Self-Oriented Monetary Policy, Global Financial Markets and Excess Volatility of International Capital Flows

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Increasing importance of spillovers from advanced economies to EME's

- Recent events
  - Evidence from GFC
  - Effects of unconventional monetary policy
  - Episode of Taper
- What factors are important?
  - (De)-stabilizing role of capital flows
  - Role of US exchange rate
  - Role of banks/financial markets
- Policy questions
  - Fed needs a more global orientation?
  - Trilemma versus dilemma?
  - Benefits of international cooperation?

What do we do?

- Apply local projections in a novel way to explore spillovers from US to EME's
- Develop DSGE model to address these issues from a structural theory view
- Explore source of spillovers
- Importance of financial constraints
  - Channels are through bank lending, leverage and IR spreads
  - Highlights volatility of capital flows, importance of gross flows
- Role of US Dollar
- Exchange rate regime
- Identify optimal policy

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Existing literature: voluminous .

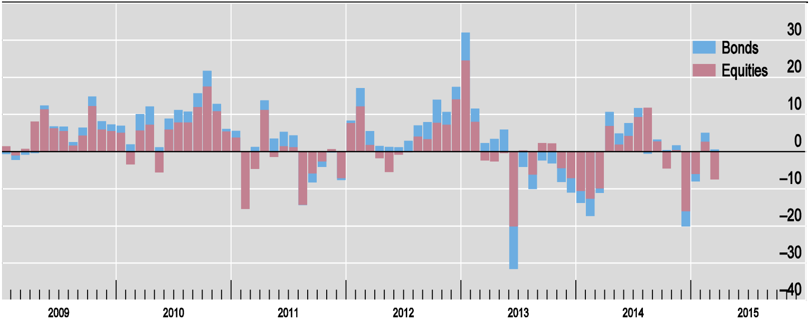
Mostly empirical:
Rey 2014, Agrippino and Rey 2014, Fratschzer and Forbes 2013, Forbes and Warnock 2013, Claessens et al. 2014, Lane 2012, Bruno Shin 2014, Chen-Filardo-He-Zhu, 2015, Ahmed and Zlate, 2014 Borio 2012, Georgiadis and Mehl (2015)

Some relevant theoretical work:
Bruno and Shin 2014 Fahri and Werning 2013
Gertler Karadi, 2011 Nuno and Thomas 2013
Earlier work by Dedola Lombardo Karadi, 2013 etc.

The evidence

Some motivating evidence: Capital flows to group of EME's

Net flows into emerging market portfolio funds[1] Graph 4



[1] In billions of US dollars, data up to end of 23 March 2015. Sums across major economies in each region. Data cover net portfolio flows (adjusted for exchange rate changes) to dedicated funds for individual EMEs and to EME funds for which country or at least regional decomposition is available.

Source: EPFR.

Empirical Methodology .

- How to estimate effects of US monetary policy shocks on EME's?
- We estimate directly IRFs to MP shocks using local projection methods - Jorda 2005
- Alternative use (FA)VAR approach à la BBE (e.g. Aggripino and Rey, Boiven et al. (2013) etc.)
  - Results depend a lot on sample
  - Not long samples for EMEs
  - We tried anyway (not reported) and found some suggestive evidence in line with LP.

US monetary policy shocks and EME markets .

- We identify US monetary policy shocks using an updated Romer and Romer series (Coibion et al. 2012)
  - Currently experimenting with Gertler Karadi HF instruments
- Data goes up to zero bound period only
- Estimate local projection of US shocks on variables from panel of EME's
- Argentina, Brazil, Chile, China, Colombia, Indonesia, India, Korea, Malaysia, Mexico, Peru, Philippines, Russia, Thailand, Turkey, South Africa.
- Sample: 1989Q1-2007Q2.

