

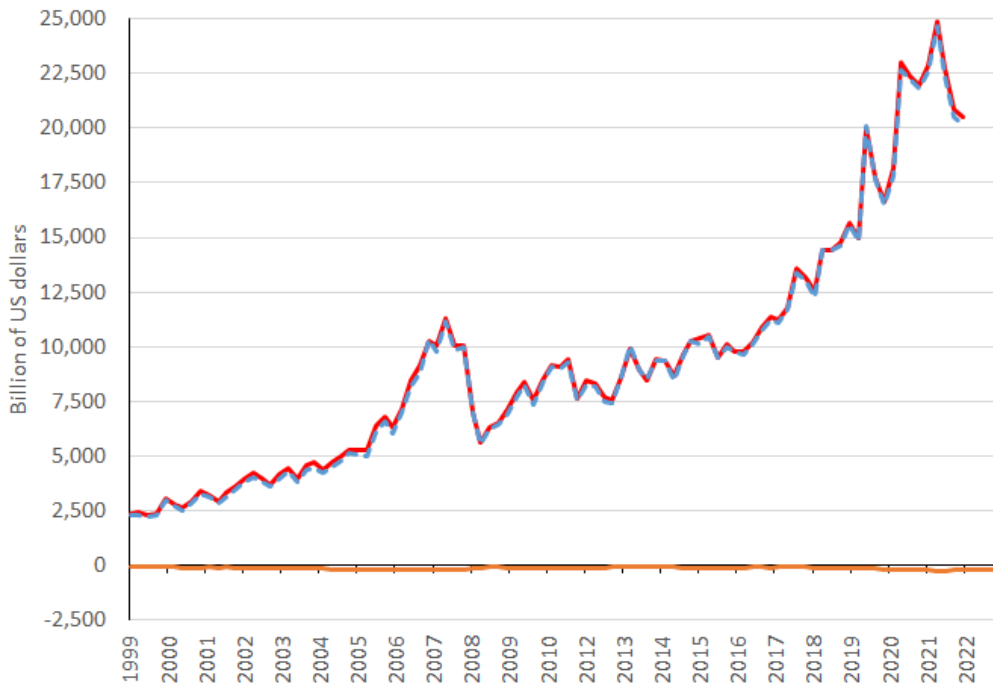
How Does International Capital Flow?

Michael Kumhof, BoE Phurichai Rungcharoenkitkul, BIS
Andrej Sokol, Bloomberg

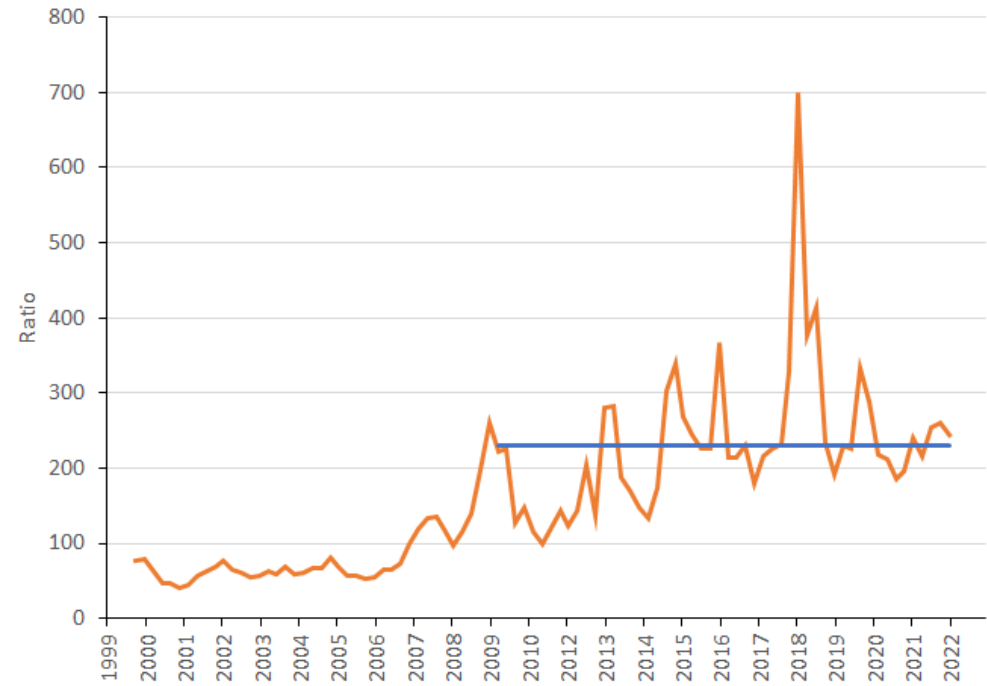
Czech National Bank Annual Conference
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1 Gross and Net Capital Flows: Data



- Gross purchases by foreigners from US residents
- - - Gross sales by foreigners to US residents
- Net purchases by foreigners from US residents (CA balance)



- Gross Flows/Net Flows
- Post-GFC Average

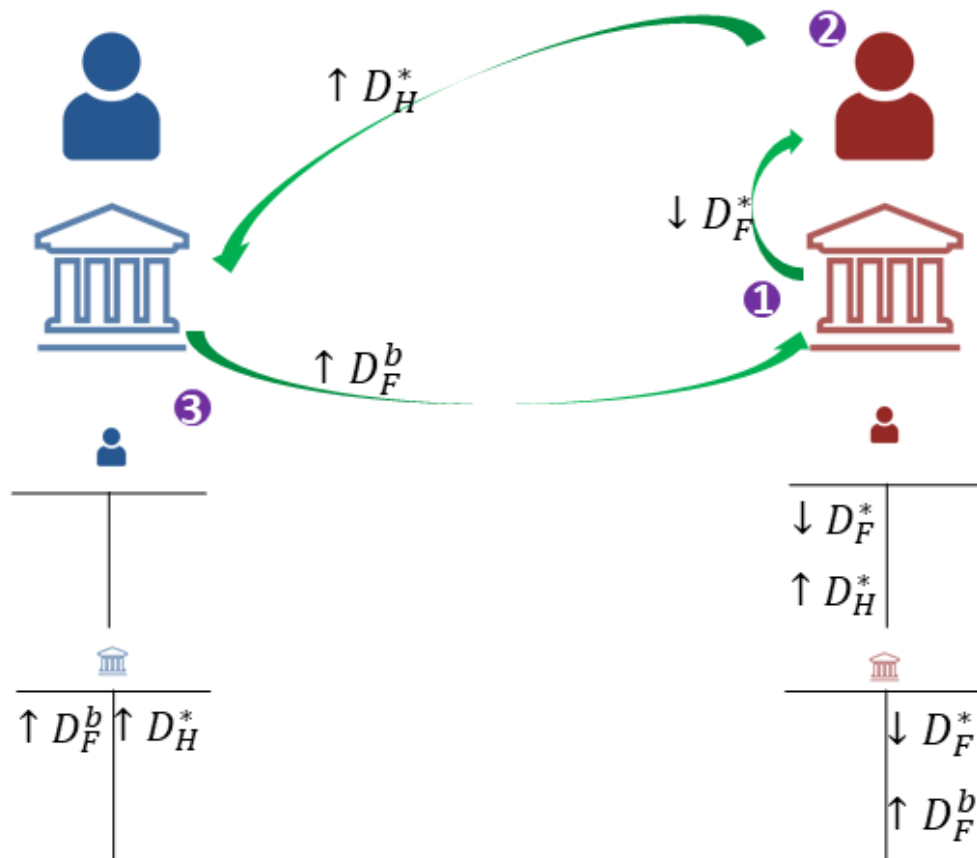
2 Gross and Net Capital Flows: Economics

- Renewed interest in gross capital flows and stocks (Obstfeld, Shin).
- Empirical work can use much better data now (BIS, IMF).
- Analytical frameworks (and as a result policy discussions) still lag behind:
 - Mostly still rely on net capital flow frameworks. Only capital flows:
 - * **Payment flows (goods against assets)** = tiny fraction of gross flows.
 - Net flows reflect the global pattern of goods production and goods trade.
- This paper proposes an updated analytical framework:
 - Gross + net capital flow framework:
 - * **Payment flows (goods against assets)** = tiny fraction of gross flows.
 - * **Financial flows (assets against assets)** = vast majority of gross flows.
 - Gross flows reflect the global pattern of banking and asset trade.

3 The CA, Saving, and Financing

- Saving:
 - Goods market concept: Output not consumed.
 - Foreign saving is just getting paid by foreign importers.
 - Exporting and getting paid are not separate decisions.
 - Foreign saving does not “finance the CA”.
 - **A country’s saving IS its CA – by definition.**
- Financing:
 - Financial market concept: Access to money to pay for things.
 - **The CA IS NOT a measure of a country’s financing.**
 - Money (deposits) is created by banks as a gross liability.
 - Bank financing is typically domestic rather than foreign.
 - Bank financing is by far the most important type of gross flow.

4 Gross Flows Example: Inflow into US Deposits



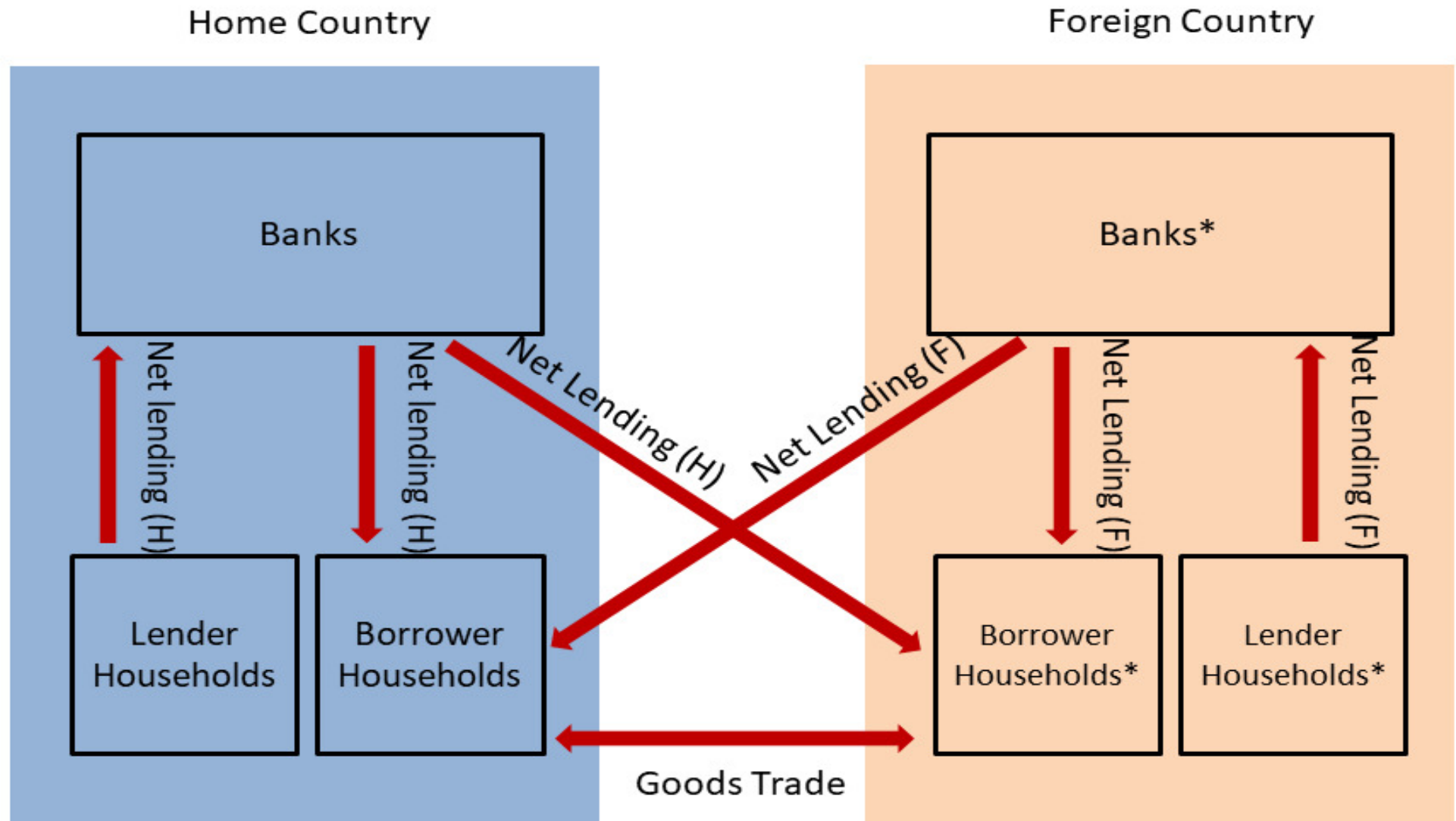
1. Euro HH deposits € check at US bank.
2. US bank does FX conversion.
3. US bank credits \$ to Euro HH's account.
4. US bank collects funds from Euro bank.
5. US bank credits its € nostro account with the Euro bank.
6. This does not finance anything.
7. Gross inflow and outflow come in a pair.
8. CA and "foreign saving" are unaffected.
9. No connection of foreign inflow and foreign financing.

