

Financial Globalization and Monetary Transmission¹

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¹The views in this presentation are those of the author and do not necessarily represent those of the Swiss National Bank.

Aim of the paper

- Analysis of the effects of international financial integration on the impact of monetary policy in a standard theoretical open economy framework
- Assessment of the concern that financial integration undermines monetary policy effectiveness
- Addressing the limitations of existing contributions to capture the effects of *financial* integration (Erceg, Gust and Lopez-Salido, 2007; Cwik, Müller and Wolters, 2010; and Woodford, 2007)

Approach

- Extension of a general New Keynesian model to a richer structure in financial markets with international asset trading in multiple assets and incomplete asset markets
- Two crucial modeling choices which allow an analysis of two different forms of financial integration
 - ① Inclusion of transaction costs for trading assets
⇒ International financial integration in the form of a decrease in the costs of international asset trading
 - ② Linearization of the model around an exogenous steady state asset portfolio ⇒ International financial integration in the form of an increase of gross foreign asset positions

Main result

- None of the analyzed forms of international financial integration undermines the impact of monetary policy on output and inflation.
- If anything, integration makes monetary policy *more* rather than *less* effective as weakened interest rate channels are always more than offset by strengthened wealth or exchange rate channels.

Basic structure (cf. Gali, 2008)

- Two countries: Home and Foreign
- Households consume goods and supply labor services:

$$U(j) = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{1}{1-\sigma} (C_t(j))^{1-\sigma} - \frac{\kappa}{1+\varphi} (N_t(j))^{1+\varphi} \right]$$
- Firms use both labour and capital inputs:

$$Y_t(i) = A_t (K_t(i))^{1-\mu} (N_t(i))^\mu$$
- Monopolistic competition in labor and goods markets and both sticky prices and wages
- Capital accumulation subject to adjustment costs:

$$K_{t+1} = (1 - \delta) K_t + I_t - \frac{\xi}{2} \frac{(K_{t+1}(I) - K_t(I))^2}{K_t(I)}$$

Basic structure (cont.)

- Monetary authorities in both countries are assumed to follow a Taylor rule, e.g. for the Home country modeled as :

$$1 + i_t = (1 + i_{t-1})^\rho \left(\left(\frac{P_t}{P_{t-1}} \right)^{\phi_\pi} (Y_t)^{\phi_y} \right)^{(1-\rho)} R_t$$

Financial markets

- International trade in four assets
- Home and Foreign nominal bonds, B_{Ht} and B_{Ft} , denominated in Home and Foreign currency respectively, with nominal returns:

$$(1 + i_t) \text{ and } (1 + i_t^*)$$

- Equity shares, Q_{Ht} and Q_{Ft} , which are claims on Home and Foreign firms' profits, assumed to be a balanced portfolio across all firms in the respective country, with nominal returns:

$$\left(P_{Qt} + \left(\frac{V_t}{\bar{Q}} \right) \right) \text{ and } \left(P_{Qt}^* + \left(\frac{V_t^*}{\bar{Q}^*} \right) \right)$$

Financial transaction costs (cf. Ghironi, Lee and Rebucci, 2007)

- Convex financial transaction costs, γ , for changes in all asset holdings. E. g. for domestic equity holdings, Q_H , defined as:

$$\underbrace{\frac{\gamma_{Q_H} \bar{P}_Q (Q_{Ht+1}(j) - Q_{Ht}(j))^2}{2 \bar{Y}}}_{\text{defining different scenarios}} \quad \text{and} \quad \underbrace{\frac{\psi_{Q_H} \bar{P}_Q (Q_{Ht}(j) - \bar{Q}_H(j))^2}{2 \bar{Y}}}_{\text{technical device}}$$

Exogenous steady state portfolio (cf. Tille, 2008)

- Linearization around exogenous steady state portfolio allocation \Rightarrow Steady state can be chosen exogenously as particular solution among set of feasible solutions
- Alternative approach with endogenous solution (cf. Devereux and Sutherland, 2006, and Tille and van Wincoop, 2009)
- Exogenous approach allows choice of international portfolio that is in line with empirical evidence, without need to finetune the model

Additional flexible features (cf. Obstfeld and Rogoff, 2005 and Corsetti and Pesenti, 2005)

- Standard CES consumption basket over traded and non-traded goods baskets , $C_t = \left[\gamma^{\frac{1}{\omega}} C_{Tt}^{\frac{\omega-1}{\omega}} + (1 - \gamma)^{\frac{1}{\omega}} C_{Nt}^{\frac{\omega-1}{\omega}} \right]^{\frac{\omega}{\omega-1}}$, with tradables basket defined as:

$$C_{Tt} = \left[\alpha^{\frac{1}{\phi}} C_{HTt}^{\frac{\phi-1}{\phi}} + (1 - \alpha)^{\frac{1}{\phi}} C_{FTt}^{\frac{\phi-1}{\phi}} \right]^{\frac{\phi}{\phi-1}}$$

