No Pain, No Gain: Multinational Banks in the Business Cycle

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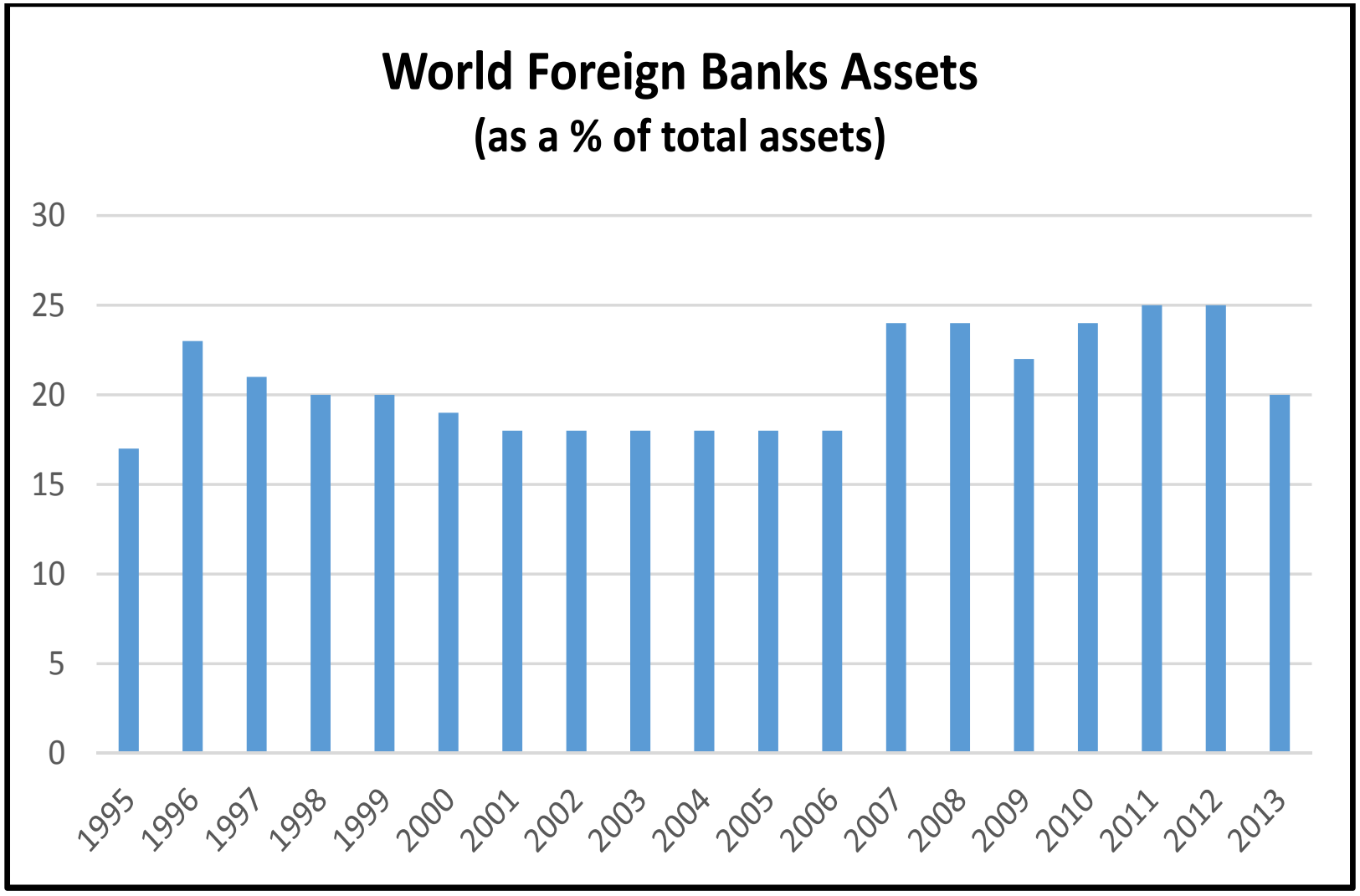
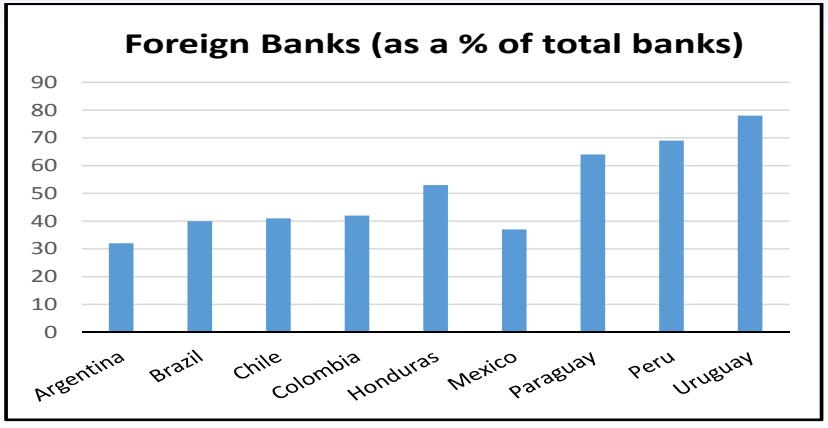
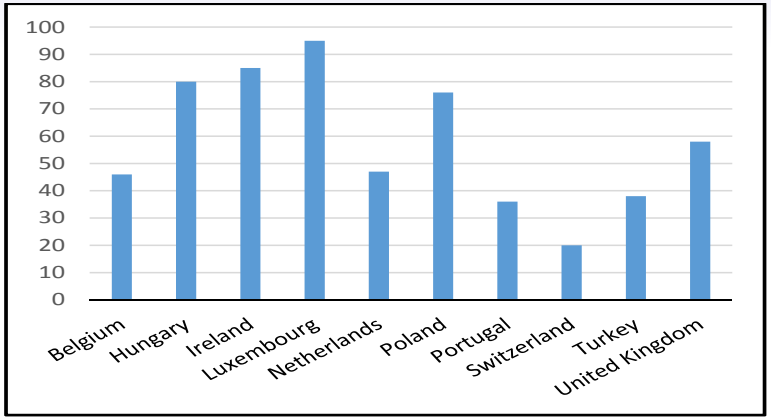
Motivation

- Multinational banks' market share growing in both advanced and developing countries
- Relatively little is established about macroeconomic impact



Source: Global Financial Development Database (GFDD), The World Bank.