5 The Model

5.1 Overview

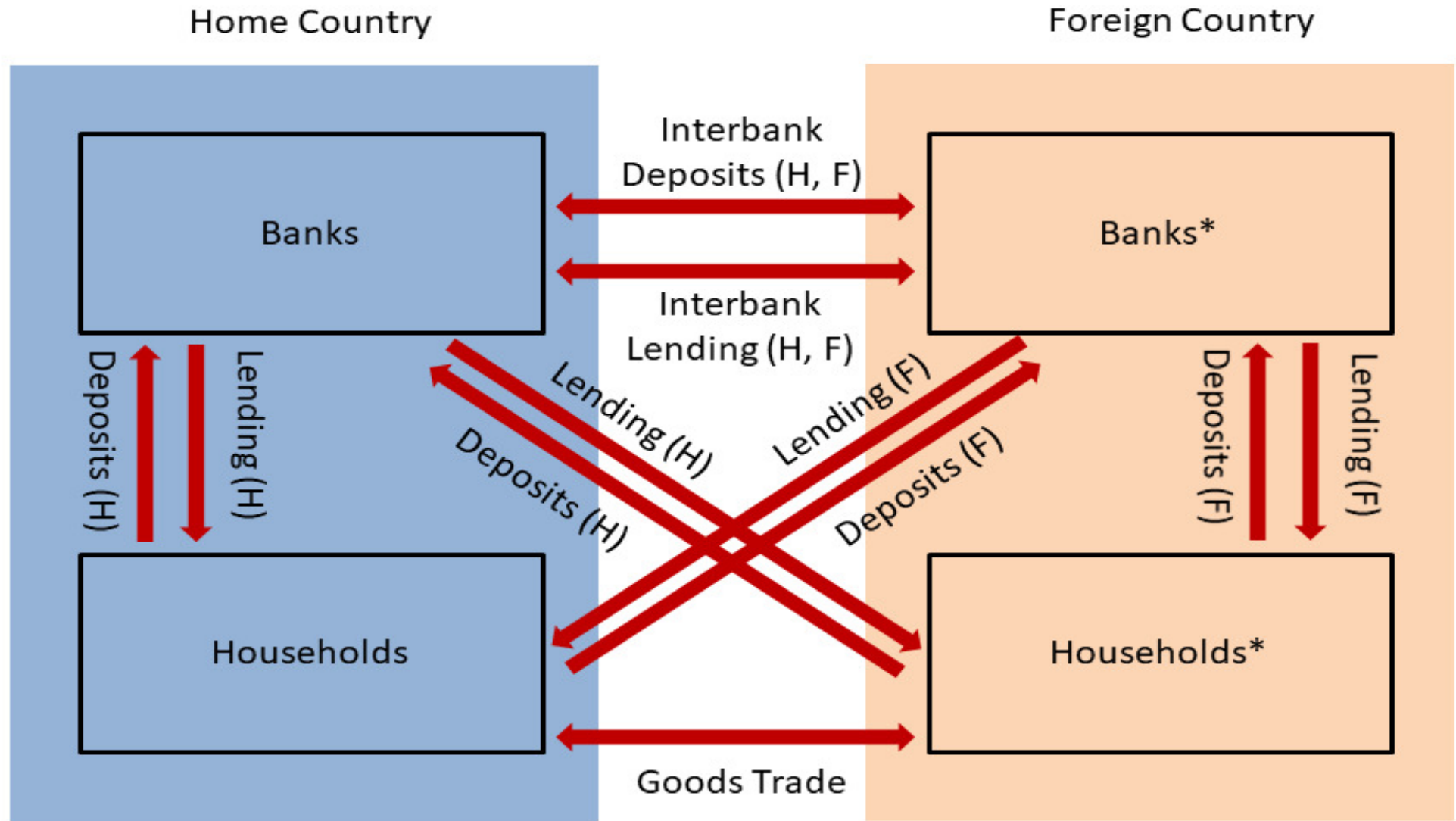
- 2-country New Keynesian DSGE.
- Financial Sector:
 - Loans create currency (deposits) s.t. regulatory costs and BGG (1999).
 - Deposits reduce transactions costs similar to SGU (2004).
 - Optimization over gross financial assets and liabilities (deposits, loans).
 - Not over net physical flows (production, consumption, loanable funds).
- Open Economy:
 - Domestic banks only issue domestic currency HH loans and deposits.
 - HHs need loans/deposits in both currencies \Rightarrow cross-border positions.

Domestic and Foreign NET Capital Flows and Goods Flows



Conventional Net Flow Model

Domestic and Foreign GROSS Capital Flows and Goods Flows



Our Model

5.2 Households

- Standard preferences:

$$\max \mathbb{E}_0 \sum_{t=0}^{\infty} \beta_{0,t} \left\{ \left(1 - \frac{\nu}{x}\right) S_t^c \log(c_t(j) - \nu c_{t-1}) - \psi \frac{h_t(j)^{1+\frac{1}{\eta}}}{1 + \frac{1}{\eta}} \right\}$$

- CES consumption aggregator:

$$c_t(j) = \left[(b^c)^{1/\theta_c} (c_{H,t}(j))^{\frac{\theta_c-1}{\theta_c}} + (1 - b^c)^{1/\theta_c} (c_{F,t}(j))^{\frac{\theta_c-1}{\theta_c}} \right]^{\frac{\theta_c}{\theta_c-1}}$$

- Money demand - transactions cost:

$$s_t^c(j) = A^c S_t^{mon} (v_t^c(j))^{\varpi} \quad , \quad v_t^c = \frac{P_t c_t(j)}{D_{liq,t}(j)}$$

- Liquidity aggregator:

$$D_{liq,t}(j) = \left[(b^d S_t^{ccy})^{1/\theta_d} (D_{H,t}^h(j))^{\frac{\theta_d-1}{\theta_d}} + (1 - b^d S_t^{ccy})^{1/\theta_d} (E_t D_{F,t}^h(j))^{\frac{\theta_d-1}{\theta_d}} \right]^{\frac{\theta_d}{\theta_d-1}}$$

Our main capital inflow shock will be to decrease home bias of foreign households

- Budget constraint:

$$\begin{aligned}
 & D_{H,t}^h(j) + E_t D_{F,t}^h(j) + Q_t k_t(j) - L_{H,t}^h(j) - E_t L_{F,t}^h(j) \\
 = & i_{dH,t-1}^h D_{H,t-1}^h(j) + E_t i_{dF,t-1}^h D_{F,t-1}^h(j) \\
 & + Ret_{k,t} Q_{t-1} k_{t-1}(j) \left(1 - \kappa_{H,t-1}^h \Gamma_{H,t}^h(j) - \kappa_{F,t-1}^{h*} \Gamma_{F,t}^{h*}(j) \right) \\
 & - P_t (1 + s_t^c(j)) c_t(j) + W_t^{hh} h_t(j) + P_t \Upsilon_t(j)
 \end{aligned}$$

- Simultaneous choice of loan and deposit gross position vis-a-vis banks.
- Critical for the modeling of gross flows.

5.3 Policy

- Monetary policy: Inflation-forecast-based interest rate rule:

$$i_t = (i_{t-1})^{m_i} (\bar{r}\bar{\pi}^p)^{1-m_i} \left(\frac{(\pi_{t+3}\pi_{t+2}\pi_{t+1}\pi_t)^{0.25}}{\bar{\pi}^p} \right)^{(1-m_i)m_\pi}$$

6 US CA Deficit = Global Saving Glut?

- Bernanke (2005): Abundant foreign saving financed the US CA deficit.
- But:
 - Saving is a physical (non-financial) concept.
 - Financing is a financial (non-physical) concept.
- **Conclusion:**
 - **Domestic HH do not finance CA deficits with physical saving provided by foreign HH.**
 - **They finance it with digital purchasing power provided by banks.**
 - **These banks are more likely to be domestic than foreign.**

Reinterpreting the "Saving Glut" from a Gross Flow Perspective

Possible Culprits

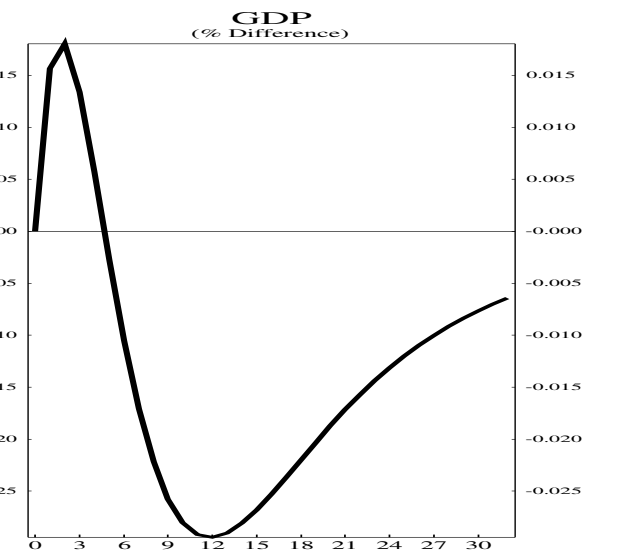
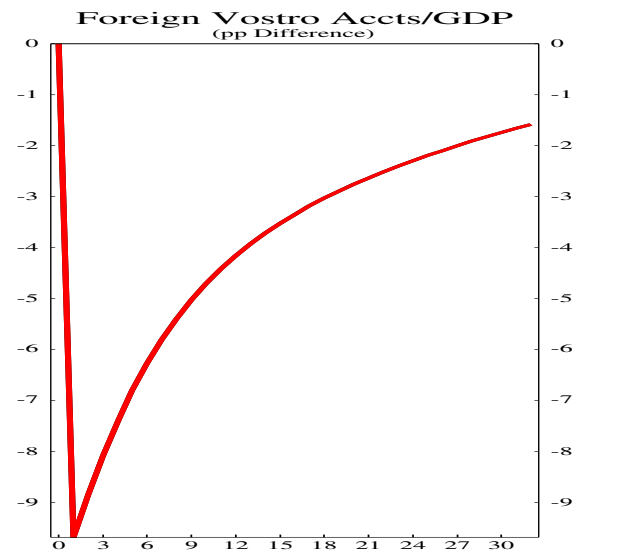
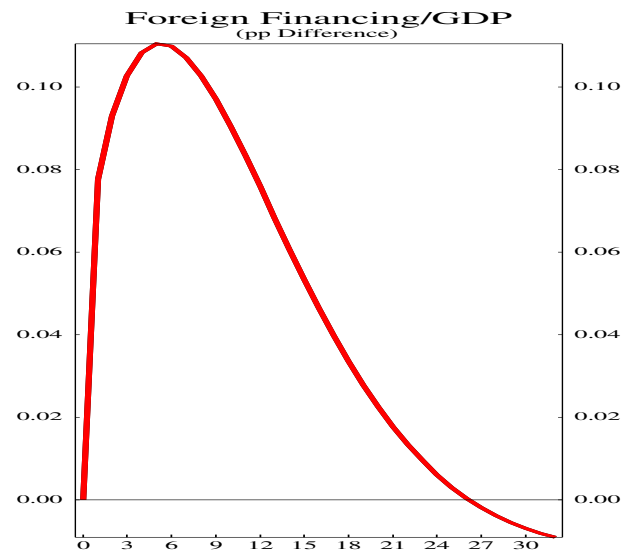
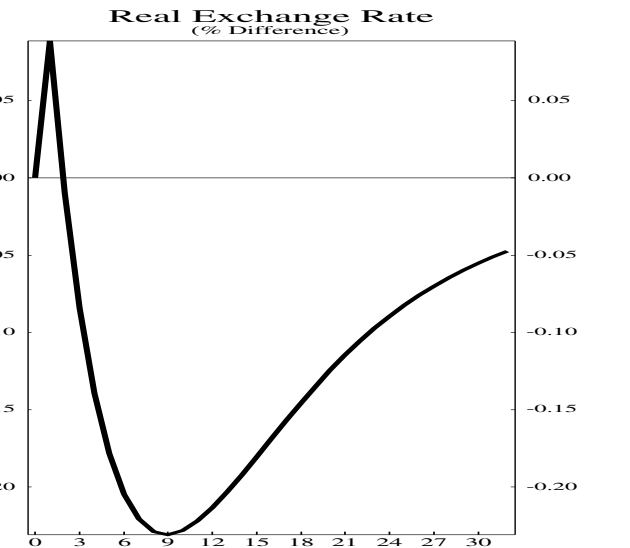
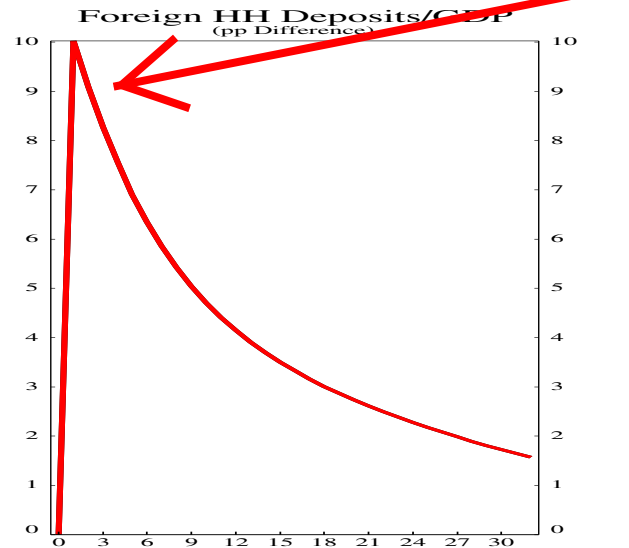
1. Foreign Real "Saving Inflow": Usual story ("patience"), omitted to save time.
2. Foreign Deposit Inflow (increase in safe **gross** asset demand): See above
3. Domestic Credit Glut (increase in safe **gross** asset supply).