- Flexible exchange rate pass-through elasticity, τ , which can vary between 0 and 1. E.g. foreign-currency price of a Home traded goods brand, $P_{HTt}^*(i)$, is defined as:

$$P_{HTt}^*(i) = \frac{P_{HTt}^{Opt*}}{S_t^\tau}$$

Solution method

- 1 Log-linearization around a stationary steady state (where inflation and NFA equal zero)
- 2 Calibration
- 3 Numerical simulation and comparison of impulse response functions to monetary policy shocks in different scenarios → monetary policy shock defined as a 25 basispoints one-off positive shock, \hat{r}_t , on the nominal interest rate in the Home country:

$$\hat{i}_t \approx \rho \hat{i}_{t-1} + (1 - \rho) \left(\phi_\pi \hat{\pi}_t + \phi_y \hat{y}_t \right) + \hat{r}_t$$

Baseline calibration

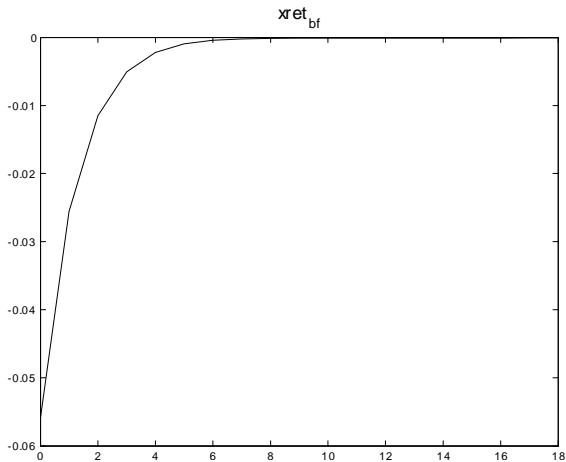
β	0.99	α	0.5	μ	0.6	ρ_r	0.6
σ	2	ϕ	2	δ	0.026	$\psi_{...}$	0.005
κ	1	θ	6	θ_P	0.66	$\gamma_{B_H}, \gamma_{Q_H}$	1
φ	1	θ_W	0.75	τ	0.5	$\gamma_{B_F}, \gamma_{Q_F}$	3
γ	0.25	η	21	ϕ_π	1.5	$\frac{\bar{P}_Q^* Q_F}{\bar{P}^* Y^*}, \frac{B_F}{\bar{P}^* Y^*}$	0.3
ω	2	ξ	8	ϕ_γ	0.125		

Calibration of transaction costs: Excess returns implied by Euler equations

$$\begin{aligned}
 (\widehat{xret}_{B_F})_t &\approx \gamma_{B_F} (E_t \{ \hat{b}_{Ft+1} \} - \hat{b}_{Ft}) - \beta \left(\begin{array}{c} \gamma_{B_F} E_t \{ \hat{b}_{Ft+2} - \hat{b}_{Ft+1} \} \\ -\psi_{B_F} E_t \{ \hat{b}_{Ft+1} \} \end{array} \right) \\
 &- \left[\gamma_{B_H} (E_t \{ \hat{b}_{Ht+1} \} - \hat{b}_{Ht}) - \beta \left(\begin{array}{c} \gamma_{B_H} E_t \{ \hat{b}_{Ht+2} - \hat{b}_{Ht+1} \} \\ -\psi_{B_H} E_t \{ \hat{b}_{Ht+1} \} \end{array} \right) \right]
 \end{aligned}$$

$$\underbrace{[0.0015]}_{\text{Excess return (LHS of above equations)}} \approx \underbrace{\left[\begin{array}{c} (1*0.1) - (0.99*((1*0.1) \\ - (0.005*0.1))) \end{array} \right]}_{\text{RHS of above equations}}$$

Calibration of transaction costs: IRF of excess returns



Calibration of financial market integration

- ① Increase of ratio of steady state gross foreign asset holdings to GDP from 0.3 to 1 → cf. gross foreign asset positions of industrial economics between 1990 and 2004 (see Lane and Milesi-Ferretti, 2007)
- ② Reduction of transaction costs on changes in foreign asset holdings from 3 to 1