Foreign Banks (as a % of total banks)
90
80
70
60
50
40
30
20
10
0
Argentina
Brazil
Chile
Colombia
Honduras
Mexico
Paraguay
Peru
Uruguay


100
90
80
70
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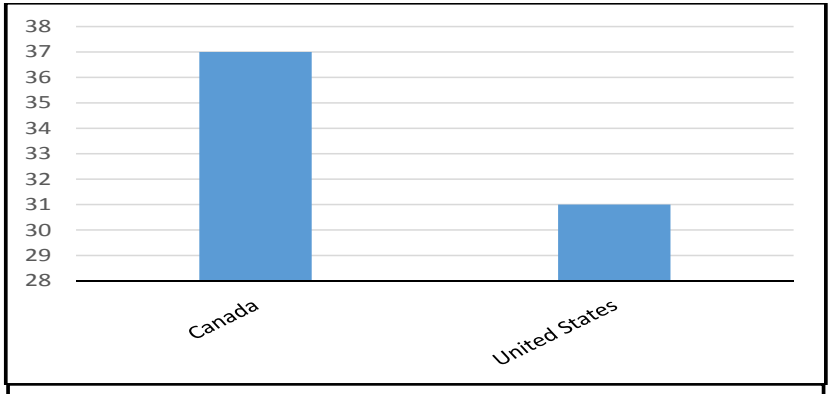
10
0
Belgium
Hungary
Ireland
Luxembourg
Netherlands
Poland
Portugal
Switzerland
Turkey
United Kingdom


38
37
36
35
34
33
32
31
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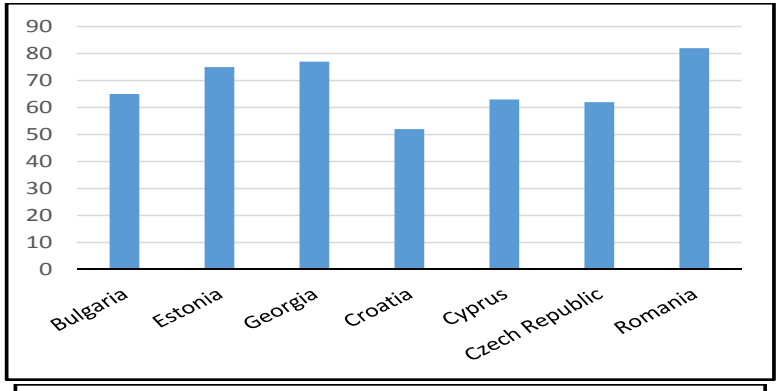
29
28
Canada
United States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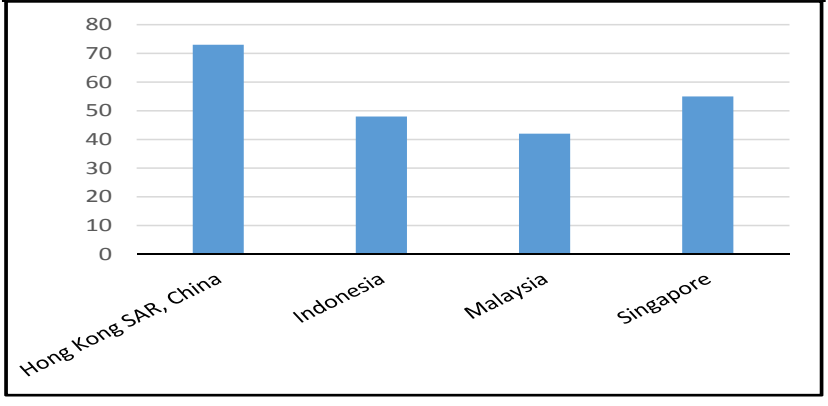
Bulgaria
Estonia
Georgia
Croatia
Cyprus
Czech Republic
Romania


80
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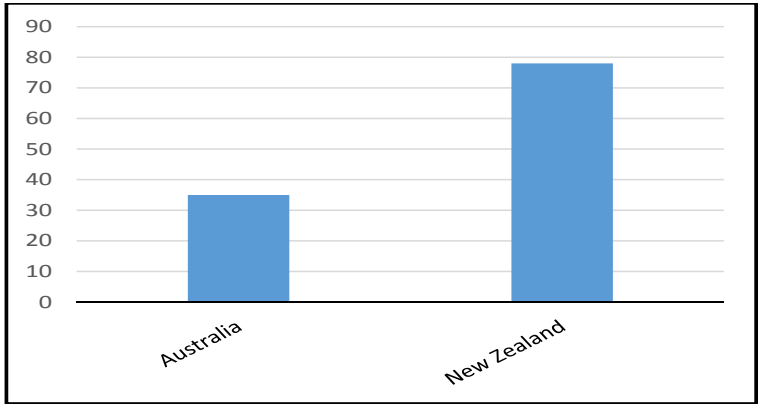
0
Hong Kong SAR, China
Indonesia
Malaysia
Singapore


90
80
70
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30
20
10
0
Australia
New Zealand

Motivation

Micro Evidence

Empirical *micro-level* studies:
i) Multinational banks *deep pockets of liquidity*, exploit internal capital markets (Cetorelli and Goldberg, JIE 2012; De Haas and Van Horen, RFS 2013);

ii) Multinational banks *less experienced at allocating liquidity to local* businesses in host countries, especially small and informationally opaque firms (Diamond and Rajan, JME 2001; Giannetti and Ongena, Review of Finance, 2009)

Motivation

Macro Evidence

Trade-off echoed in ambiguous *macro-level* empirical findings.

Little consensus whether multinational banks are amplifiers (destabilizers) or buffers (stabilizers) of aggregate shocks

Motivation

- *The "Liquidity Origination" Advantage:* Subsidiaries and branches of multinational banks in host countries get support from parents in home country (internal capital markets) $\rightarrow$ stabilizing force

- *The "Liquidity Allocation" Disadvantage:* Multinational banks are less efficient than domestic banks at monitoring, assessing collateral of local firms. They allocate their more abundant liquidity only to selected firms/sectors $\rightarrow$ destabilizing force

Model

Environment: players

- Two-country economy: home and foreign
- Representative households
  - Bankers and workers (perfect risk-sharing)
- Entrepreneurs (goods producers)
- Capital producers

Model

Environment: preferences

- Households' preferences (GHH)

$$\mathbb{E}\sum_{t=0}^{\infty}\beta^t\frac{\left(C_t-\frac{H_t^{1+\epsilon}}{1+\epsilon}\right)^{1-\gamma}-1}{1-\gamma},\qquad \mathbb{E}\sum_{t=0}^{\infty}\beta^t\frac{\left(C_t^*-\frac{H_t^{*,1+\epsilon}}{1+\epsilon}\right)^{1-\gamma}-1}{1-\gamma}$$

- Entrepreneurs' preferences

$$\mathbb{E}\sum_{t=0}^{\infty}\beta_e^t\frac{\left(C_t^e\right)^{1-\gamma_e}-1}{1-\gamma_e},\qquad \mathbb{E}\sum_{t=0}^{\infty}\beta_e^t\frac{\left(C_t^{e,*}\right)^{1-\gamma_e}-1}{1-\gamma_e}$$

Assume $\beta_e<\beta$ to induce borrowing in equilibrium

Model

Environment:technology

- Production of consumption goods:

$$Y_t = A_t K_{t-1}^{\alpha} H_t^{1-\alpha},$$

- Capital-good producers: use $I_t \left[1 + f\left(\frac{I_t}{I_{t-1}}\right)\right]$ units of consumption goods to produce I_t units of capital goods.
- Capital accumulation:

$$K_t = (1-\delta)K_{t-1} + I_t$$

Bankers

- Bankers in the home country operate two types of banks.
  - Local banks: takes deposits from home-country households and extend loans to home-country entrepreneurs.
  - Global banks: a parent operating in the home (domestic) country and an affiliate operating in the host (foreign) country.
- All the bankers in the foreign country operate local banks.