1. Foreign Deposit Inflow

2. Domestic Credit Glut

Foreign Deposit Inflow

1. Shock = 10% of GDP inflow = deposit of Foreign check in Home bank

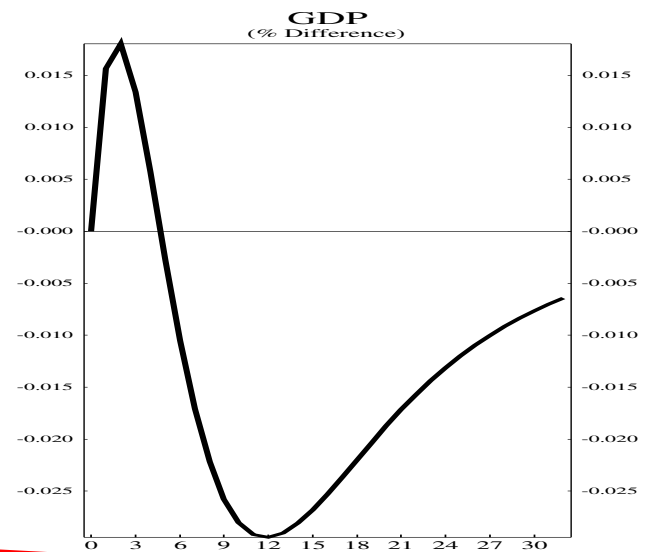
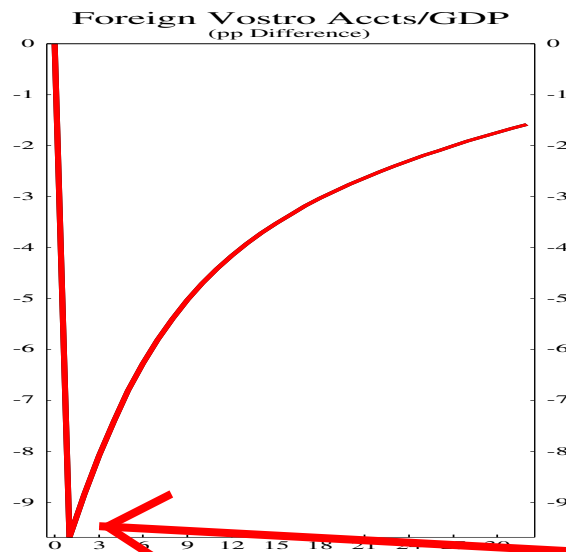
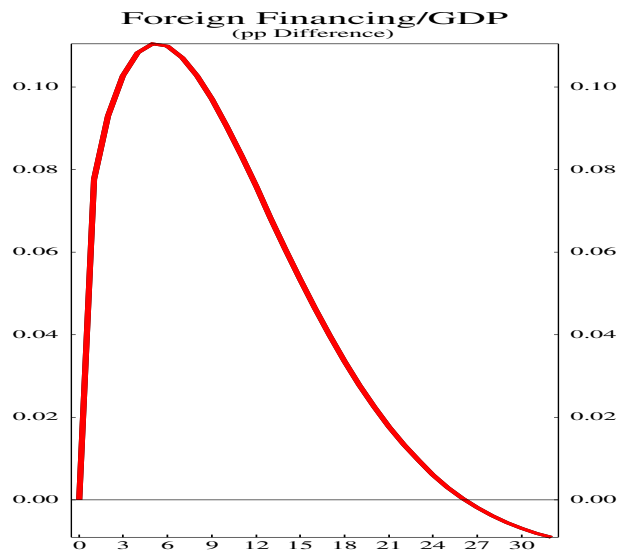
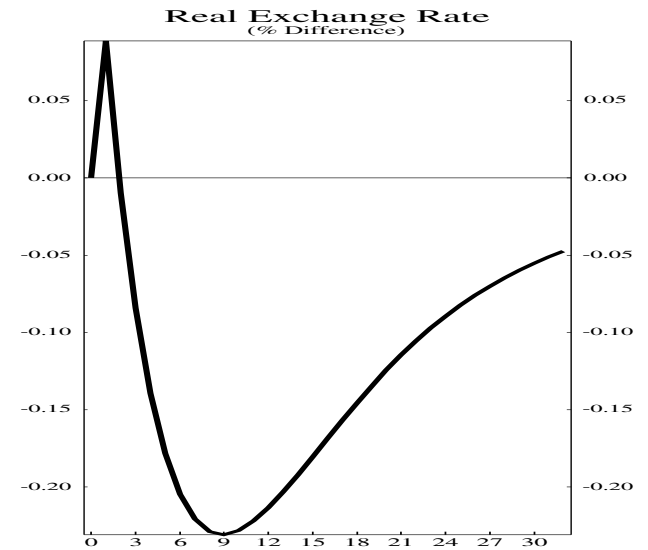
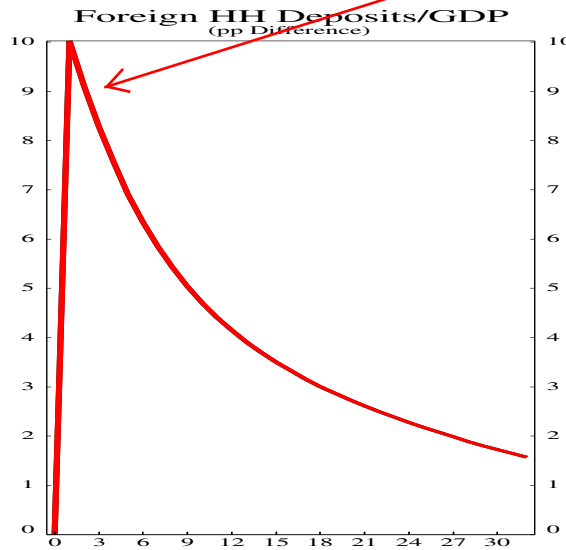


black = real variables

red = financial variables

Foreign Deposit Inflow

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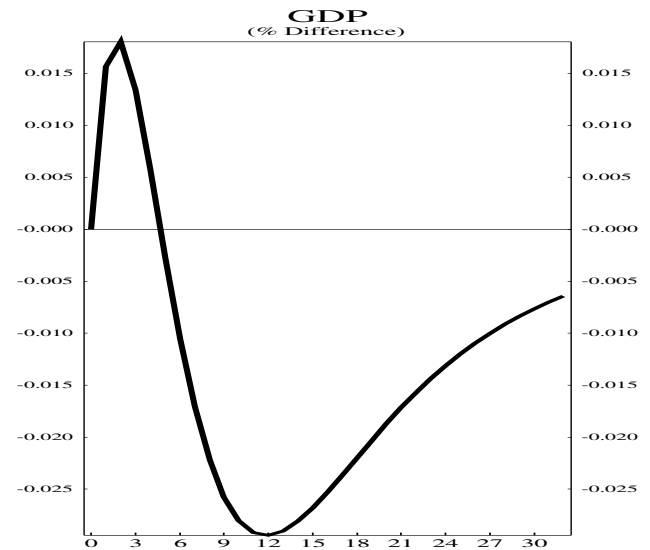
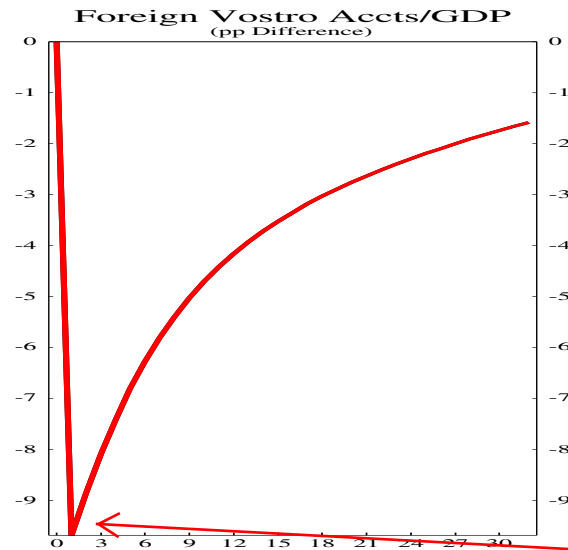
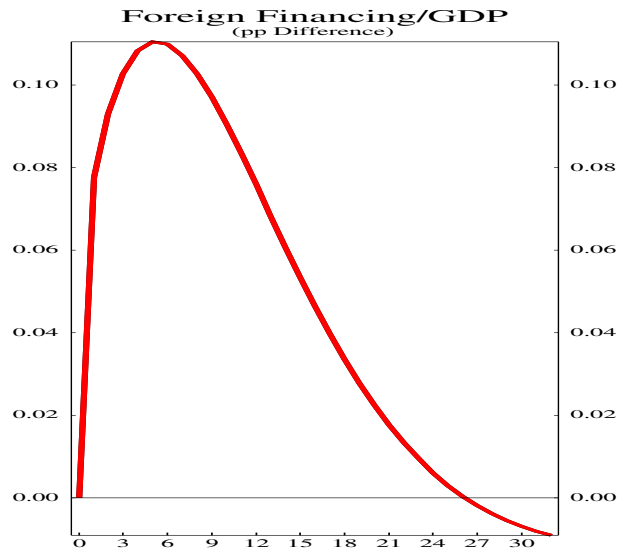
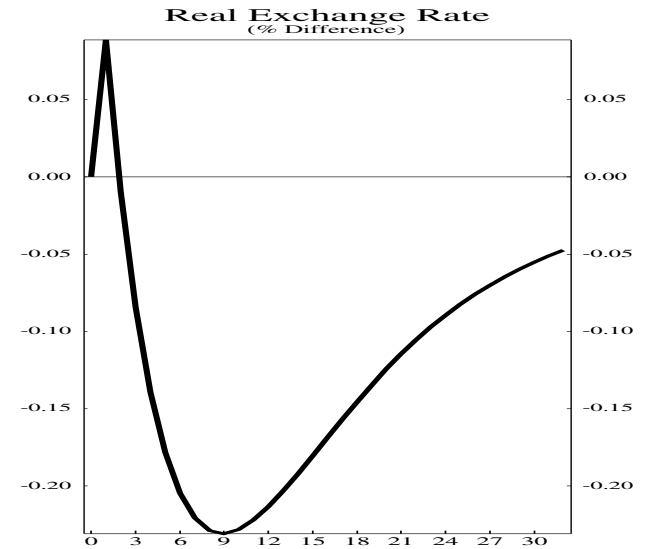
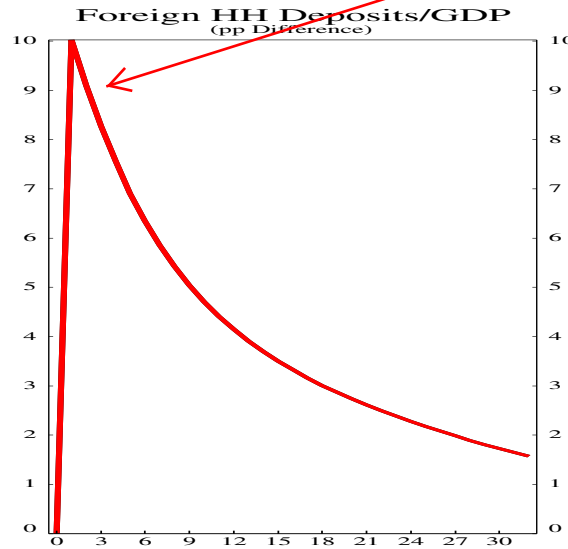
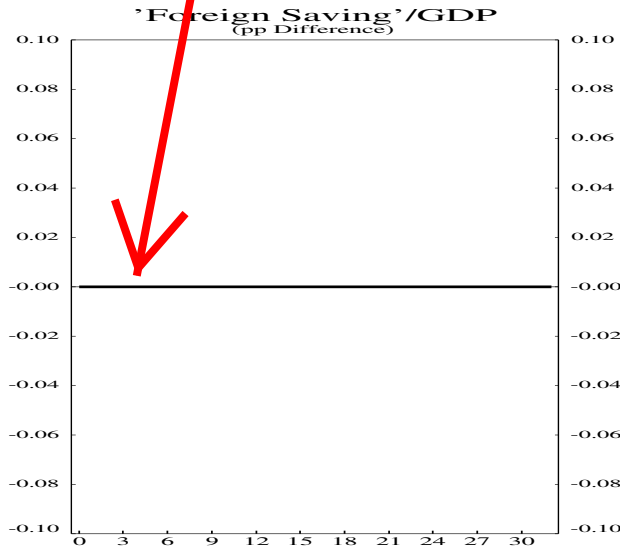


2. Check collection + settlement = drop in foreign ccy vostro account

Foreign Deposit Inflow

3. "Foreign saving" does not change at all

1. Shock = 10% of GDP inflow = deposit of Foreign check in Home bank



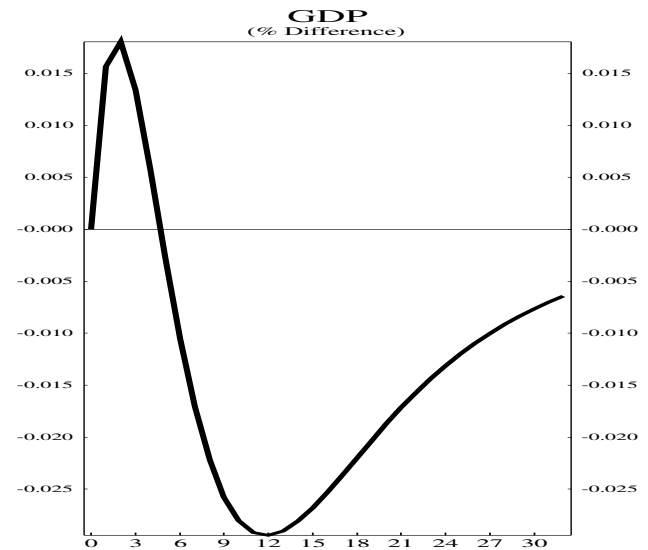
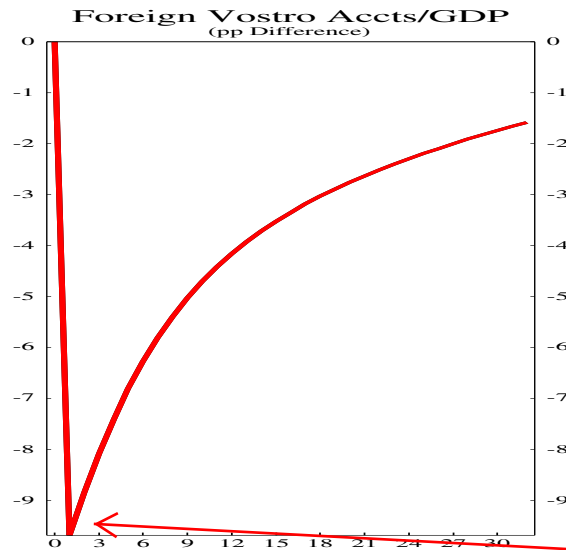
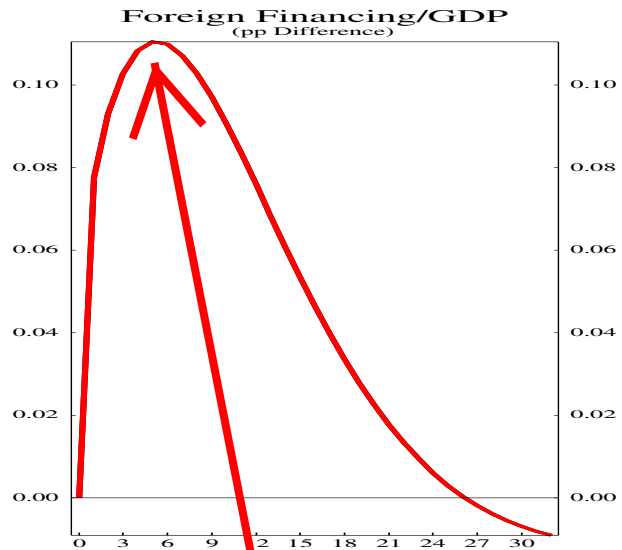
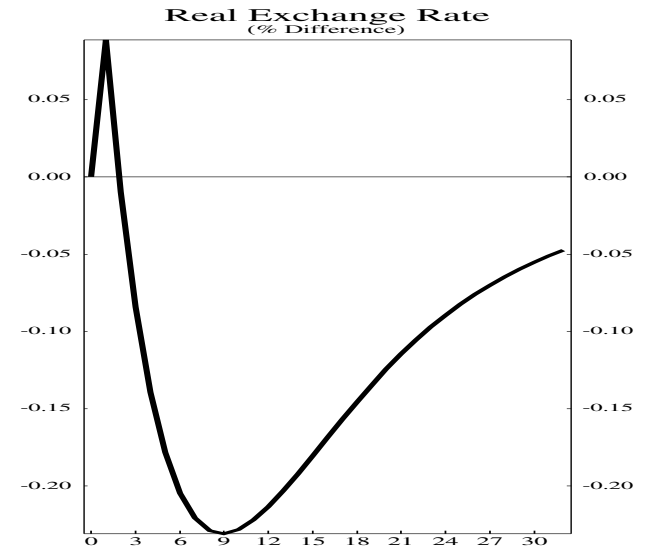
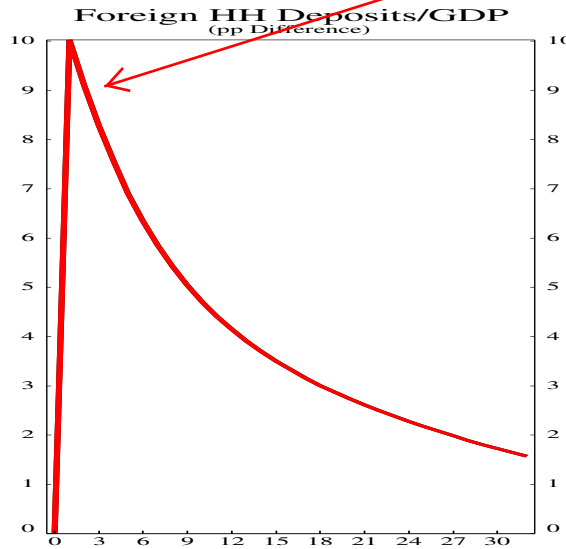
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Foreign Deposit Inflow