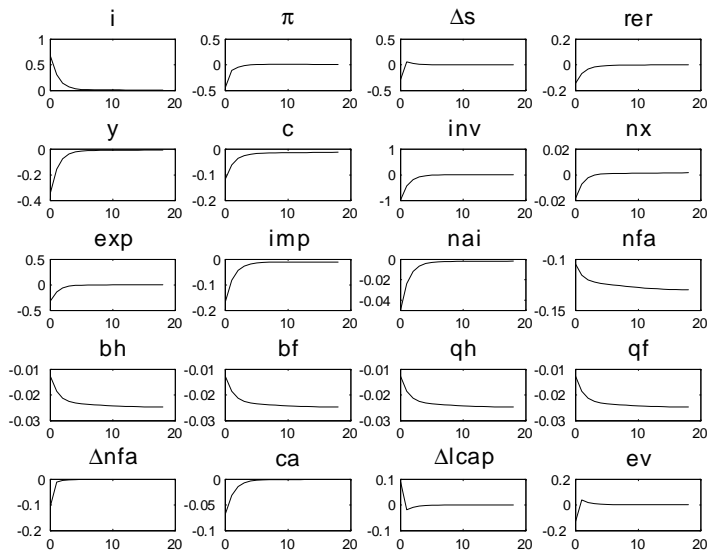
Calibration of trade integration and lower exchange rate pass-through

- 1 "Trade" integration in the form of a reduction of α from 0.5 to 0.1
- 2 Reduction in exchange rate pass-through, τ , from 0.5 to 0.1

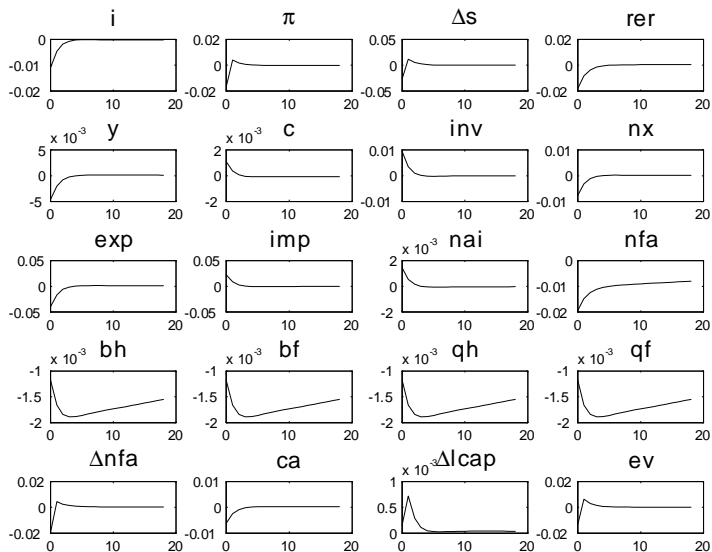
Four different experiments

- 1 Decrease in financial transaction costs
- 2 Increase in gross foreign asset holdings
- 3 Interaction of both forms of financial integration
- 4 Interaction of financial and "trade" integration

Baseline



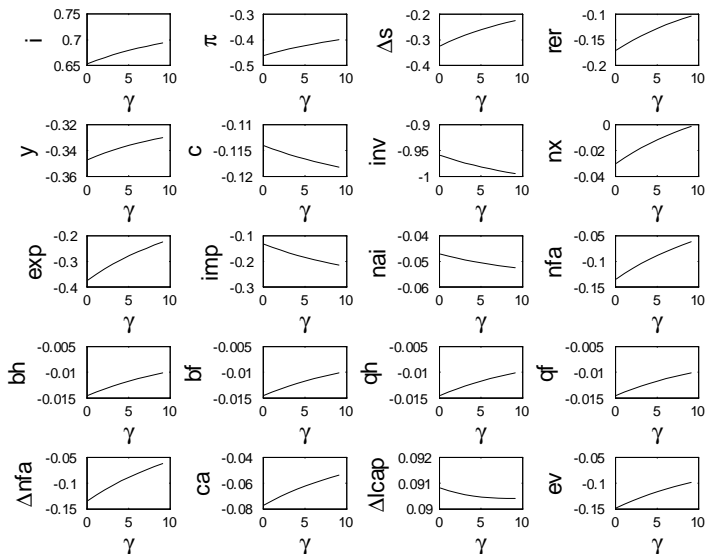
1) Decrease in transaction costs of trading foreign assets