Local projection

- We estimate the following equation for $h = 0, 1, \dots H$

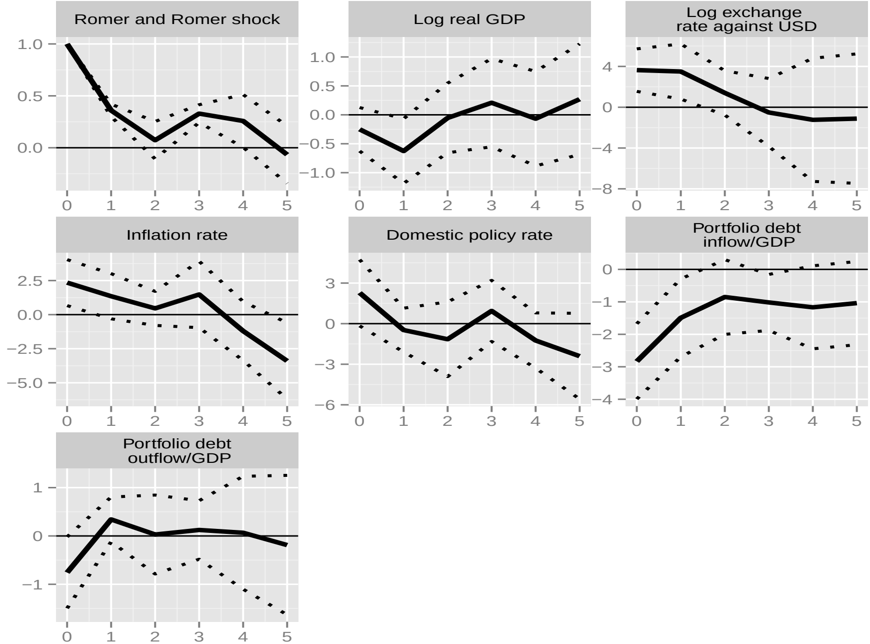
$$y_{i,t+h} - y_{i,t-1} = \alpha^h + \theta^h MS_t + \gamma^h w_{i,t-1} + \epsilon_{i,t+h} \tag{1}$$

Local projection cont'd

where

- $y_{i,t-1} = \{$log bilateral exchange rate with the US dollar, log real GDP, inflation, the domestic policy rate, and both portfolio debt outflows and inflows as a share of GDP$\}$
- MS_t = policy shock
- $w_{i,t-1} = \{$ two lags of output growth, export-weighted GDP growth of country i's major trading partners, inflation, the domestic policy rate, the log change in the US dollar bilateral exchange rate, the change in domestic long-term bond yields, the change in the ratio of foreign exchange reserves to short-term external borrowing, both portfolio debt inflows and outflows as a share of GDP, past US monetary policy surprises and US 10-year Treasury yields. The HP-filtered domestic output gap in period $t-1$ is also included as a control variable. $\}$

Effects of a US monetary policy shock on EMEs



Notable implications

- US monetary shock (100bp) causes FX depreciation (4% on impact)
- Fall in GDP (about 0.5% initially)
- Rise, followed by a fall in CPI inflation (about 50bp: pass through?)
- Rise in policy rate and long term rates (Domestic PR up by 200bp on impact: attempt to resist outflows?)
- Fall in portfolio debt inflows (stronger 3% of GDP) and outflows (milder, less than 1%)

The DSGE Model

Households

$$E_0 \sum_{t=0)}^{\infty} \beta^t \left(\frac{C_t^{e(1-\sigma)}}{1-\sigma} - \frac{H_t^{e(1+\psi)}}{1+\psi} \right)$$

subject to the budget constraint (in real terms)

$$C_t^e + RER_t B_t^e = W_t^e H_t^e + \Pi_t^e + \frac{R_{t-1}^*}{\pi_t^c} RER_t B_{t-1}^e$$

Households cont'd

FOCs:

$$E_t \Lambda^e_{t+1} \frac{R^*_t}{\pi^c_{t+1}} \frac{RER_{t+1}}{RER_t} = 1 \tag{2}$$

$$\frac{W^e_t}{P^e_t} = C^{e\sigma}_t H^{e\psi}_t$$

where $\Lambda^e_{t+1} \equiv \beta \left(\frac{C^e_{t+1}}{C^e_t} \right)^{-\sigma}$, $\pi^c_{t+1} \equiv \frac{P^e_{t+1}}{P^e_t}$ and $RER = \frac{P^c_t S_t}{P^e_t}$.