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1. Shock = 10% of GDP inflow = deposit of Foreign check in Home bank



4. Foreign financing changes by almost nothing

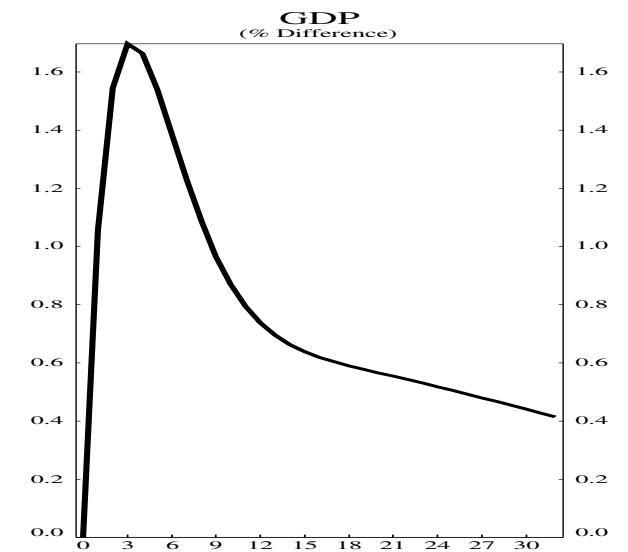
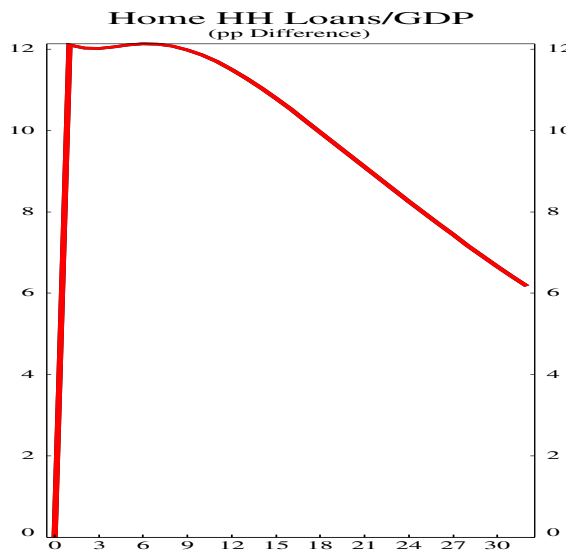
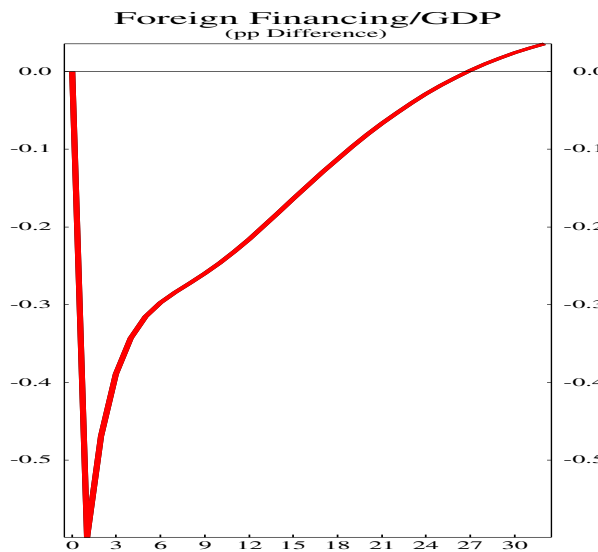
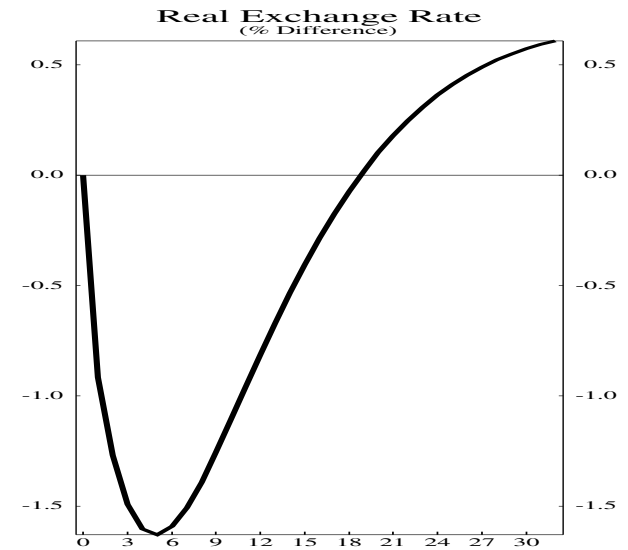
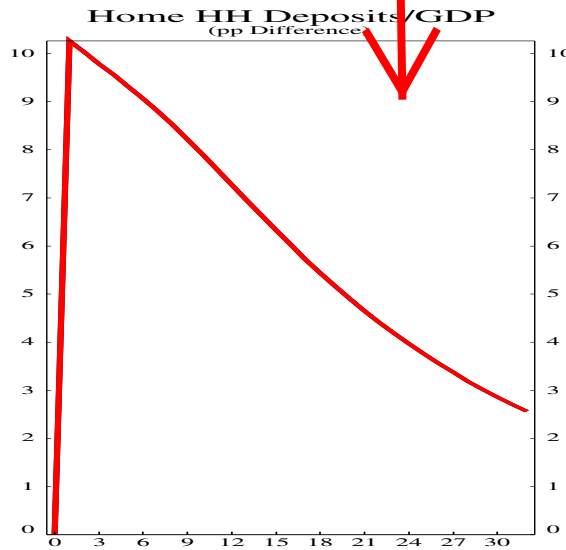
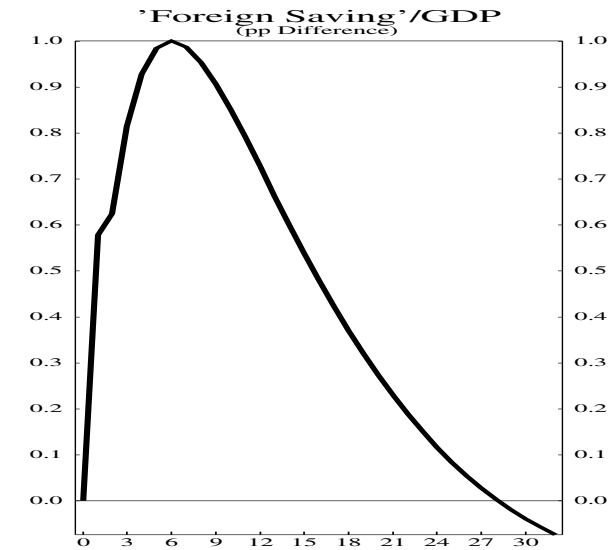
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1. Foreign Deposit Inflow

2. Domestic Credit Glut

Domestic Credit Glut

1. Shock increases US bank lending and deposit creation

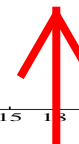
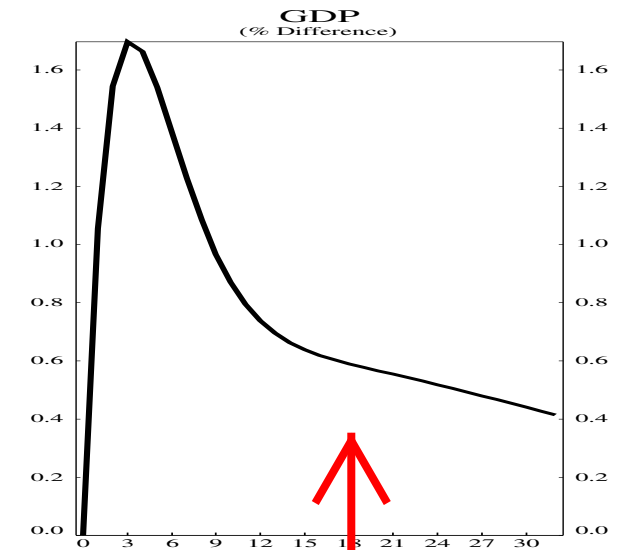
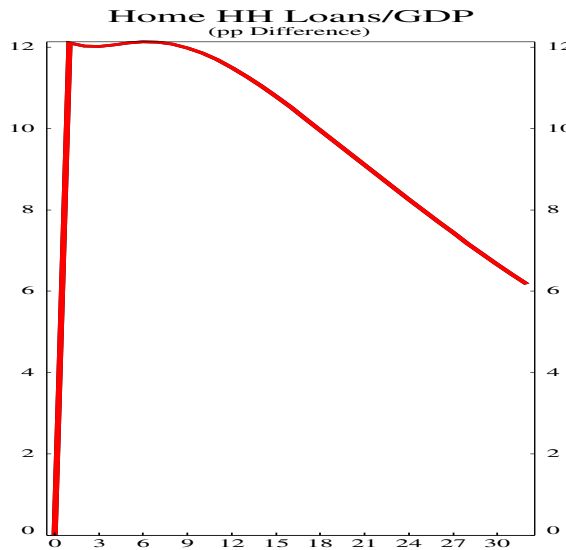
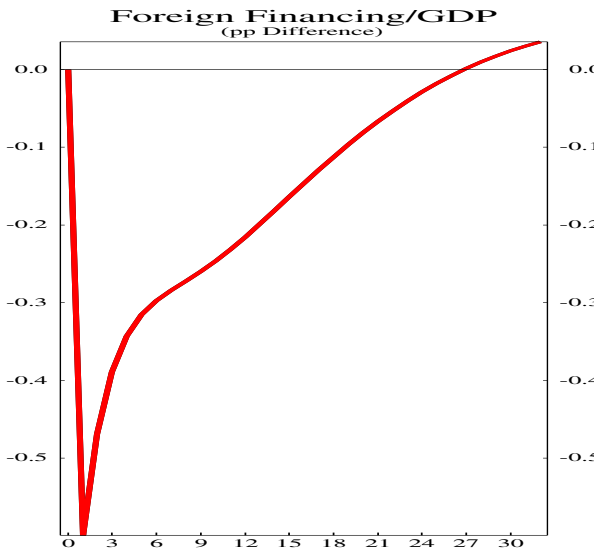
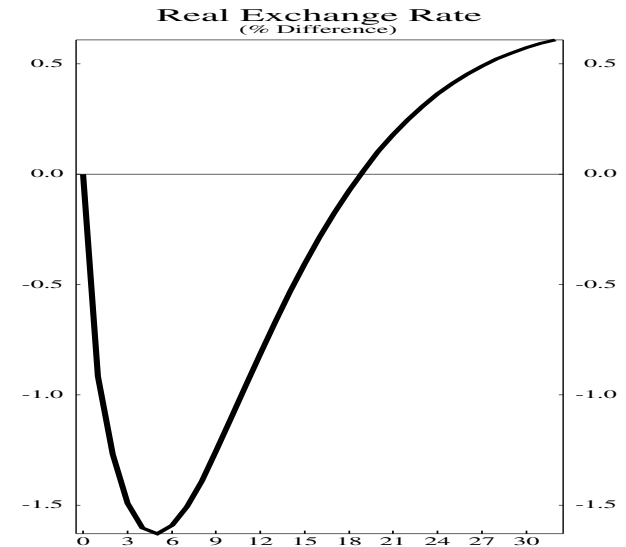
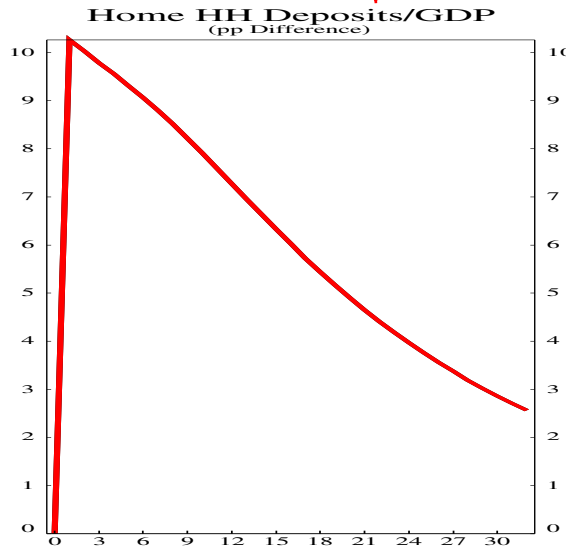
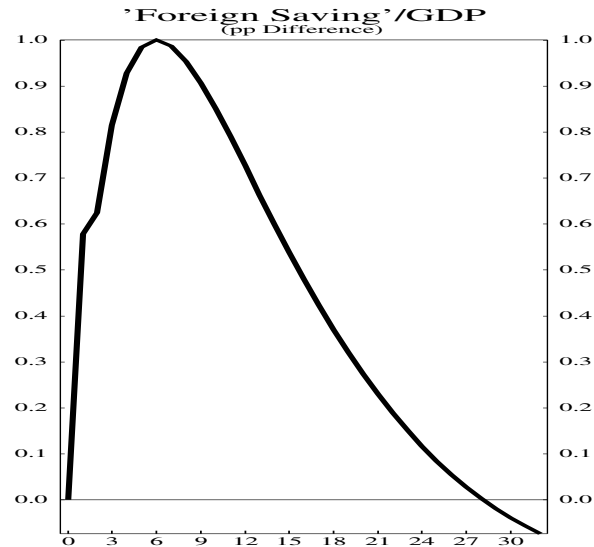