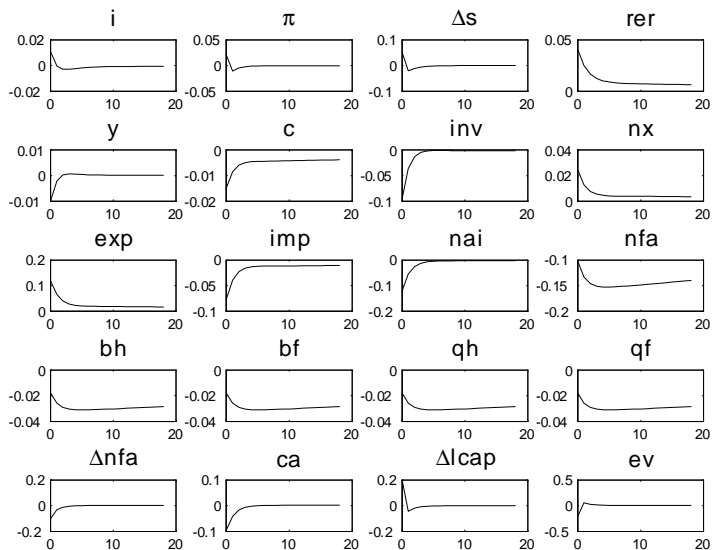
1) Decrease in transaction costs of trading foreign assets

- Weakens part of the interest rate channel due to an increase in consumption smoothing and a reduced reaction of consumer spending and investment
- But more than offset by strengthened impact on net exports as higher consumption smoothing also applies to import spending and as exchange rate channel is strengthened
- Overall, slightly higher reduction in output (about 1% of the initial response), as well as inflation (about 4% of the initial response).

1) Sensitivity to calibration of transaction costs



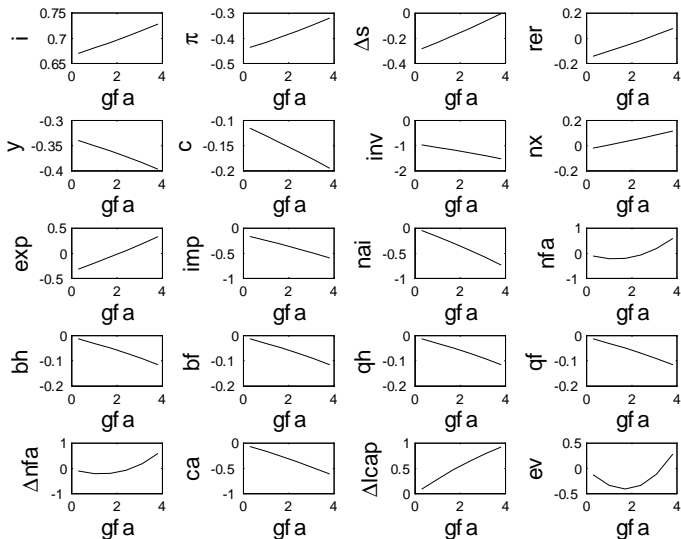
2) Increase in StSt gross foreign asset holdings



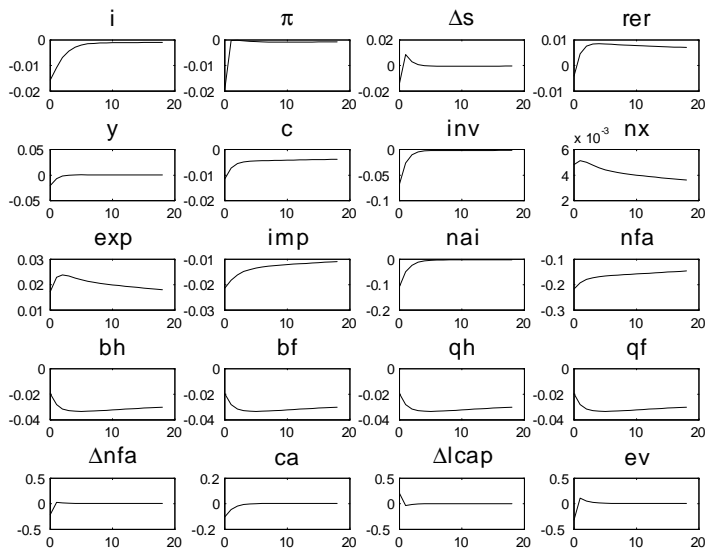
2) Increase in StSt gross foreign asset holdings

- Strengthens wealth channels, which lead to higher impact on consumption and investment
- More than offset a lower impact on net exports (a positive interest rate shock now leads to a slightly positive impact reaction of net exports), which is due to a strengthened wealth channel and weakened exchange rate channel
- Overall, higher impact on output (about 2.5% percent of the initial response) and slightly lower impact on inflation in first period, but more persistent (5% lower impact effect)