EME Banks

EME bank $i's$ balance sheet

- $$Q^e_t K_{t+1,i} = N^e_{t,i} + RER_t V^e_{t,i} \tag{3}$$

$$\text{Max} \quad J^e_{t,i\ [K^e_{t+1,i}, V^e_{t,i}]} = E_t \Lambda^e_{t+1} \begin{bmatrix} (1-\theta)(R^e_{k,t+1} Q^e_t K^e_{t+1,i} \\ -RER_{t+1} R_{ct} V^e_{t,i}) + \theta J^e_{t+1,i} \end{bmatrix} \tag{4}$$

Subject to ICC (no-absconding)

$$J^e_{t,i} \geq \kappa^e_t Q^e_t K^e_{t+1,i}. \tag{5}$$

where Net worth evolves as

$$N^e_{t+1} = \begin{matrix} \theta\left((R^e_{kt+1} - \frac{RER_{t+1}}{RER_t} R_{c,t}) Q^e_t K^e_t + \frac{RER_{t+1}}{RER_t} R_{c,t} N^e_t\right) \\ +\delta_T Q^e_t K^e_{t-1} \end{matrix}$$

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Centre country banks

Bank's budget constraint

$$V_{jt}^{e} + Q_{t}^{c} K_{jt}^{c} = N_{jt}^{c} + B_{t}^{c} \tag{6}$$

Bank's problem

$$J_{jt}^{c} = E_t \max_{K_{j,t+1}^{c}, V_{jt}^{e}, B_t^{c}} \Lambda_{t+1}^{c} \begin{bmatrix} (1-\theta)(R_{kt+1}^{c} Q_t^{c} K_{jt}^{c} + R_{ct} V_{jt}^{e} - R_t^{*} B_t^{c}) \\ +\theta J_{jt+1}^{c} \end{bmatrix}$$

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Rest of the model

- Firms with Calvo Pricing
- Trade across countries in C and E goods
- Separate CB's in both countries: baseline follow a Taylor rule with IR smoothing
- Focus on monetary policy, and financial shocks

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Calibration .

Table : Parameter Values

Label	Value	Label	Value
n	0.15	ζ	1.728
σ_p	6	η	1.5
ς	0.8	ψ	0.276
$\lambda_{y,c}$	0.2	θ	0.96
$\lambda_{\pi,c}$	1.2	α	0.3
$\lambda_{r,c}$	0.85	$\nu^e = \nu^c$	0.96
β	0.99	σ	1.02
δ	0.025	$\kappa^c = \kappa^e$	0.38
δ_T	0.004		

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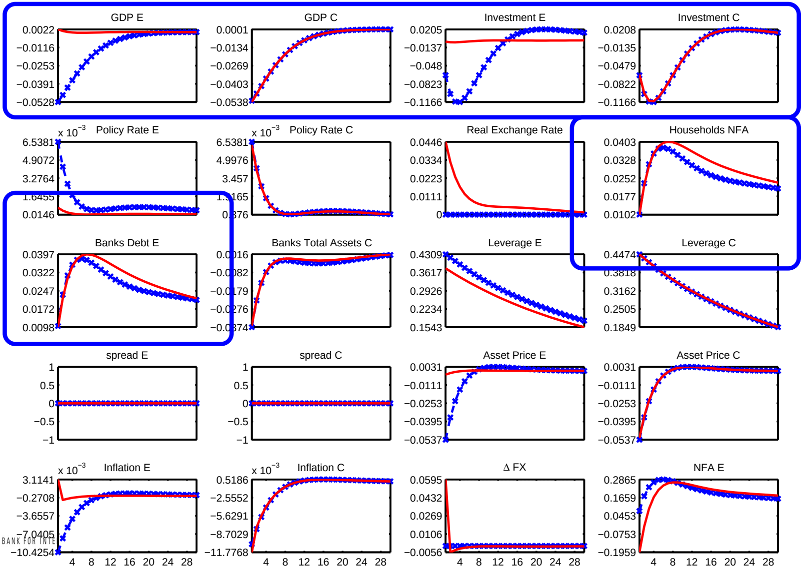
Now let's cycle through some experiments

- First question: Monetary policy spillovers in absence of financial frictions
- Compare inflation targeting (i.e. Taylor rule) to a peg
- Trilemma is clearly apparent here - i.e. peg implies significantly more spillovers

Monetary tightening in C country:

No Financial Frictions; Plain line=Flexible exchange rate; Crossed line=Peg.