black = real variables

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Domestic Credit Glut

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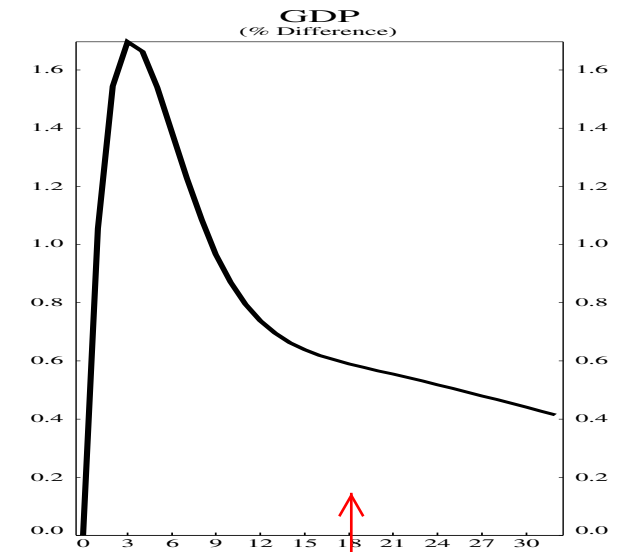
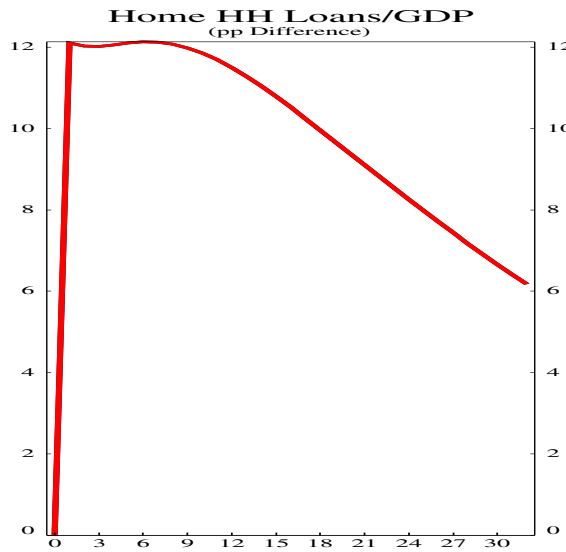
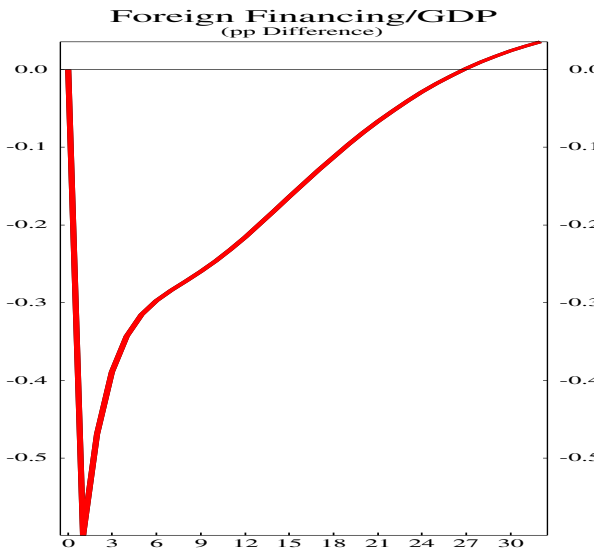
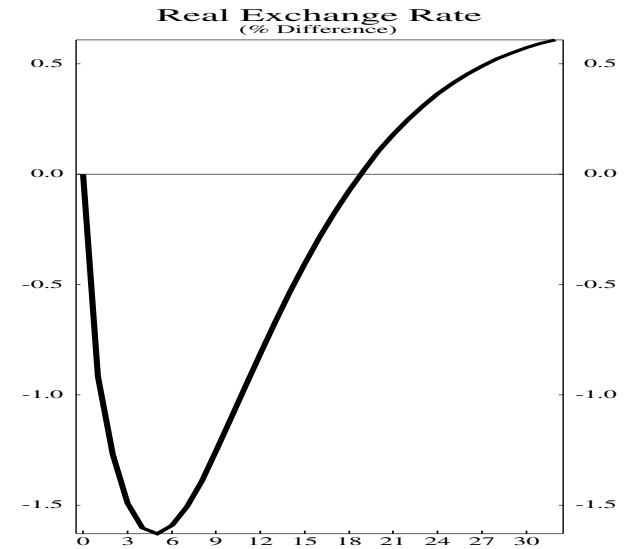
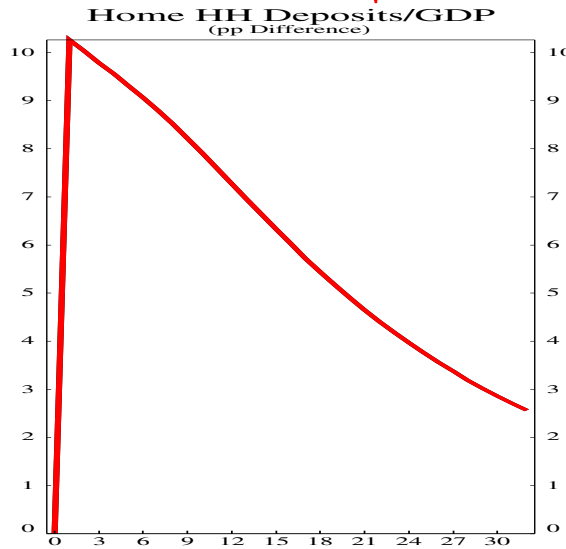
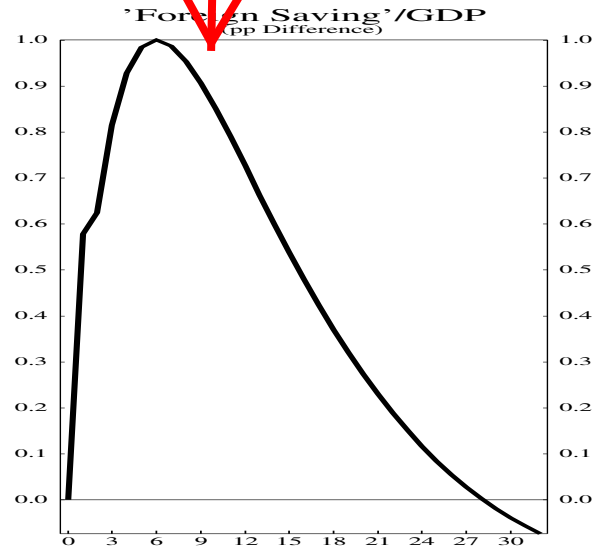


2. More purchasing power stimulates output

Domestic Credit Glut

3. Imports = "foreign saving" are a by-product of higher demand

1. Shock increases US bank lending and deposit creation

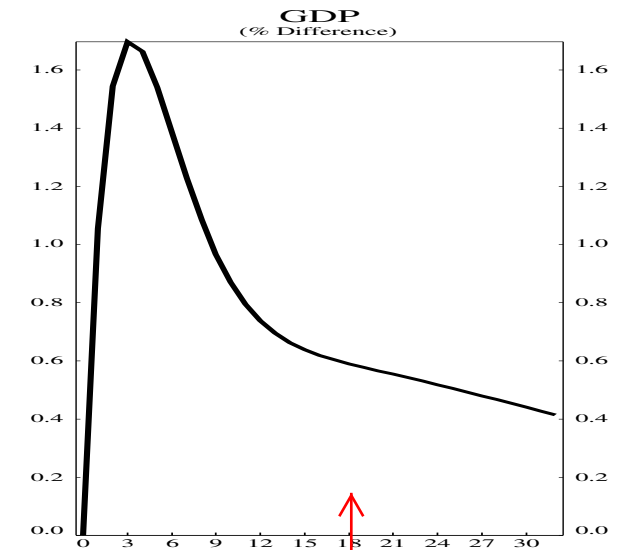
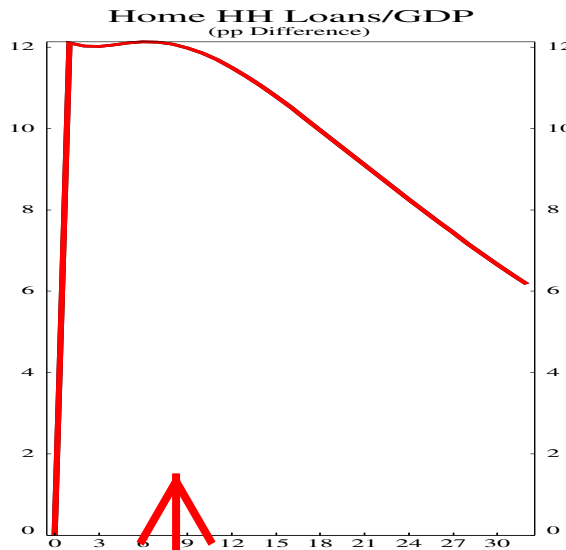
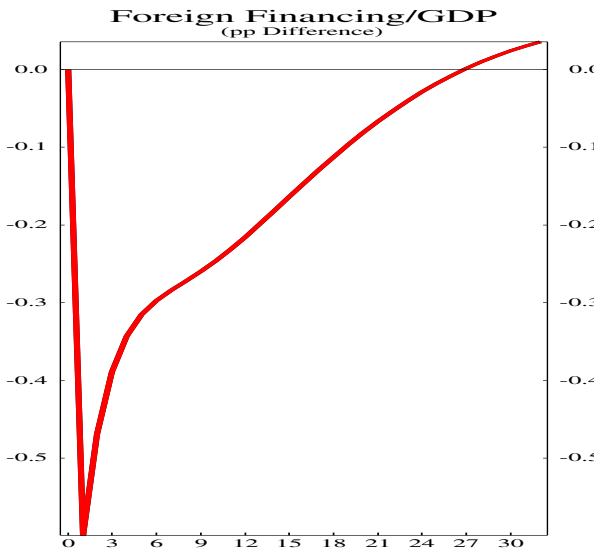
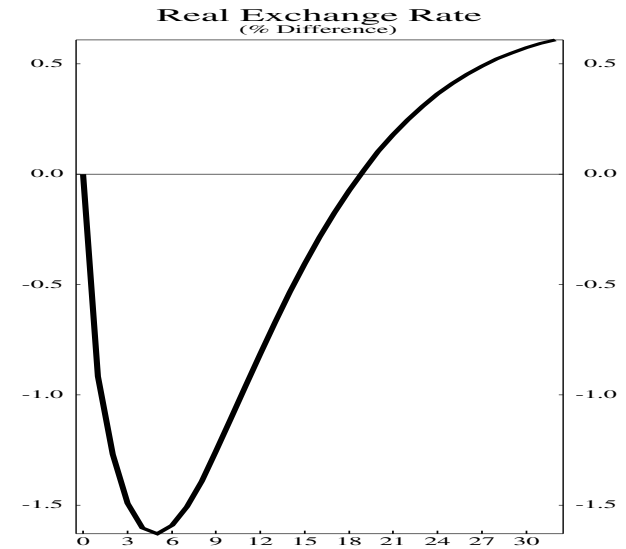
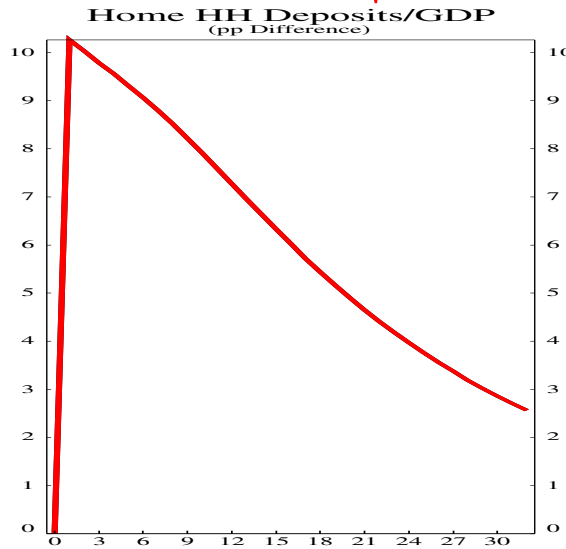
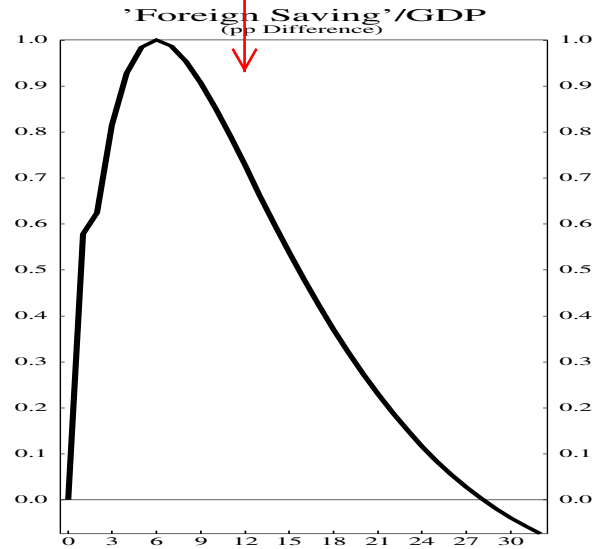