Global banks vs local banks

- Internal Capital Markets: Global banks can make transfers between the parent and the foreign affiliate subject to a cost.
- Collateral Technology: Global and local banks differ in their technology to liquidate collaterals pledged by entrepreneurs.

Foreign affiliates' problem

$$V_t^{g,*} \equiv \max_{\{X_{t+j}^{g,*}, D_{t+j}^{g,*}\}_{j\geq 0}} \quad \mathbb{E}_t \sum_{j=0}^{\infty} (1-\sigma)\sigma^j \Lambda_{t,t+j+1} N_{t+j+1}^{g,*}$$

$$\text{s.t.} \quad X_t^{g,*} = N_t^{g,*} + Z_t^{g,*} + D_t^{g,*} \qquad [\lambda_t^{g,*}]$$

$$R_t^{D,*} D_t^{g,*} + \theta Z_t^{g,*} \leq \xi \left[(1-\phi) R_t^{X,g,*} X_t^{g,*} + \phi R_t^{X,g} X_t^g \right] \qquad [\mu_t^{g,*}]$$

- $N_{t+1}^{g,*} = R_t^{X,g,*} X_t^{g,*} - R_t^{D,*} D_t^{g,*}$ is bank net worth.
- Foreign affiliates take as given the transfers they receive $Z_t^{g,*}$.
- ξ is the overall tightness of the constraint. ϕ is the consolidation parameter.

Parent banks' problem

$$\max_{\{Z^g_{t+j}, Z^{g,*}_{t+j}, X^g_{t+j}, D^g_{t+j}\}_{j\geq 0}} \quad \mathbb{E}_t \sum_{j=0}^{\infty} (1-\sigma)\sigma^j \Lambda_{t,t+j+1} N^g_{t+j+1} + V^{g,*}_t,$$

$$\text{s.t.} \quad Z^g_t + Z^{g,*}_t = 0 \qquad [\gamma^g_t]$$

$$X^g_t = N^g_t + Z^g_t - \frac{\psi}{2}\left(Z^g_t - \bar{Z}^g\right)^2 + D^g_t \qquad [\lambda^g_t]$$

$$R^D_t D^g_t + \theta Z^g_t \leq \xi \left[(1-\phi) R^{X,g}_t X^g_t + \phi R^{X,g,*}_t X^{g,*}_t\right] \qquad [\mu^g_t]$$

Local banks' problem

$$V_t^l \equiv \max_{\{X_{t+j}^l, D_{t+j}^l\}_{j\geq 0}} \quad \mathbb{E}_t \sum_{j=0}^{\infty} (1-\sigma)\sigma^j \Lambda_{t,t+j+1} N_{t+j+1}^l,$$

$$\begin{aligned} \text{s.t.} \quad & X_t^l = N_t^l + D_t^l, && [\lambda_t^l] \\ & R_t^D D_t^l \leq \xi R_t^{X,l} X_t^l, && [\mu_t^l] \end{aligned}$$

Entrepreneurs' problem

- Entrepreneurs take collateralized loans from global banks and local banks that operate in the their country.

- Liquidation technologies in the case of default
  - Local banks can liquidate a fraction κ^l of the collateral.
  - Global banks can liquidate a fraction $\kappa^g > \kappa^l$ of the collateral, but they also incur a convex liquidation cost.

Entrepreneurs' problem

$$\max_{\{H_{t+j}, C^e_{t+j}, K_{t+j}, X^g_{t+j}, X^l_{t+j}, f_{t+j}\}_{j\geq 0}} \quad \mathbb{E}_t \sum_{j=0}^{\infty} \beta_e^j \frac{\left(C^e_{t+j}\right)^{1-\gamma_e} - 1}{1-\gamma_e}$$

s.t. $$C^e_t + Q_t K_t + R^{X,g}_{t-1} X^g_{t-1} + R^{X,l}_{t-1} X^l_{t-1}$$
$$= X^g_t + X^l_t + Y_t - W_t H_t + (1-\delta) Q_t K_{t-1},$$

$$R^{X,g}_t X^g_t \leq \kappa^g \left[(1-f_t) Q_t K_t - \frac{\nu}{2\bar{Q}\bar{K}} (1-f_t)^2 Q_t^2 K_t^2 \right], \quad [\omega^g_t]$$

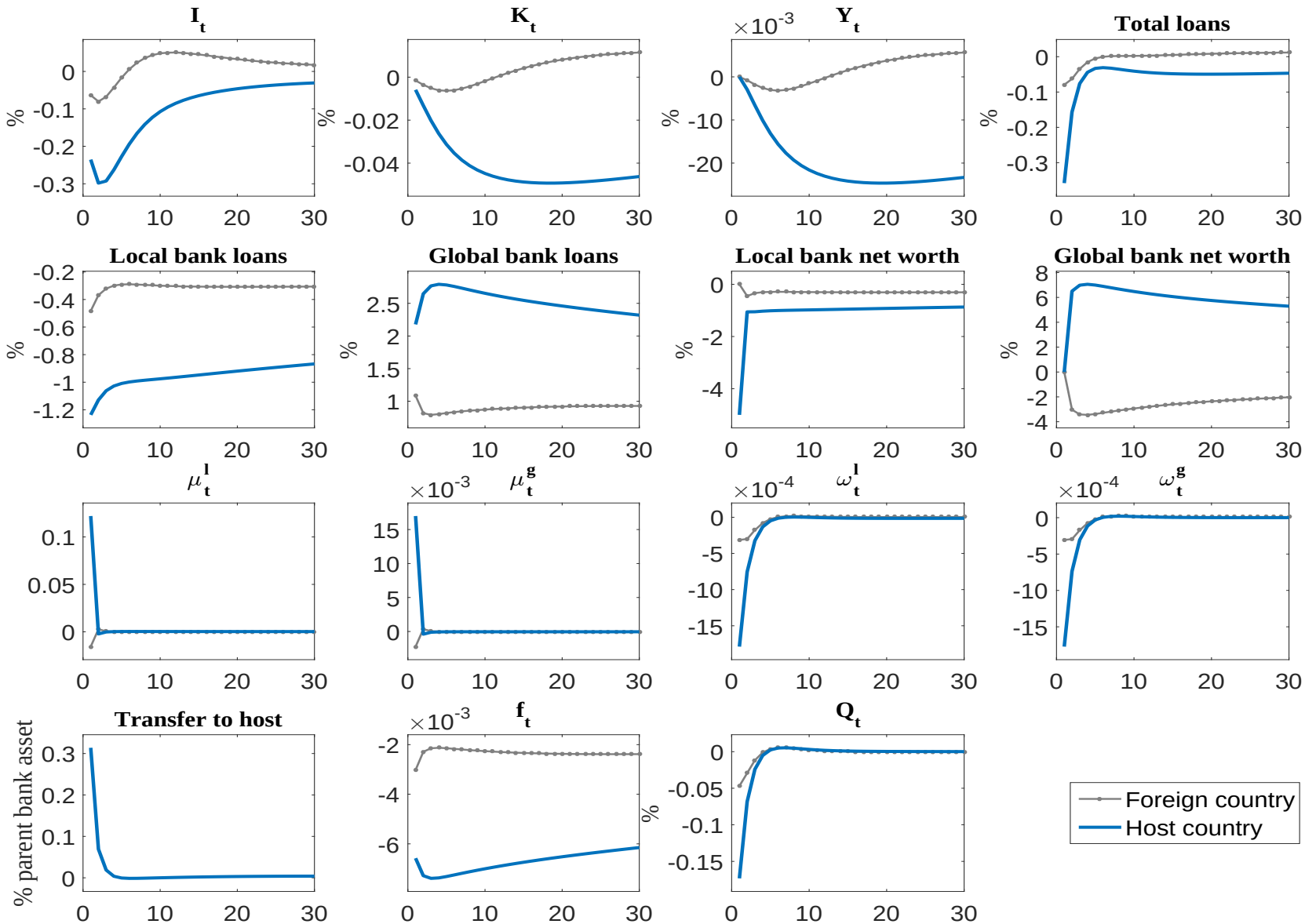
$$R^{X,l}_t X^l_t \leq \kappa^l (f_t Q_t K_t) \quad [\omega^l_t]$$