2) Sensitivity to calibration of StSt gross foreign asset holdings



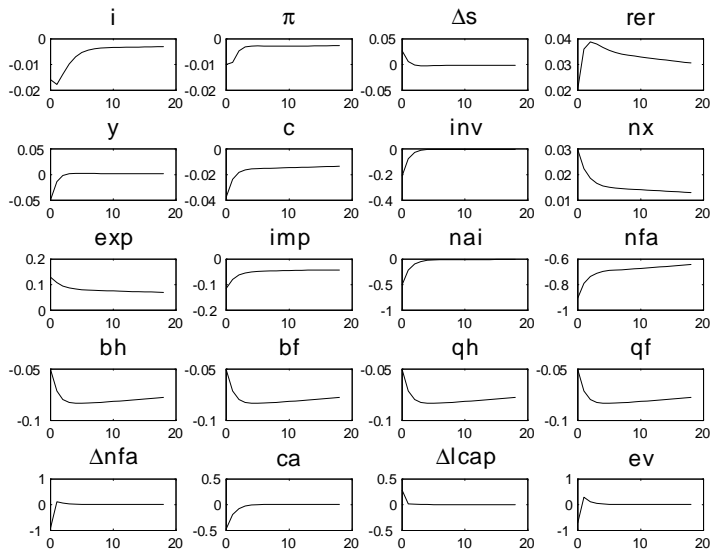
3) Interaction of both forms of financial integration



3) Interaction of both forms of financial integration

- Increases the impact of monetary policy on both output and inflation as the positive effects in the two individual scenarios reinforce each other
- Higher impact appreciation of the Home currency interacts with higher negative exchange rate valuation effect on Home households' wealth

4) Interaction of financial and trade integration



4) Interaction of financial and trade integration

- Highest positive impact on monetary policy effectiveness
- Combined effect is not just the sum of all individual effects, but the interaction of financial and trade integration actually leads to an amplification of the effects
- Lower impact appreciation of the Home currency and a lower reaction of the trade balance, but much larger negative exchange rate valuation effect
- Overall, much larger reduction in consumption and investment which in turn leads to a much larger reduction in output and inflation (around 12% and 2% of the initial responses, respectively)

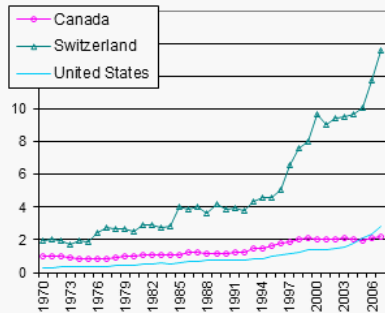
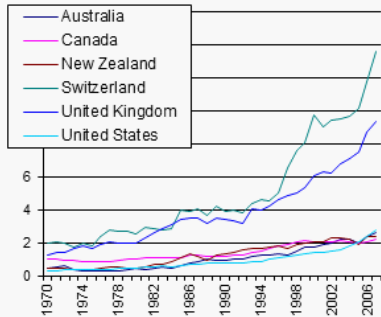
Main results

- None of the scenarios undermine monetary policy effectiveness (even if interact all potential integration scenarios)
- Simulations show three different aspects:
 - ① Two forms of financial integration have opposite effects on domestic spending
 - ② Effects of both forms of integration on domestic spending are counteracted by their effects on the trade balance
 - ③ Weakened interest channels are always more than offset by strengthened wealth or exchange rate channels
- Interaction of financial and "trade integration" leads to a non-negligible *positive* effect on the impact of monetary policy

Future steps

- Different compositions of asset holdings across the two categories and different currency denominations
- Empirical analysis:
 - 1 Estimation of model
 - 2 Combination of calibration exercise and VAR estimations along the lines of Boivin and Giannoni (2002)?
- Endogenous portfolio choice and non-neoclassical transmission channels (bank-based channels)

Sum of total gross foreign assets and liabilities as a ratio to GDP (Lane and Milesi-Ferretti, 2007)



Calibration of financial transaction costs: Data on the volatility of cross-border asset flows

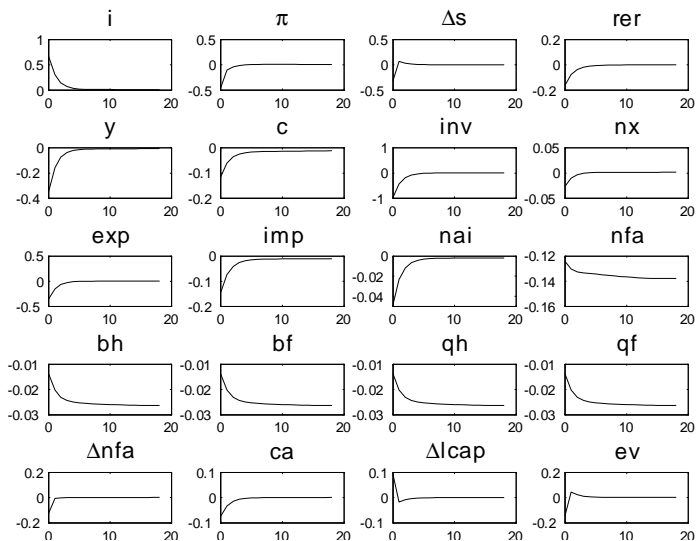
Table 1: Volatility of cross-border asset flows in the US