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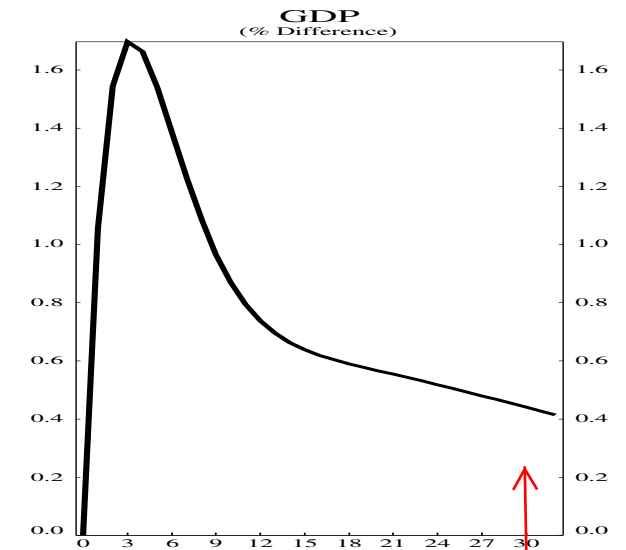
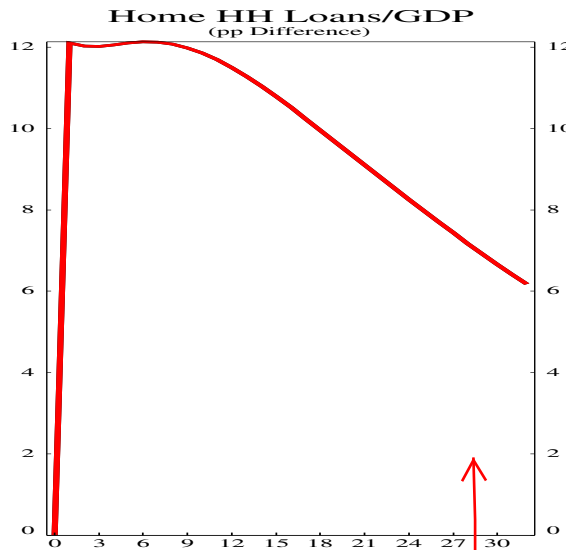
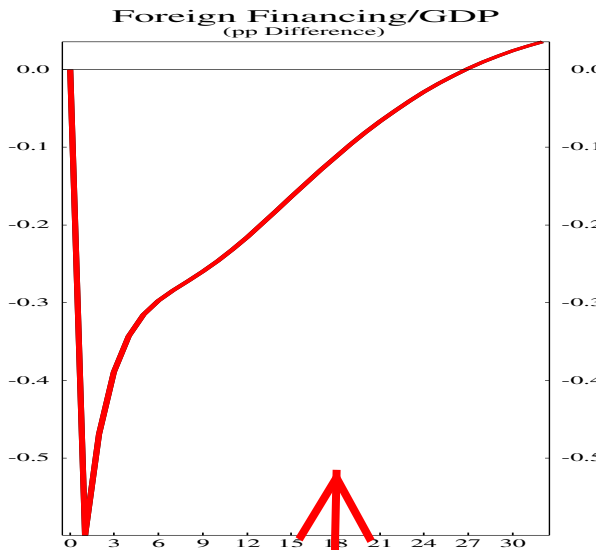
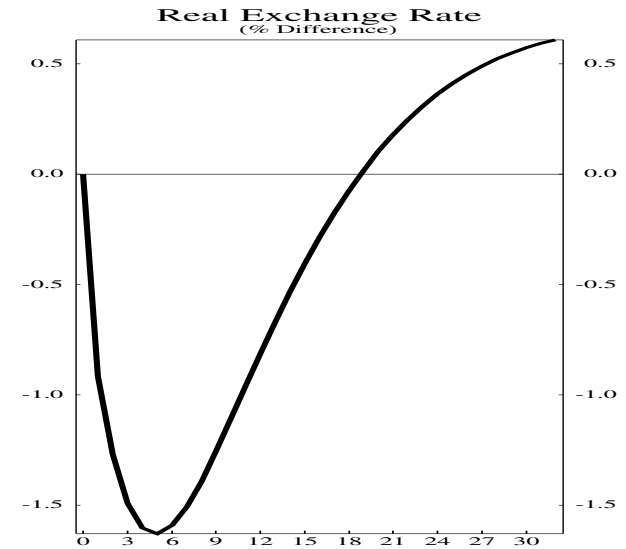
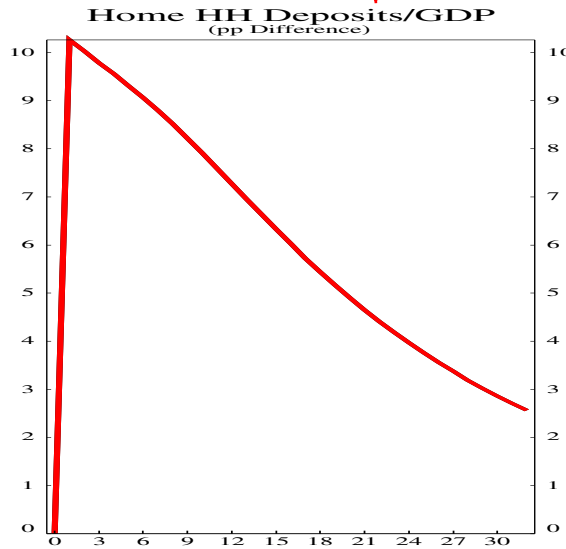
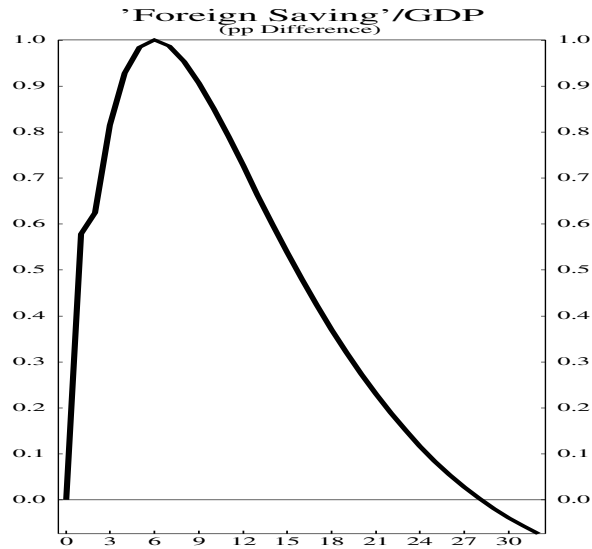
4. But the imports are financed by US banks' credit, not by "foreign financing"

2. More purchasing power stimulates output

Domestic Credit Glut

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1. Shock increases US bank lending and deposit creation



5. Net foreign financing decreases b/c importers can get their credit at home

4. But the imports are financed by US banks' credit, not by "foreign financing"

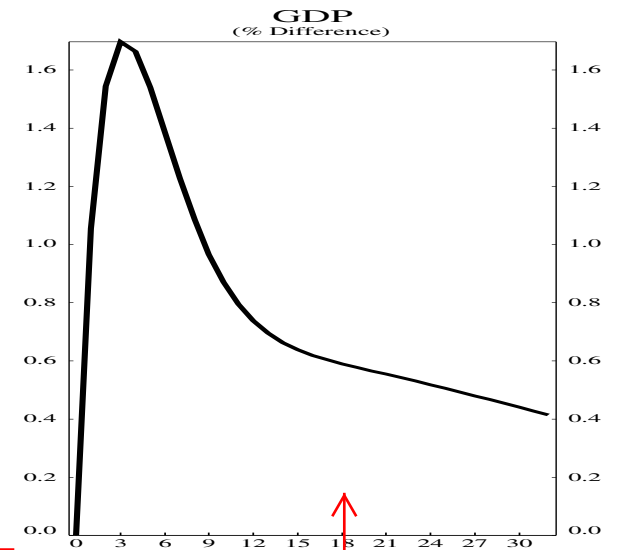
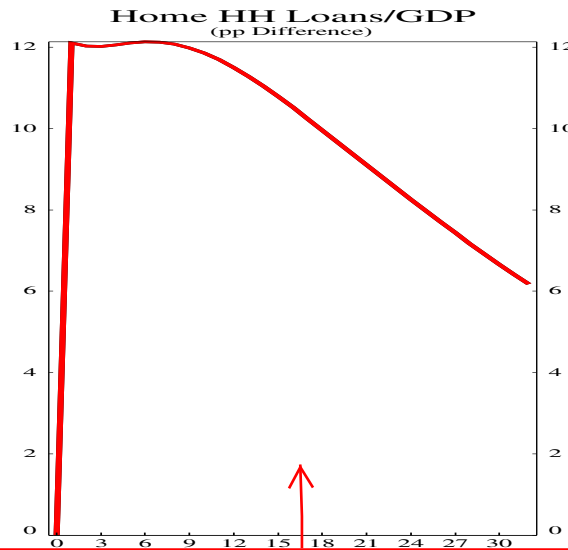
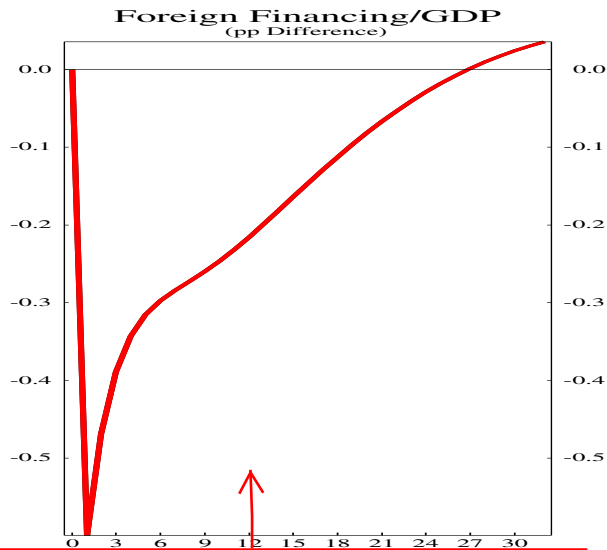
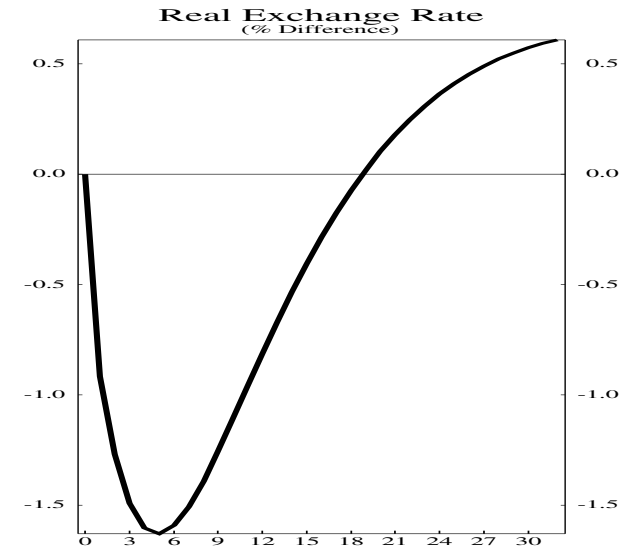
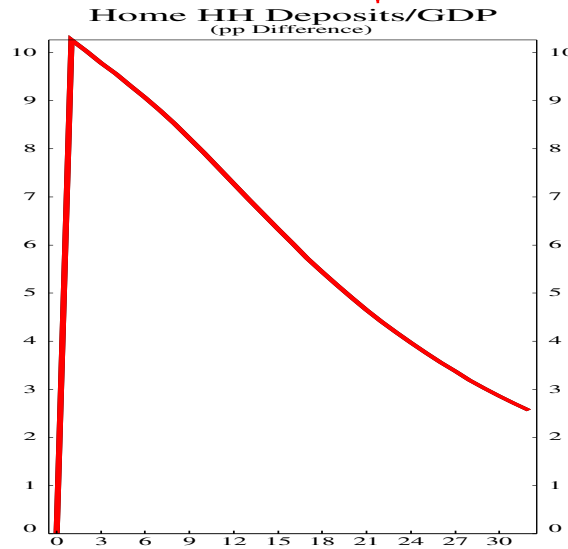
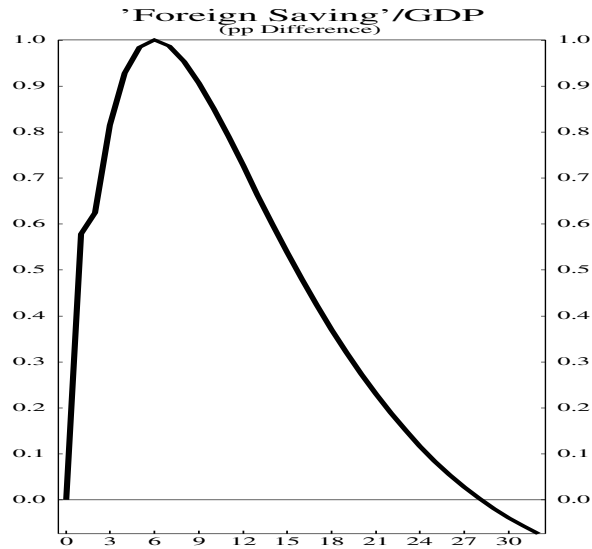
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Domestic Credit Glut

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1. Shock increases US bank lending and deposit creation

6. Changes in balance sheet variables are far larger than changes in real variables



5. Net foreign financing decreases because importers can get their credit at home

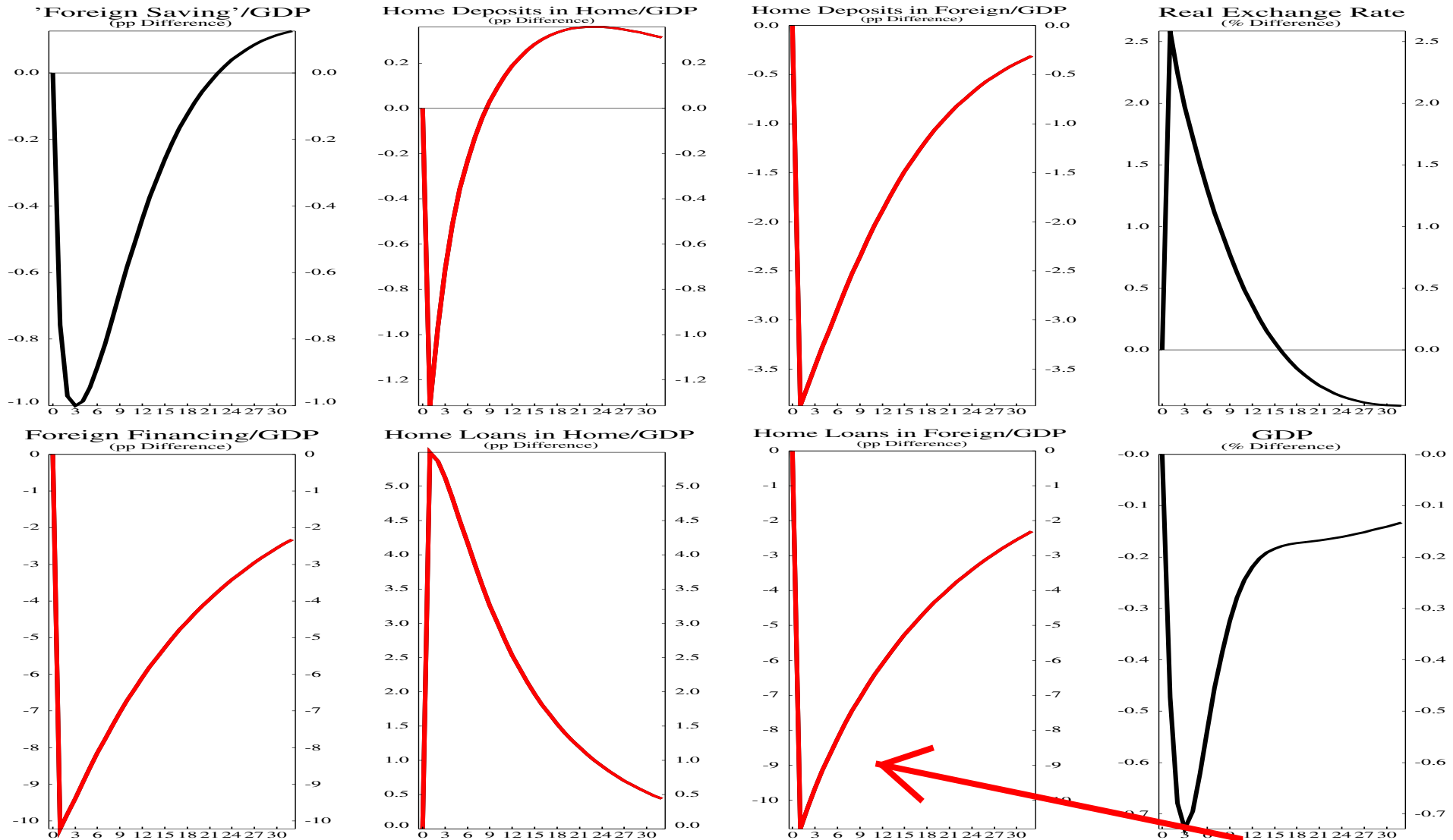
4. But the imports are financed by US banks' credit, not by "foreign financing"

2. More purchasing power stimulates output

7 Sudden Stops

- Literature: CA deficit indicates vulnerability to sudden stops.
- Conclusion:
 - In a financial crisis creditors do not stop financing (net) CAs, they stop financing (gross) debt.
 - CAs can only make a minimal contribution to the required immediate balance sheet adjustments.