Calibration

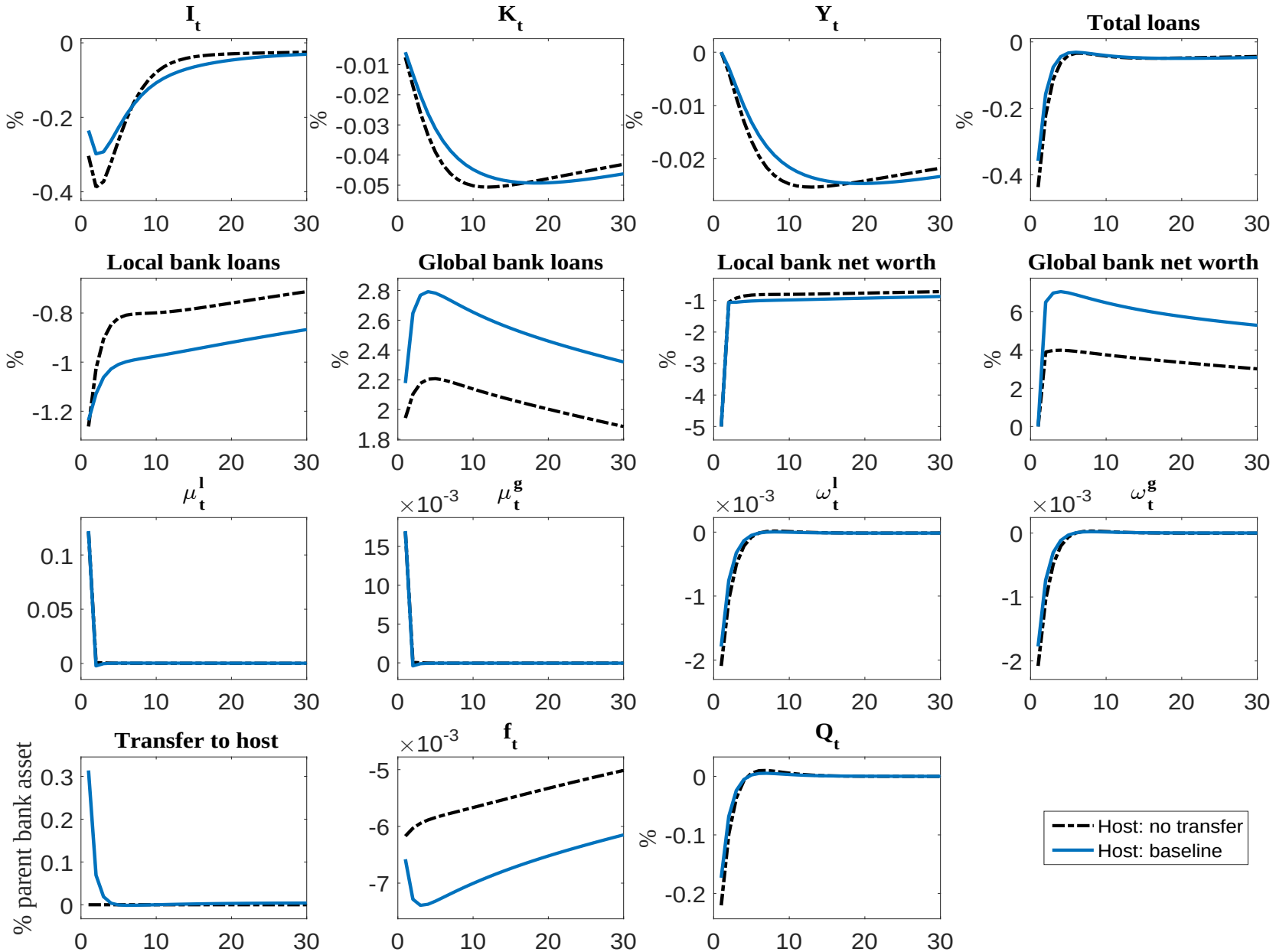
		Value	Target/Source
Preferences			
Household discount factor	β	0.990	
Household CRRA	γ	2.000	
Inverse Frisch elasticity	ϵ	1.000	
Entrepreneur discount factor	β_e	0.980	
Entrepreneur CRRA	γ_e	0.000	
Technology			
Capital share of output	α	0.330	
Capital depreciation	δ	0.025	
Investment adjustment cost	$f''(1)$	1.000	Gertler et al. (2012)
Bankers			
% bank asset as collateral	ξ	0.880	Leverage=8.33
Weight of foreign assets in constraint	ϕ	0.400	
Adjustment cost to transfers	ψ	0.100	
Weight on transfers in the constraint	θ	0.600	
% assets liquidated by local banks	κ^l	0.600	Loan-to-Value 60%
% assets liquidated by global banks	κ^g	0.650	
Cost of global bank liquidation	ν	0.308	$\bar{X}^G/\bar{X}^L = 1/3$
% assets brought by new bankers	ζ	$1.358e-04$	
Probability of surviving bankers	σ	0.969	Gertler et al. (2012)