	Standard Deviation	
	1973-1993	1994-2010
Equity outflows*	0.07%	0.20%
Equity inflows*	0.06%	0.19%
Debt outflows*	0.07%	0.31%
Debt inflows*	0.17%	0.57%
*(percent of GDP)		

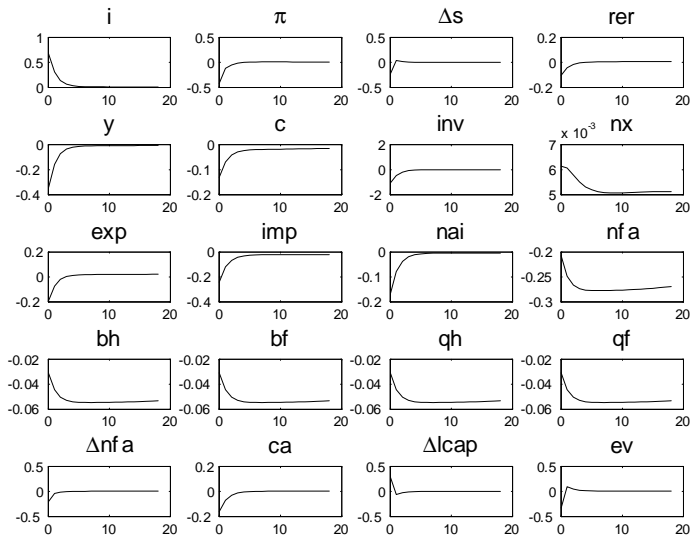
Table 2: Moments of simulated variables in model

	Standard Deviation	
	Baseline	Low transaction costs
Equity outflows*	0.08%	0.21%
Equity inflows*	0.08%	0.21%
Debt outflows*	0.08%	0.21%

