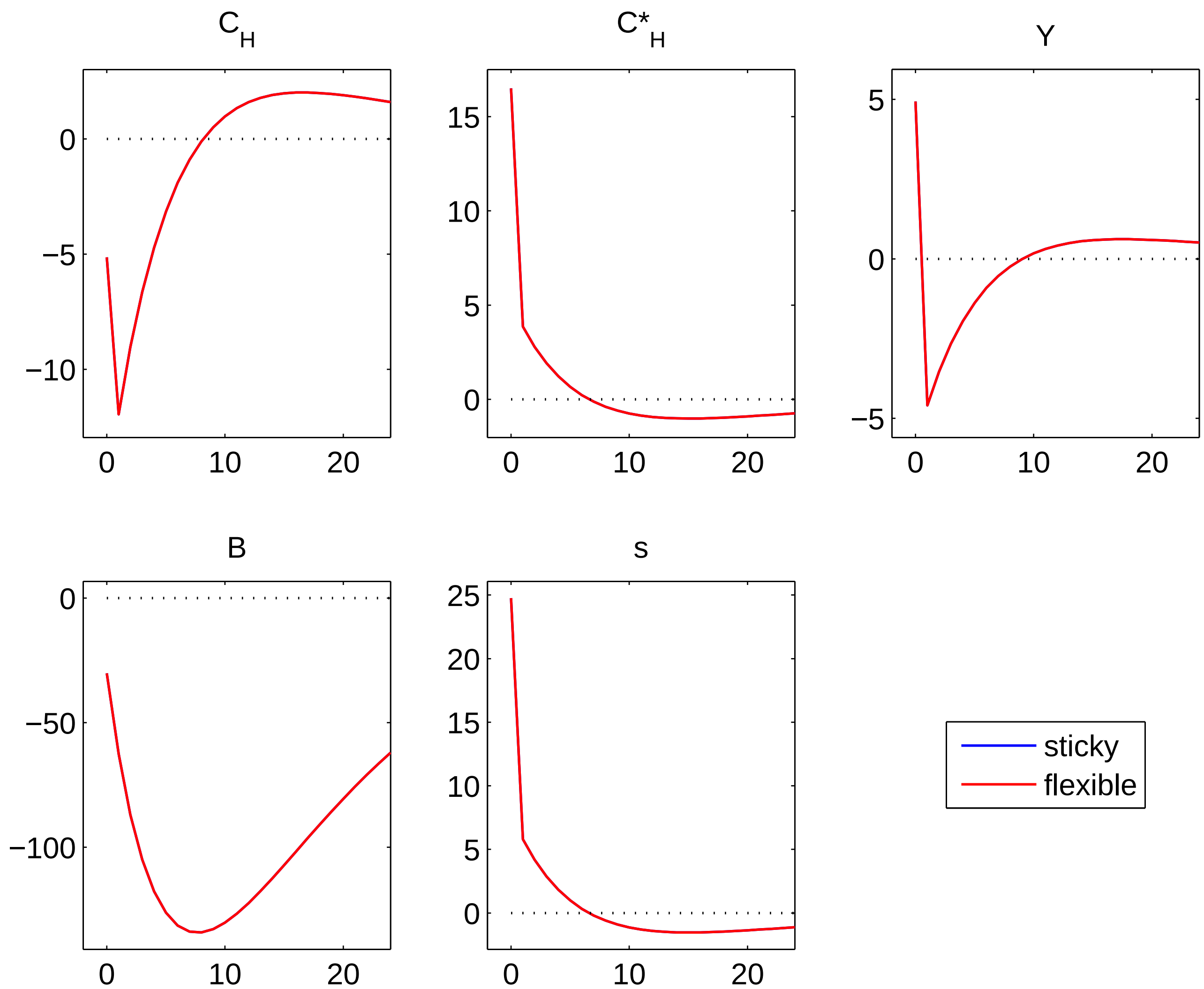
Responses to a sudden stop: elastic foreign demand



Responses to a sudden stop: degree of inflation reaction



Responses to a sudden stop: DPI stabilization



Concluding remarks

- Presented a framework tailored for emerging markets and suitable for monetary policy analysis
  - It does match some of the facts associated to sudden stops
  - Showed the importance of the demand side
- Confirmed that a peg is more contractionary than flexible exchange rates
- Showed the importance of the monetary policy stance (towards inflation)
  - more than focus on changes of the interest rate

Future work

- Framework simplifies welfare evaluation allowing for further discussion of policy issues:
  - welfare comparison of alternative rules
  - optimal policy
  - discretion vs. commitment
- Shock is structural enough to allow for further extensions
  - allowing it to react to state variables