Results

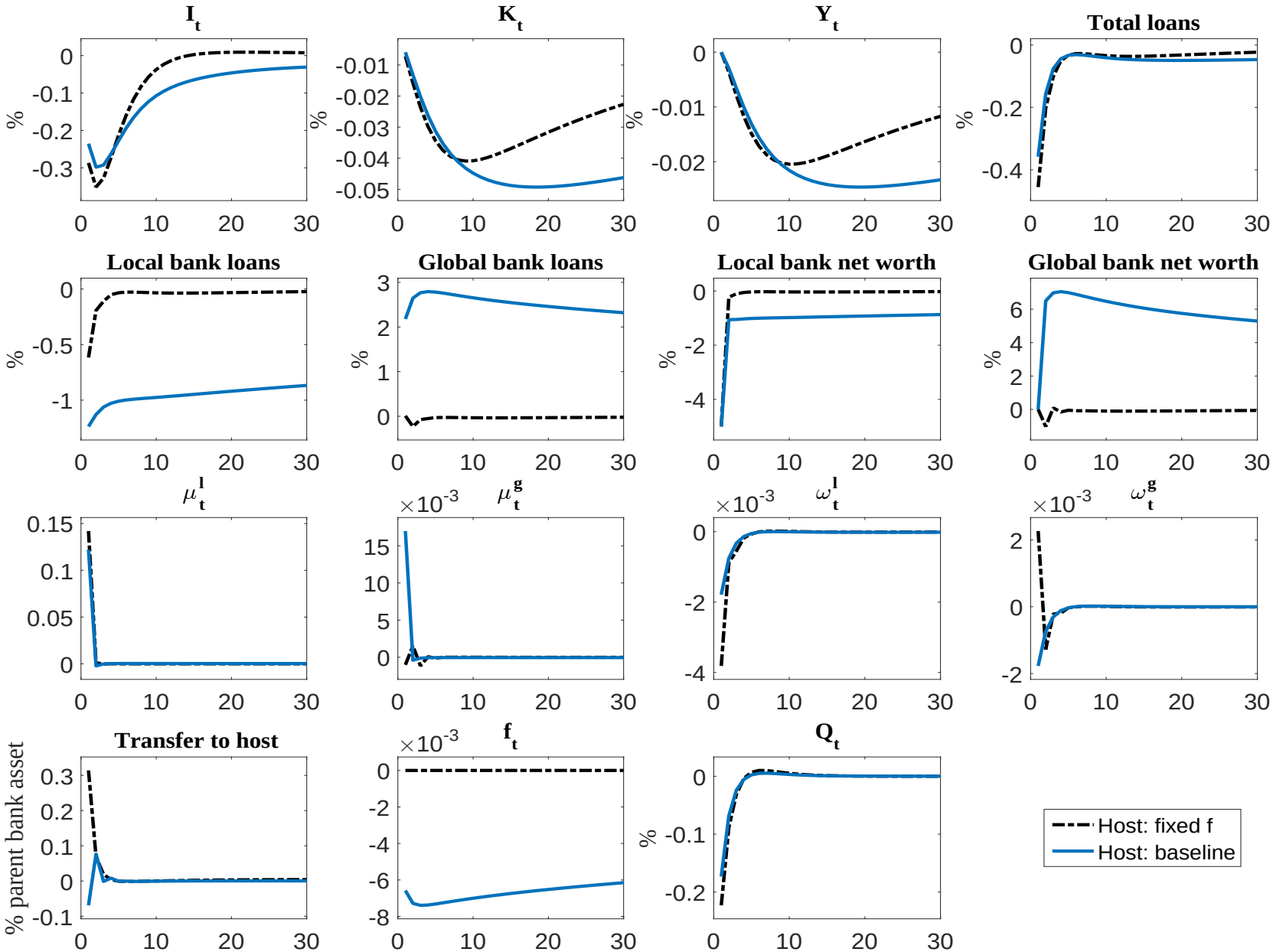
IRF to a 5% negative shock to the foreign local bank net worth