Sudden Stop Shock



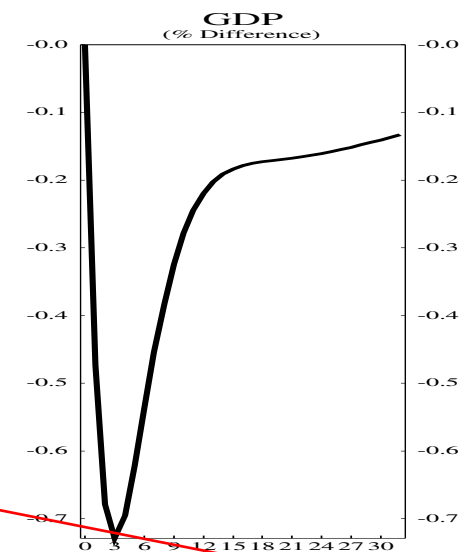
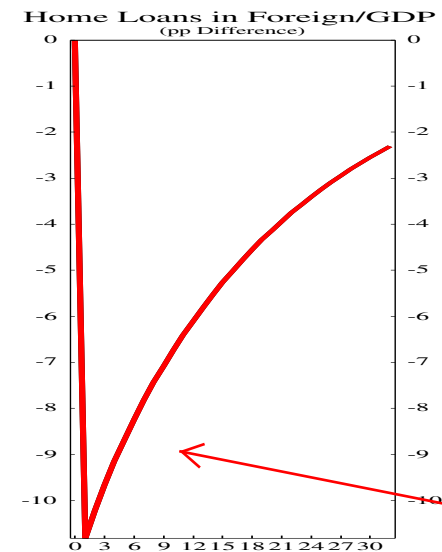
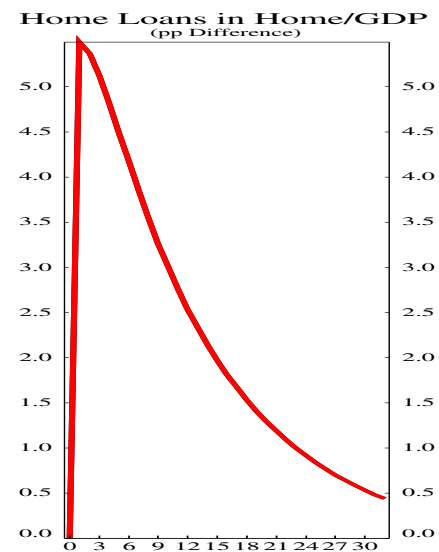
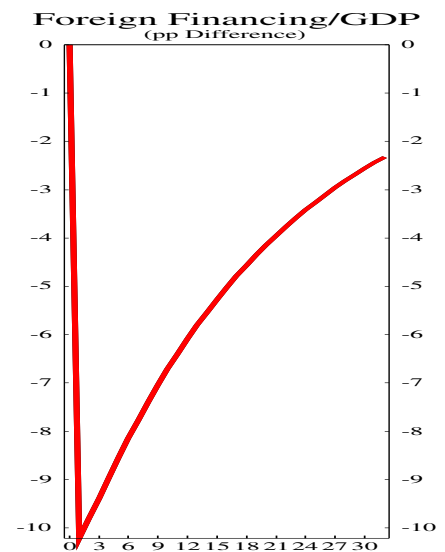
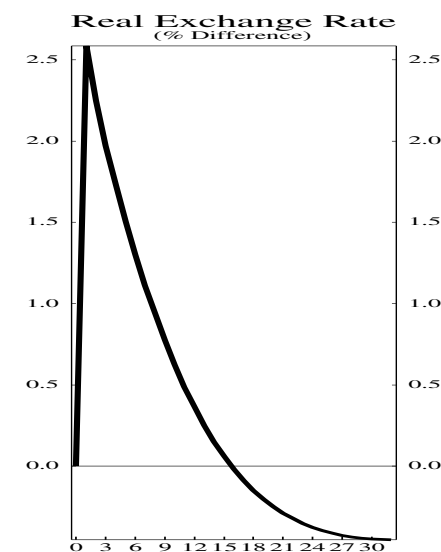
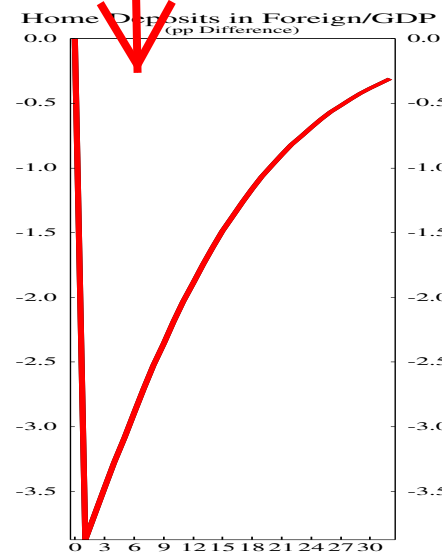
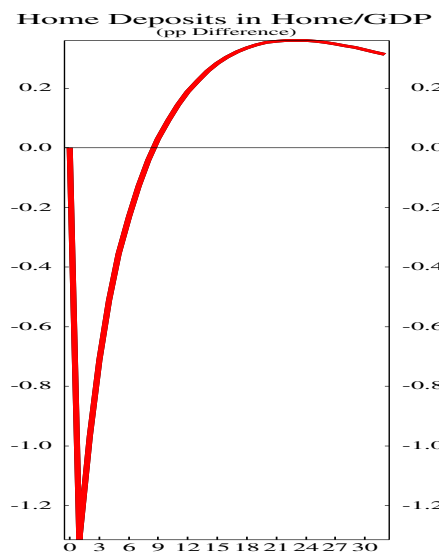
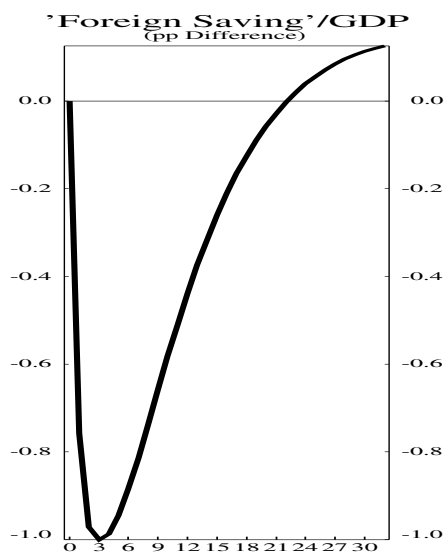
black = real variables

red = financial variables

1. Shock: Large drop in Foreign lending to Home households

Sudden Stop Shock

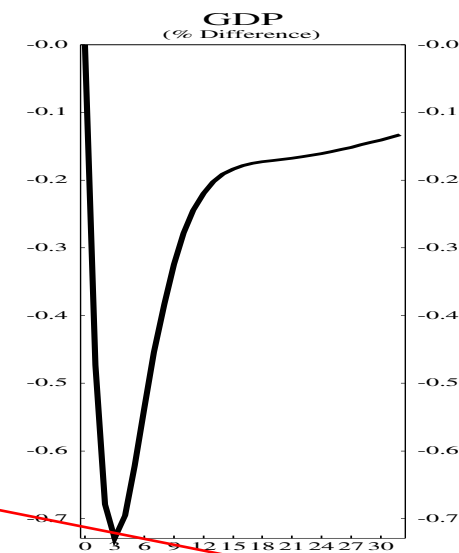
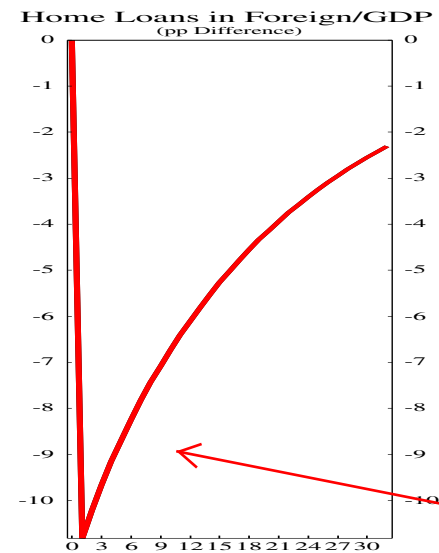
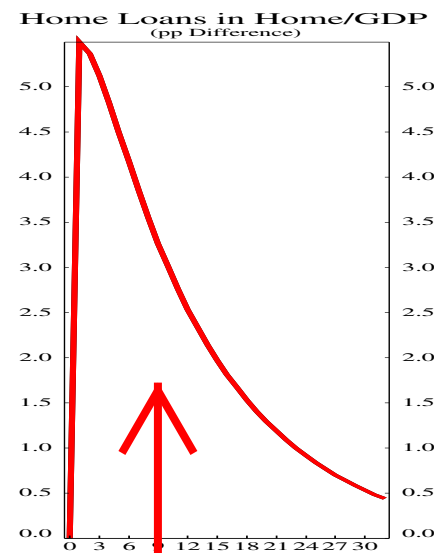
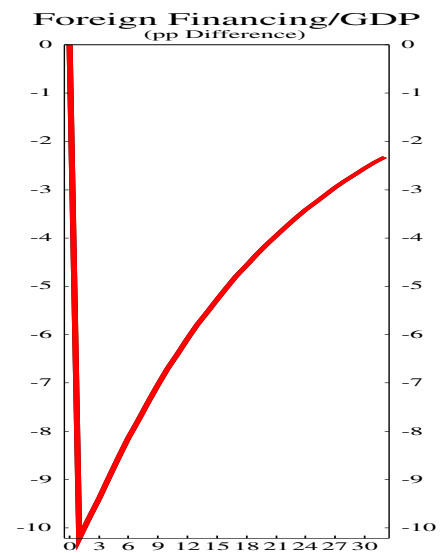
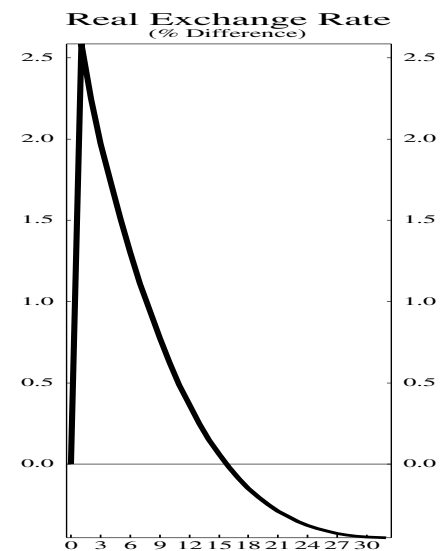
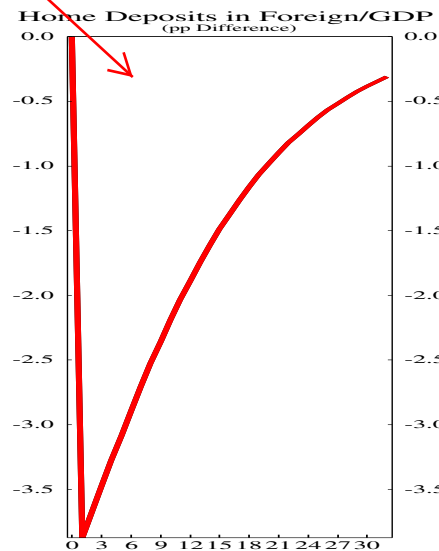
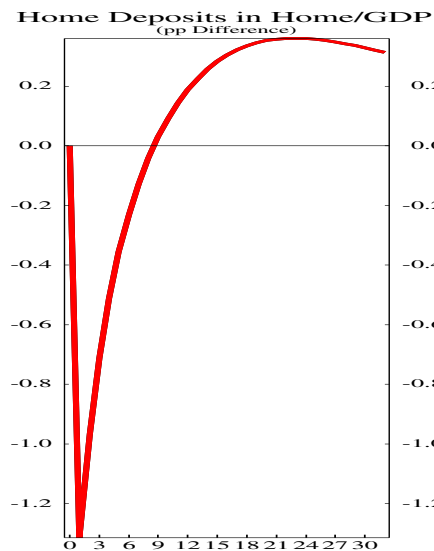
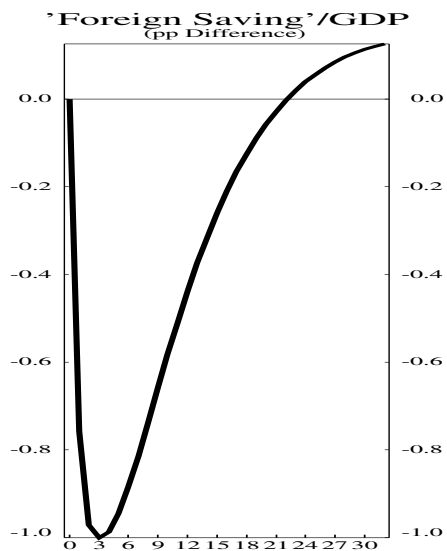
2. Loan repayment #1: Use existing Foreign currency deposits