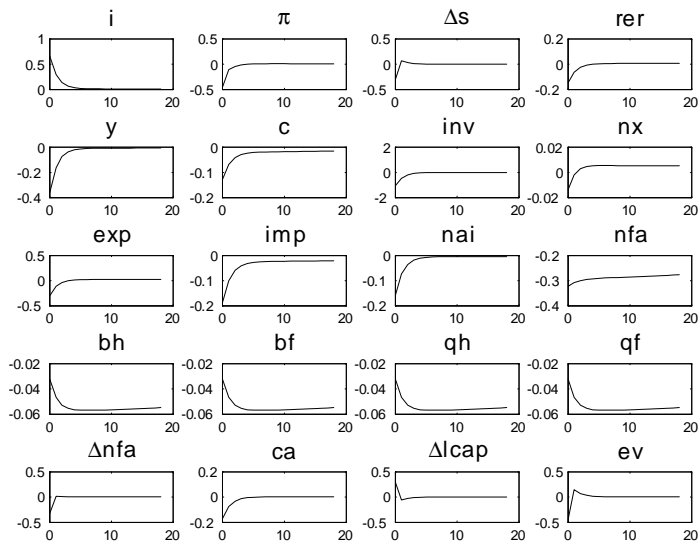
Scenario with Lower Costs



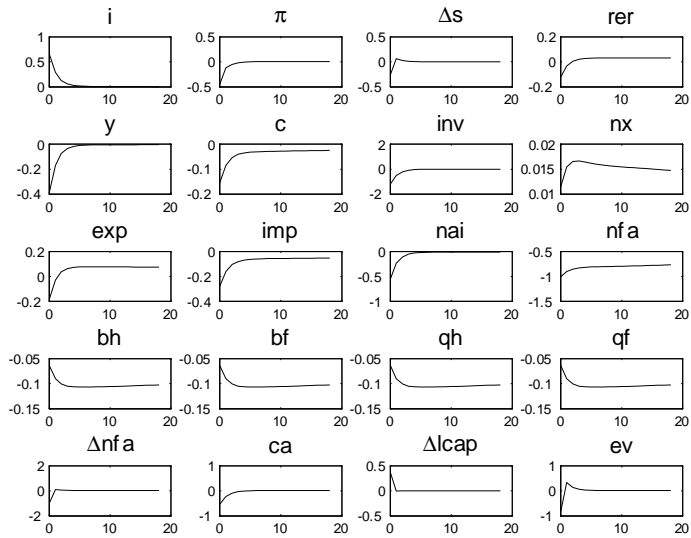
Scenario with Higher GFA



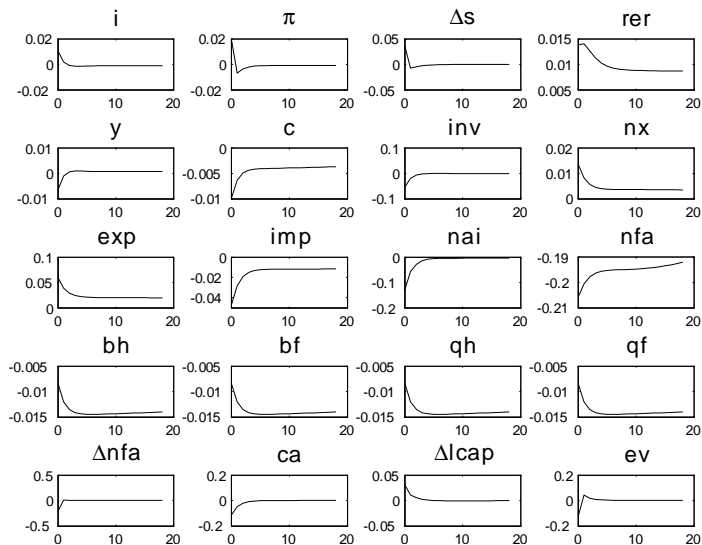
Scenario with Lower Costs and Higher GFA



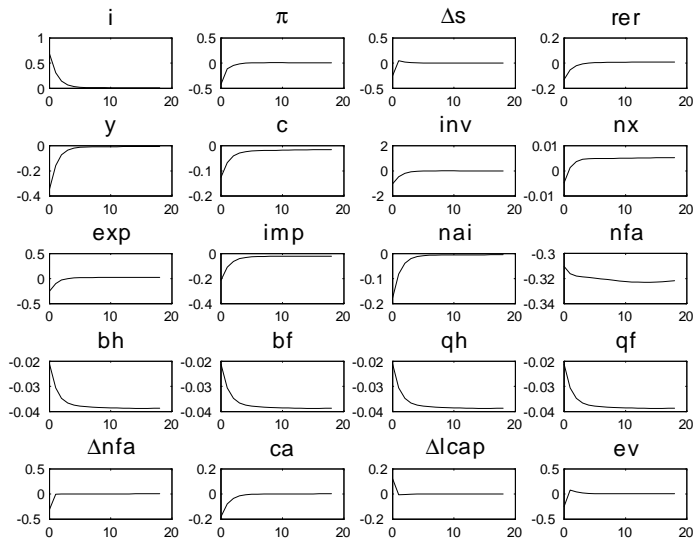
Scenario with Lower Costs and Higher GFA and "trade integration"



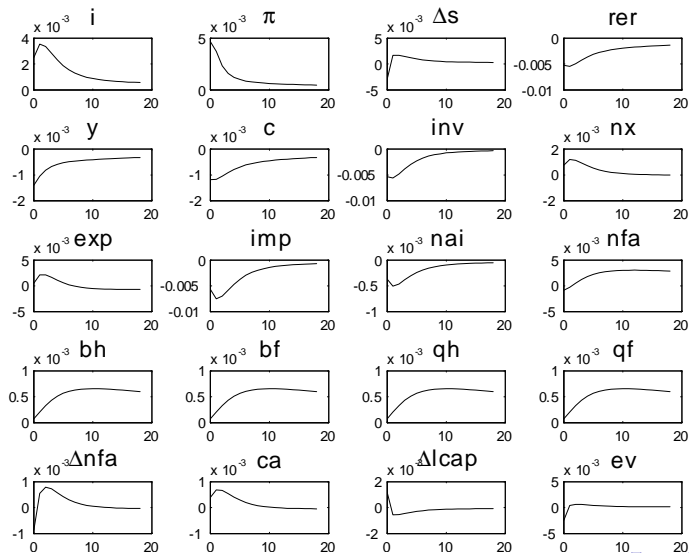
5) "Trade integration"