Benchmark: No Transfers



Benchmark: Fixed Collateral Allocation

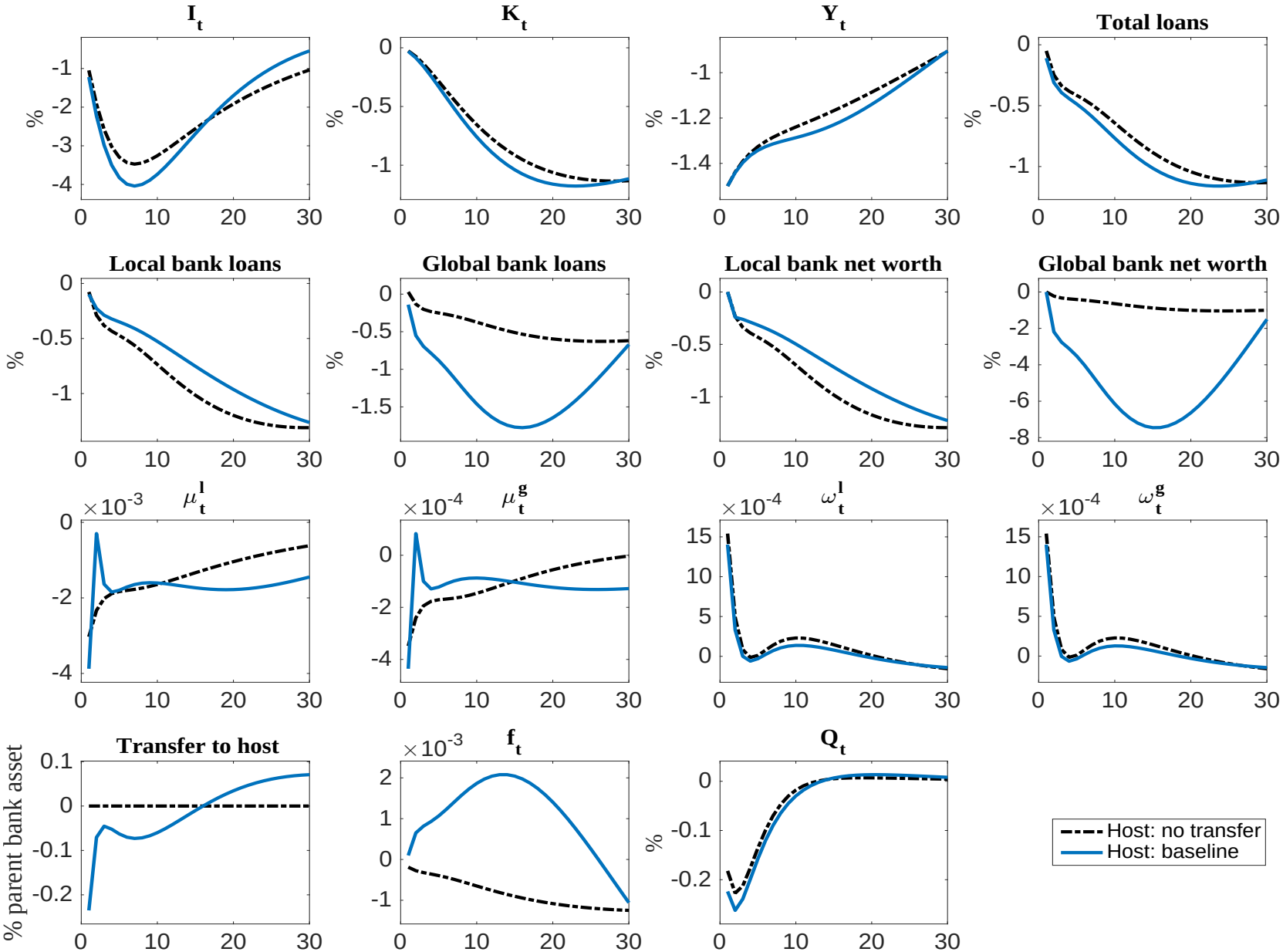


Short-Run vs Long-Run Effects

	8 Q	16 Q	28 Q	first quarter
Investment	-1.817	-2.500	-3.003	
Output	-0.085	-0.269	-0.561	
No transfer				
Investment	-2.140	-2.596	-2.937	7
Output	-0.106	-0.306	-0.589	18
Fix f				
Investment	-1.808	-1.938	-1.836	5
Output	-0.094	-0.252	-0.433	9

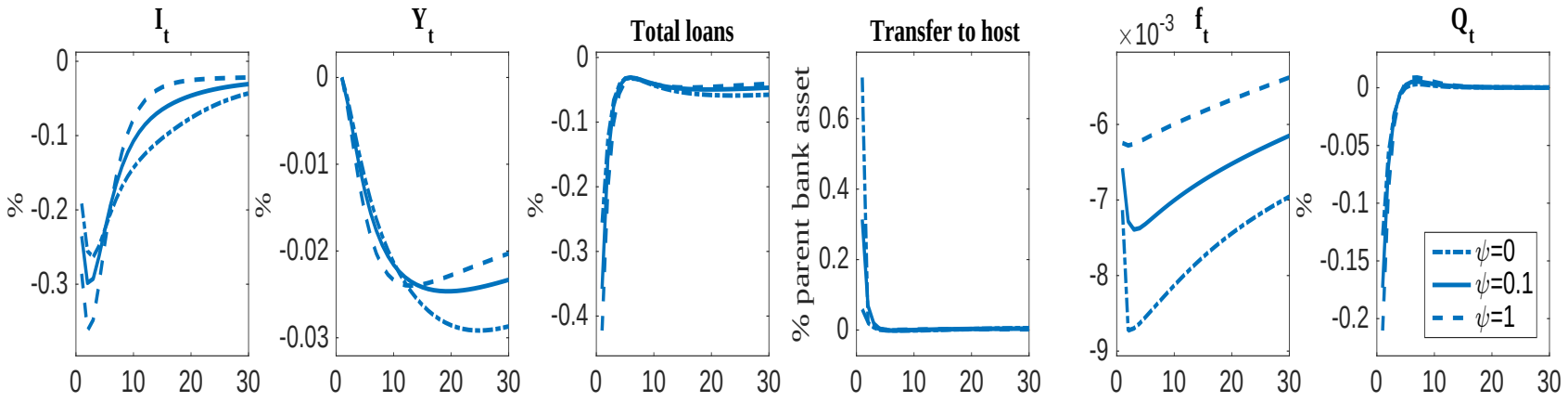
Note: the first three columns show the cumulative percentage change. The last column shows the first quarter in which the difference between the full model and the benchmark flips sign.