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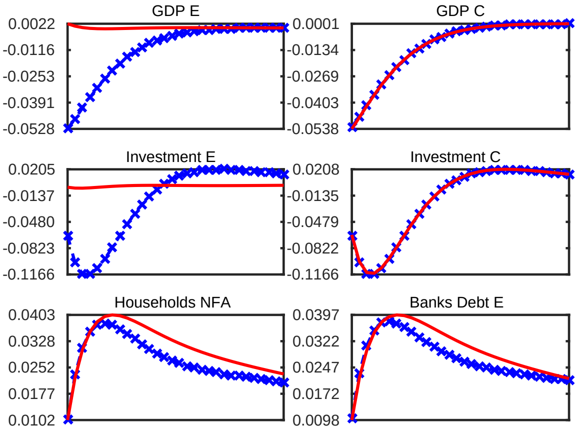

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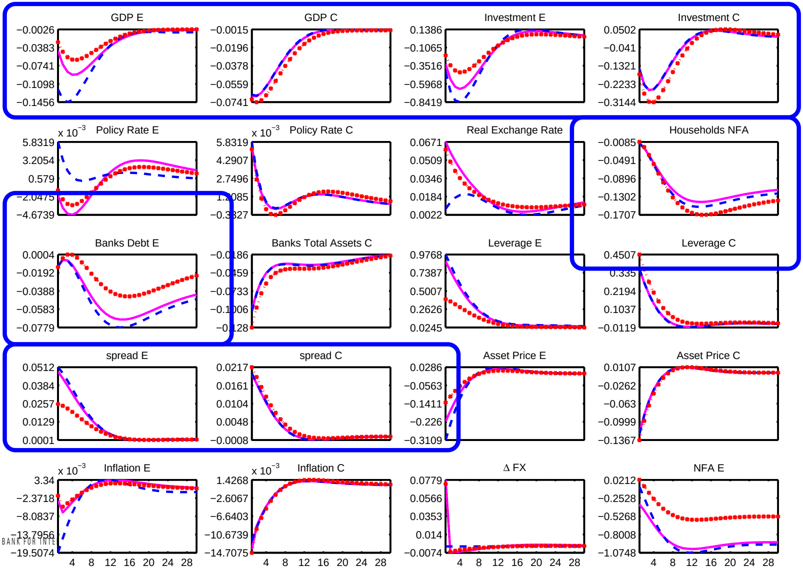
How does the comparison change with financial frictions?

- Even with Taylor rule, there exist large cross country spillovers
- Double agency problem generates greater volatility in EME than in C country
- Spillovers through spreads, leverage, and reduced loans to EME banks

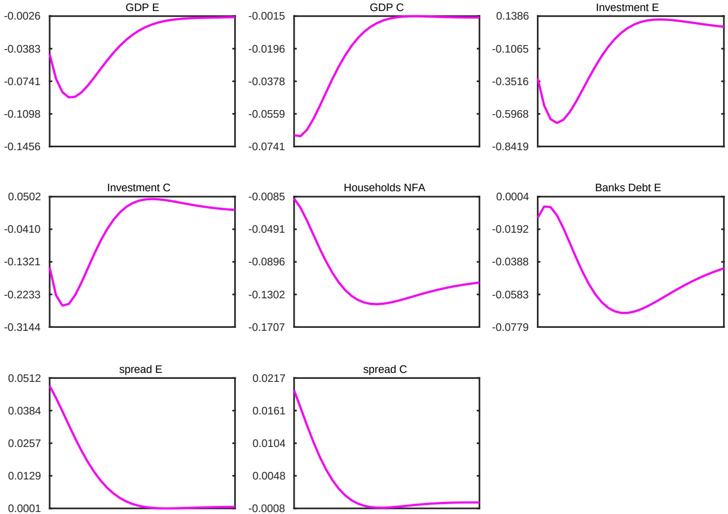
Monetary tightening in C country

Solid=baseline; dashed=peg; dots=local currency debt.



Monetary tightening in C country

Solid=baseline;



Key implications

- High correlation in spreads
- High correlation in GDP downturn with bank links
- Response of GDP and spreads is higher in EME
- Gross inflows and outflows fall - capital flow retrenchment

Trilemma revisited

- With capital flows subject to financial frictions
- Spillovers are similar under Taylor rule and peg
- RER depreciation helps only a small amount
- Depreciation cannot prevent spike in interest rate spreads