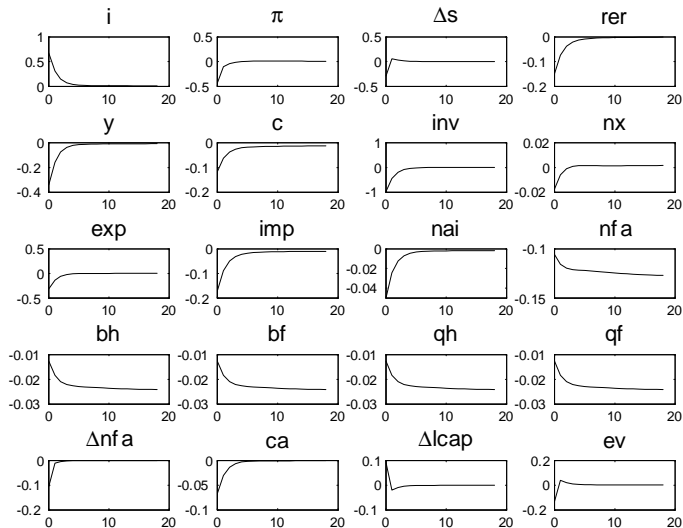
Scenario with lower share in trade goods sector



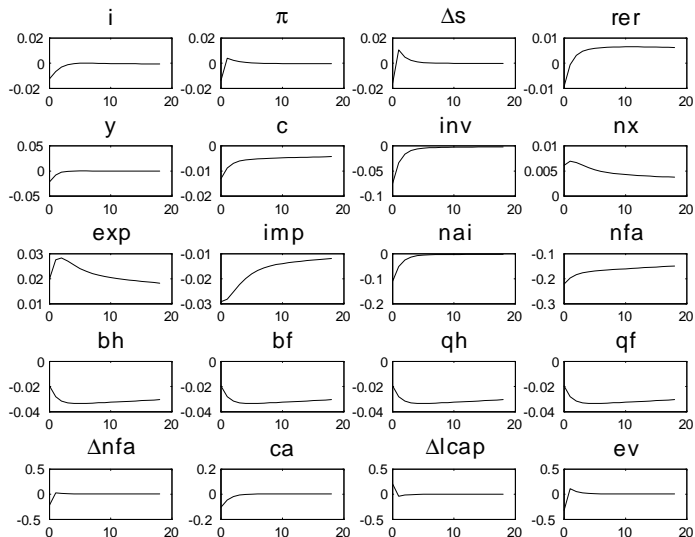
6) Decrease in ERPT



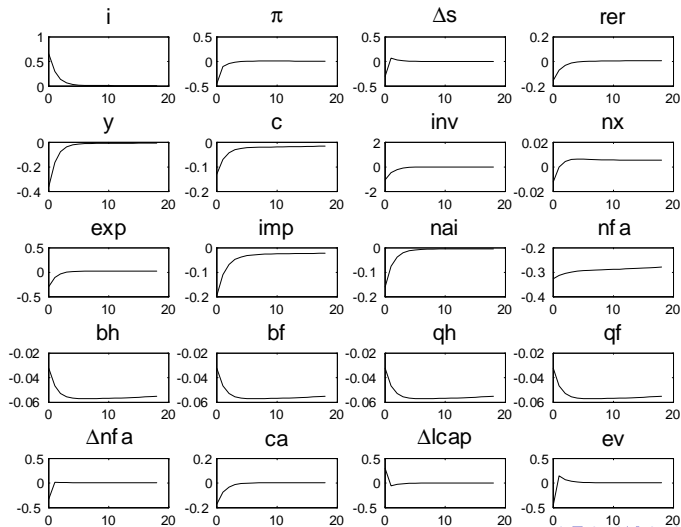
Scenario with lower ERPT



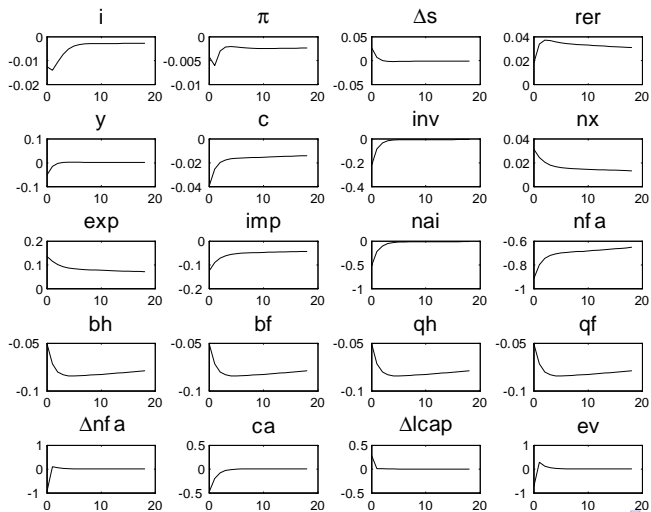
7) Decrease in ERPT plus Decrease in Costs plus Increase in GFA



Scenario with lower ERPT plus Lower Costs plus Higher GFA



8) Decrease in ERPT plus "trade integration" plus Decrease in Costs plus Increase in GFA



Scenario with lower ERPT plus lower share in traded goods sector plus Lower Costs plus Higher GFA