TFP Shock in Host Country



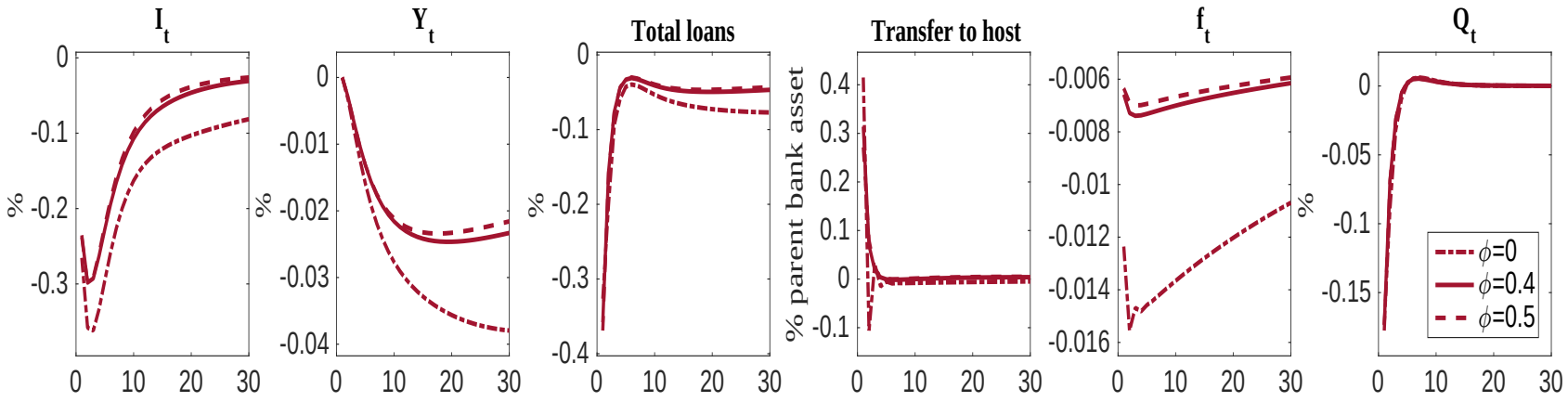
Structural Features

Cost of Transfers in Internal Capital Markets



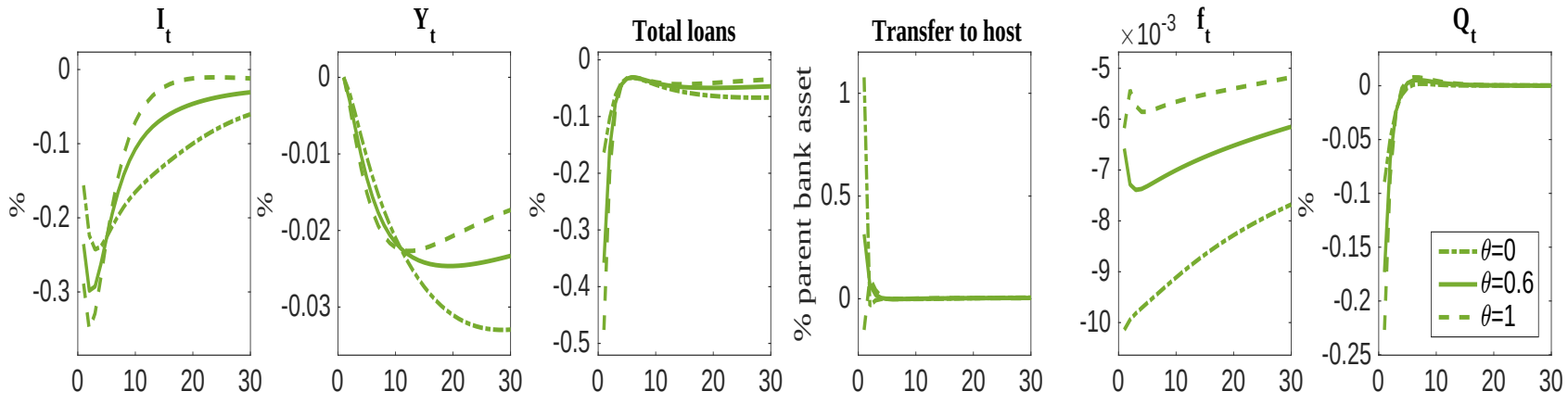
Structural Features

Consolidation of banks' balance sheets



Structural Features

Role of Transfers in the Collateral Constraint



Cyclical policies

- Policies that adjust the loan-to-value ratio of the host-country's firms borrowing from multinational banks:

$$\tilde{\kappa}_t^g = \chi \tilde{Y}_t$$

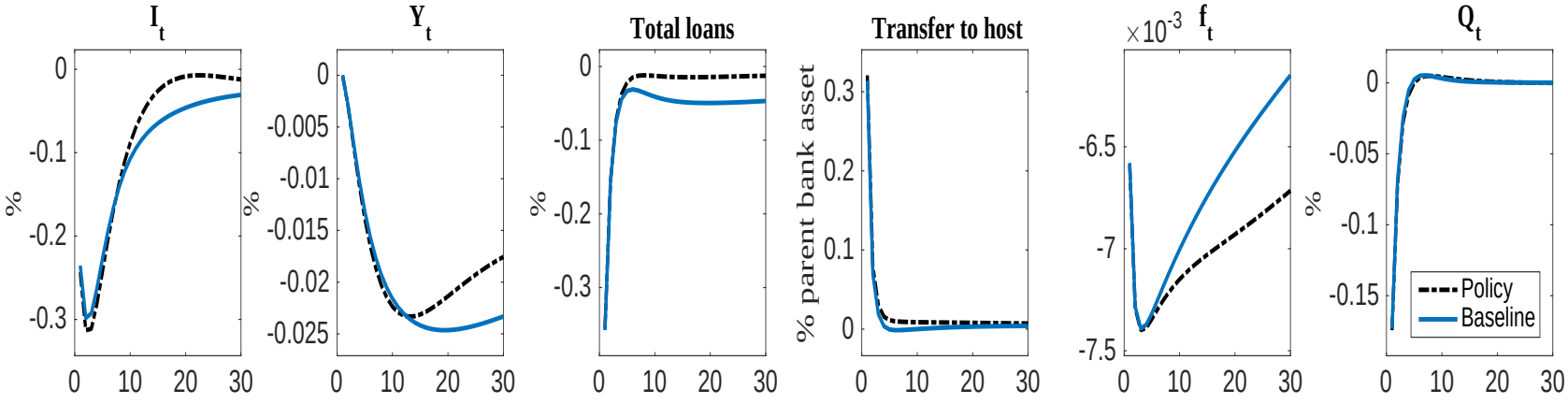


Figure: Countercyclical policy ($\chi = -5$). IRF to a negative 5% local bank net worth shock in the host country

Cyclical policies

- Policies that adjust the loan-to-value ratios of the host-country's firms borrowing from both multinational and local banks:

$$\tilde{\kappa}_t^g = \chi \tilde{Y}_t, \quad \text{and} \quad \tilde{\kappa}_t^l = \chi \tilde{Y}_t$$

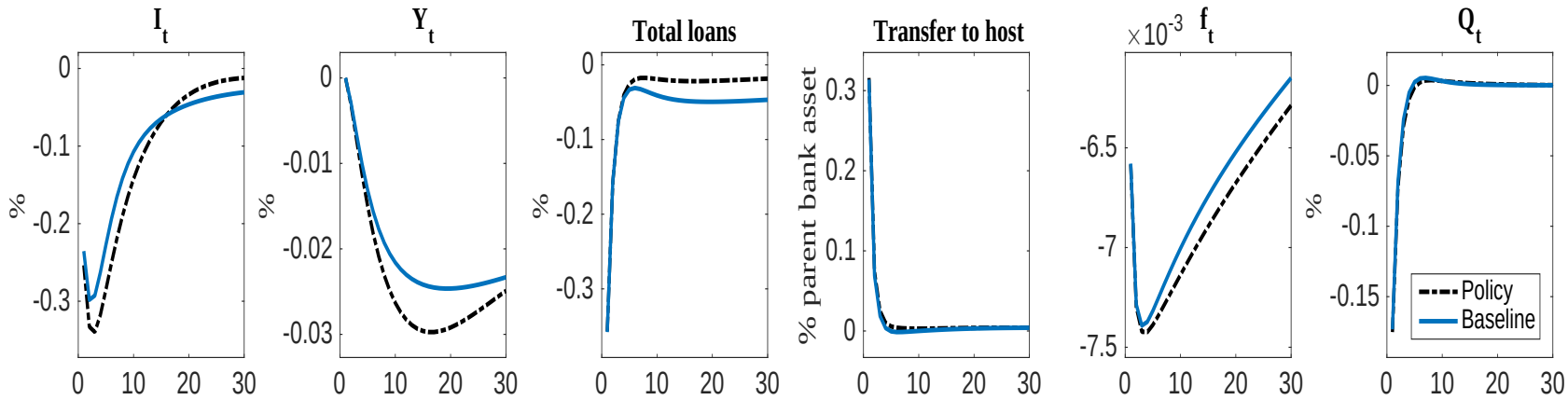


Figure: Countercyclical policy ($\chi = -1.25$). IRF to a negative 5% local bank net worth shock in the host country

In Conclusion...

i) *The "Liquidity Origination" Advantage:* multinational banks can swiftly transfer liquidity across borders, initially dampening shocks $\rightarrow$ in immediate aftermath of shocks $\rightarrow$ stabilizer for financial shocks / amplifier for TFP shocks

ii) *The "Liquidity Allocation" Disadvantage:* collateral reallocation in credit market triggers drop in average liquidation efficiency $\rightarrow$ over medium run $\rightarrow$ amplifier of financial shocks / stabilizer of TFP shocks