1. Shock: Large drop in Foreign lending to Home households

Sudden Stop Shock

2. Loan repayment #1: Use existing Foreign currency deposits



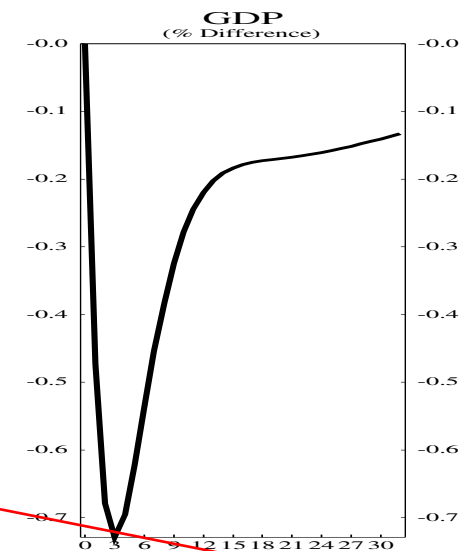
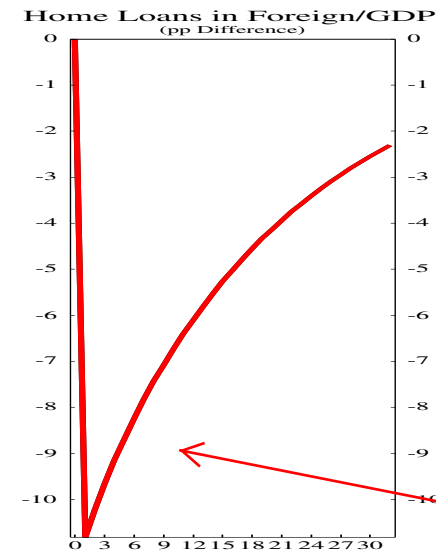
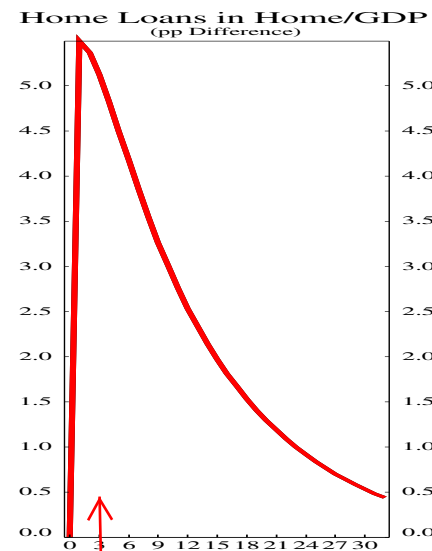
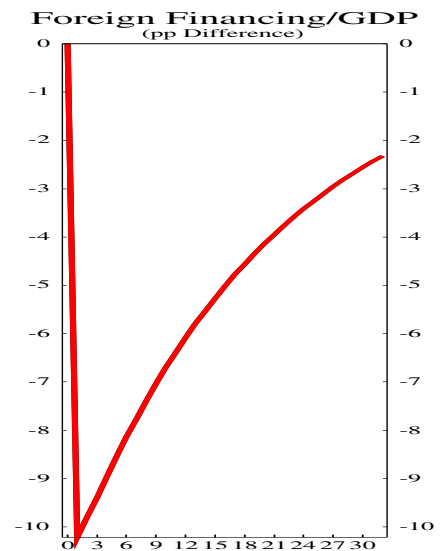
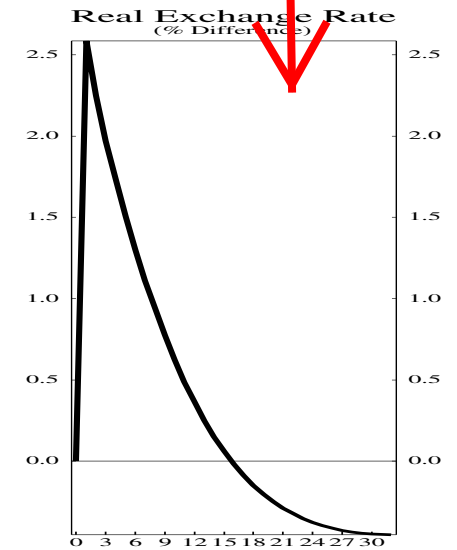
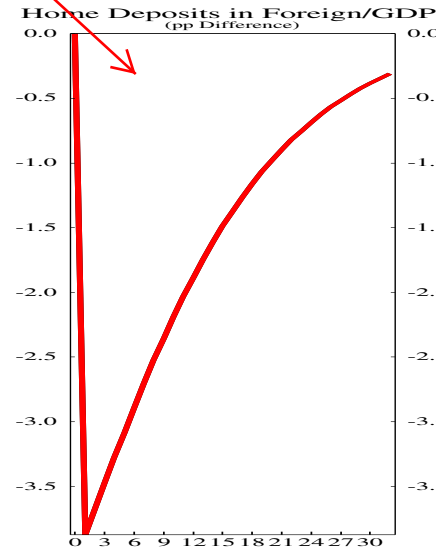
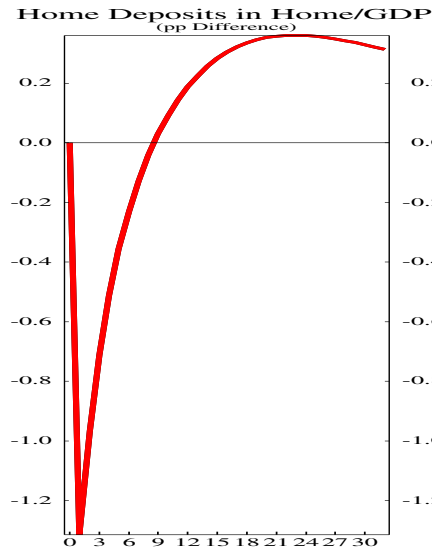
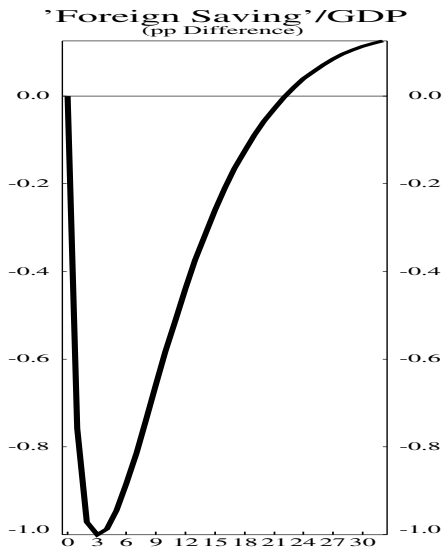
3. Loan repayment #2: Get loans from Home banks and use Home currency deposits to buy more Foreign currency

1. Shock: Large drop in Foreign lending to Home households

Sudden Stop Shock

2. Loan repayment #1: Use existing Foreign currency deposits

4. Excess demand for Foreign currency triggers real depreciation and CA surplus



3. Loan repayment #2: Get loans from Home banks and use Home currency deposits to buy more Foreign currency deposits

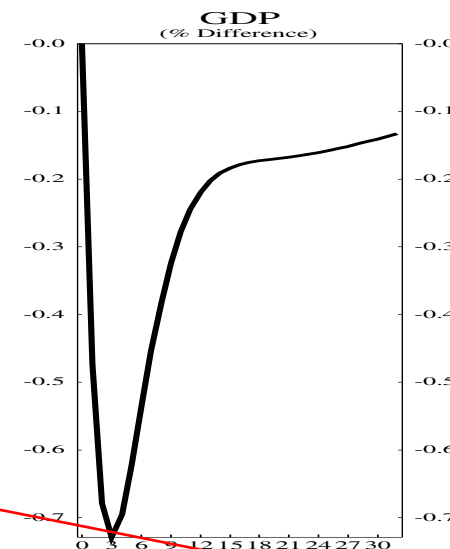
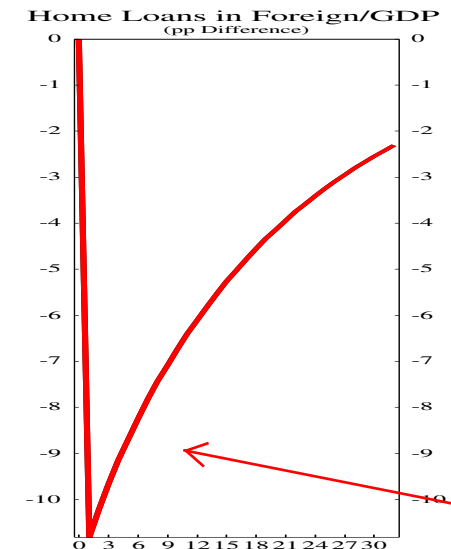
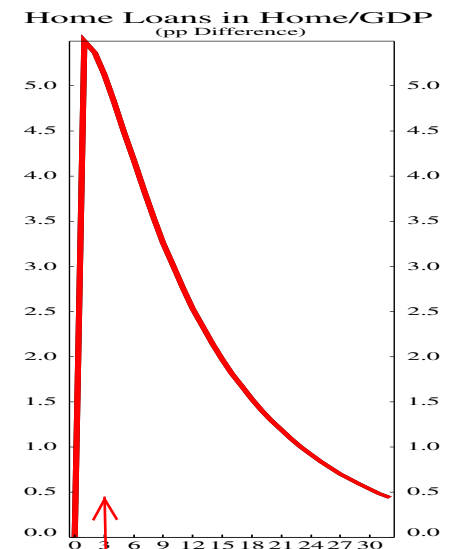
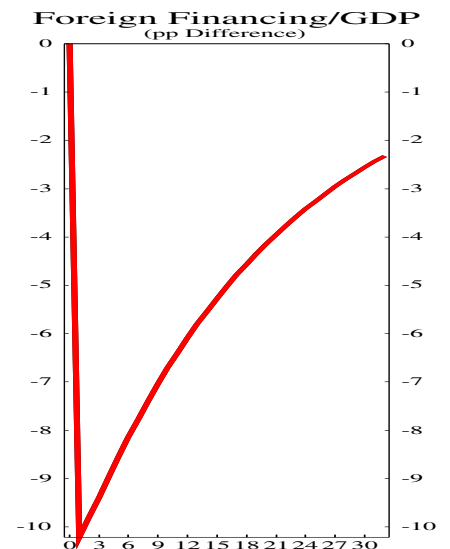
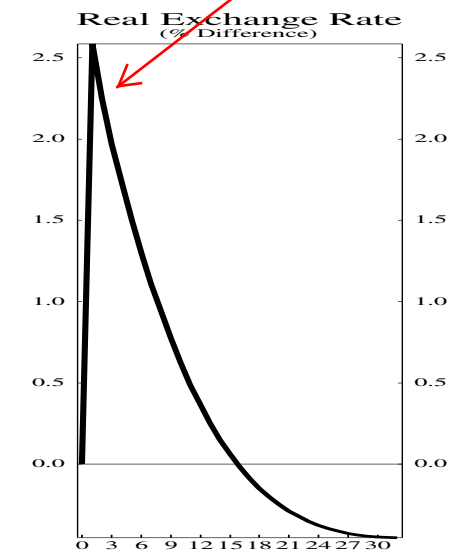
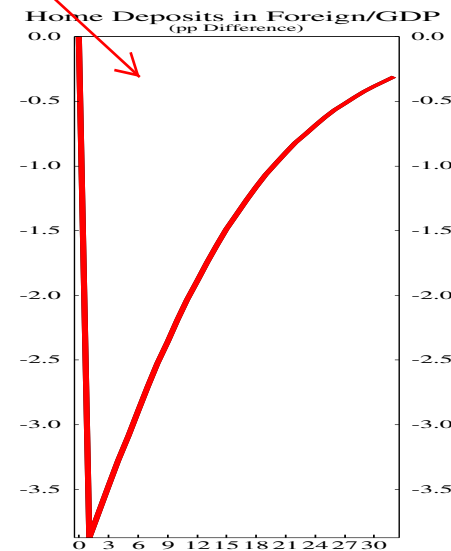
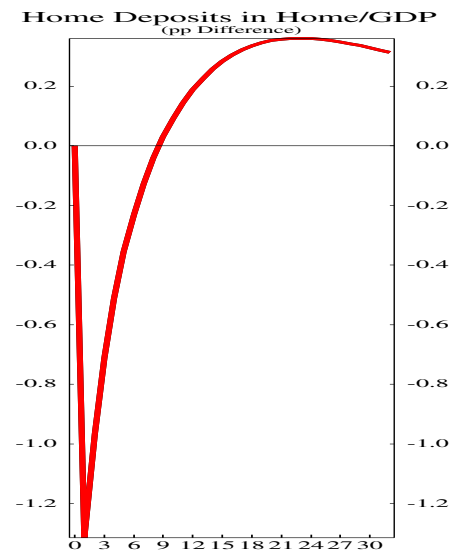
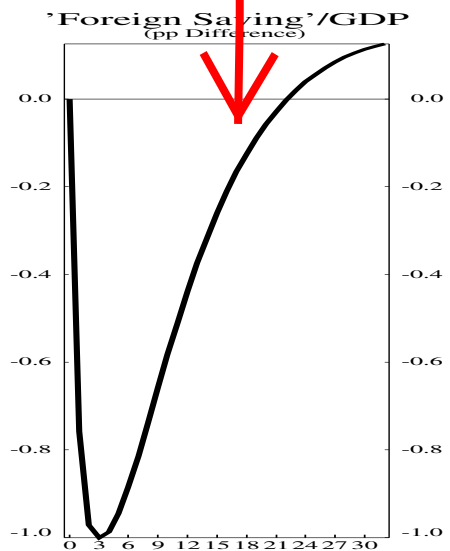
1. Shock: Large drop in Foreign lending to Home households

Sudden Stop Shock

4. Excess demand for Foreign currency triggers real depreciation and CA surplus

2. Loan repayment #1: Use existing Foreign currency deposits

5. But CA surplus (a flow) makes NO contribution to the loan repayment (an instantaneous stock change)



1. Shock: Large drop in Foreign lending to Home households

3. Loan repayment #2: Get loans from Home banks and use Home currency deposits to buy more Foreign currency deposits

8 Triffin's Current Account Dilemma

- Dilemma: Growing world economy needs growing \$ liquidity.
 - This forces the US to run excessive CA deficits.
 - Deficits eventually destroy the quality of the dollar.
- Conclusion:
 - **Creation of \$ requires \$ credit by banks (US or non-US).**
 - **\$ credit is completely independent of US CA deficits.**
 - **There is no dilemma.**

9 High Correlation of Gross In- and Outflows

- Broner et al. (2015): High correlation of gross capital outflows and inflows.
- Interpretation: Synchronized domestic and foreign investment decisions.
- **Conclusion:**
 - **All financial flows have 2 inseparable gross in- & outflow components.**
 - **They are therefore necessarily perfectly correlated.**
 - **There is therefore nothing to explain.**
- Only 2 reasons for less than perfect overall correlation:
 - Measurement errors (“errors and omissions”).
 - Significant role for payment flows (one of the flows is physical).

10 Summary

- Gross flows are mostly financial flows ($>99.5\%$), not payment flows ($<0.5\%$).
- A gross flow model needs to capture the creation of gross positions by banks.
- Model can reframe several important policy debates:
 1. **Global saving glut: Bank credit, not physical saving, finances the CA.**
 2. **Sudden stops: Gross debt positions matter far more than CA.**
 3. **Triffin: Bankers, not the US CA, create \$. There is no dilemma.**
 4. **High correlation of gross inflows and outflows: Is automatic and trivial.**

THANK YOU