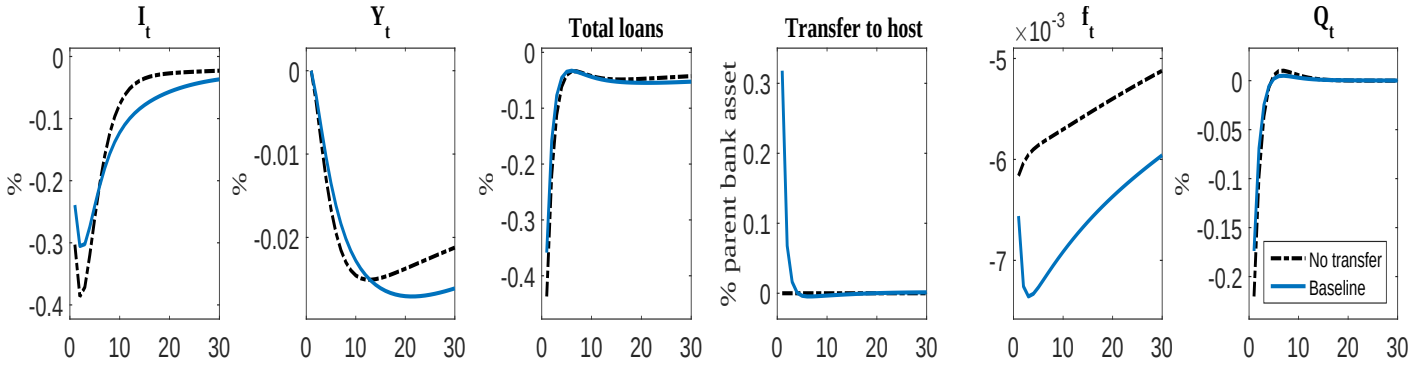
Robustness

Curvature of liquidation technology

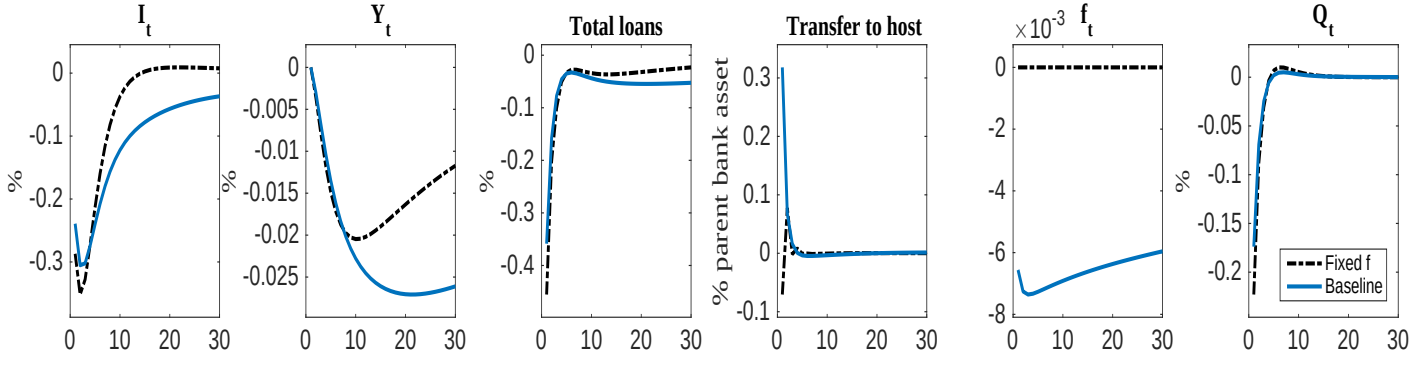
- The liquidation technology of the multinational bank in the foreign country is assumed to have less curvature: $\nu = 0.129$.
- κ^g is calibrated to 0.62 to so that local loans are three times as large as foreign loans.

Robustness

Curvature of liquidation technology



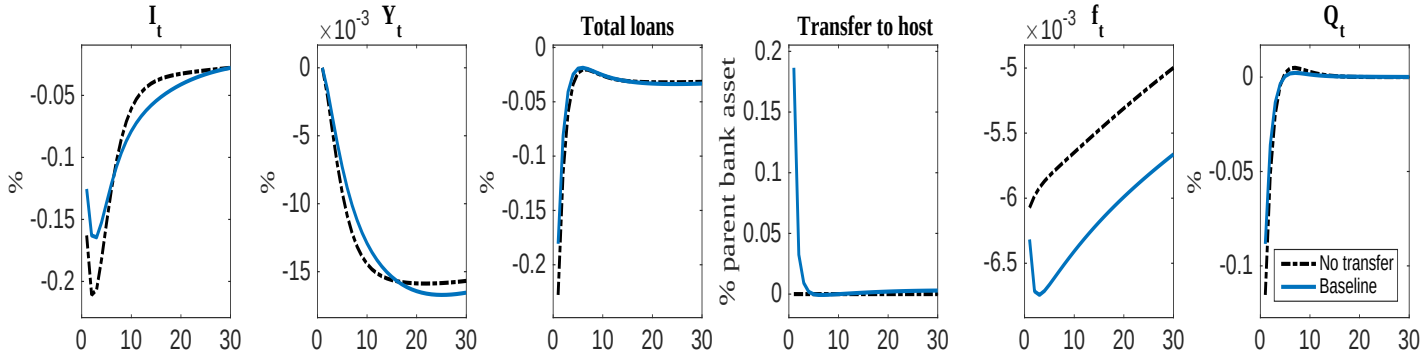
Shut down the internal capital market of multinational banks.



Shut down the collateral reallocation between local and multinational banks.

Robustness

Assume that banks transfer half net worth loss to the household and half to entrepreneurs



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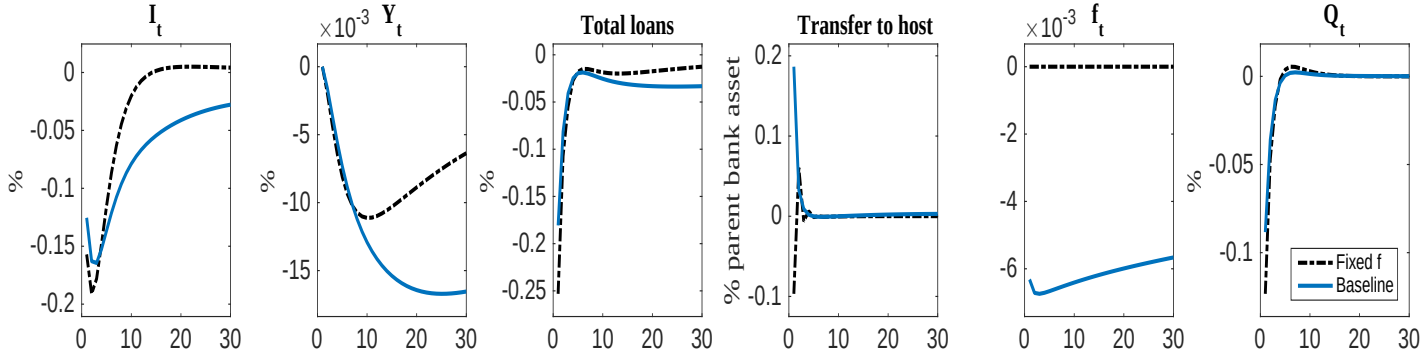

Shut down the collateral reallocation between local and multinational banks.