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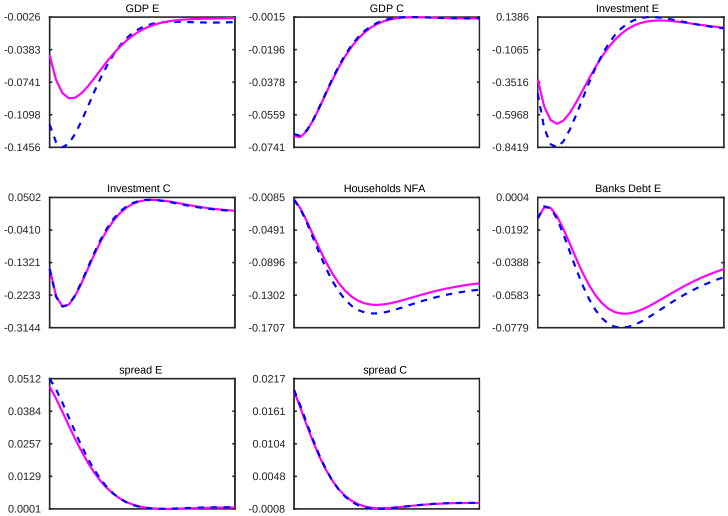
Monetary tightening in C country

Solid=baseline; dashed=peg;

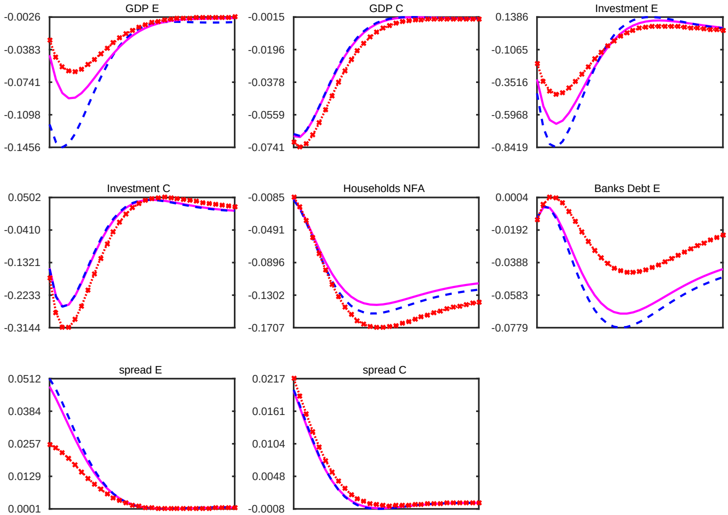


Role of liability dollarization .

- Local currency borrowing would ameliorate spillovers under flexible exchange rates
- But sizeable spillovers nonetheless
- Even with domestic currency borrowing, large spillovers through capital flows and spreads

Monetary tightening in C country

Solid=baseline; dashed=peg; dots=local currency debt.

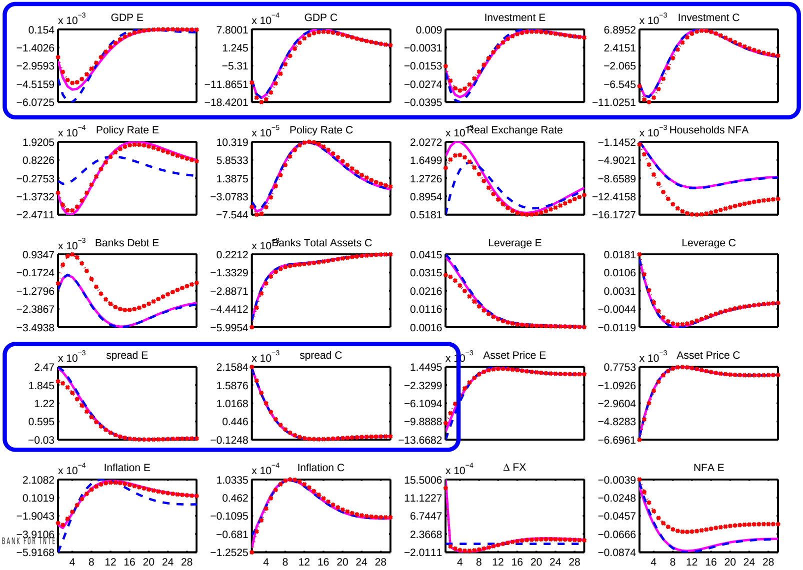


Now look at alternative shocks - credit (financial shocks) .

- Credit crunch in C country
- Cuts off capital flows to EME

Financial shock in centre country.

Solid=baseline; dashed=peg; dots=local currency debt.



Financial shock in centre country.

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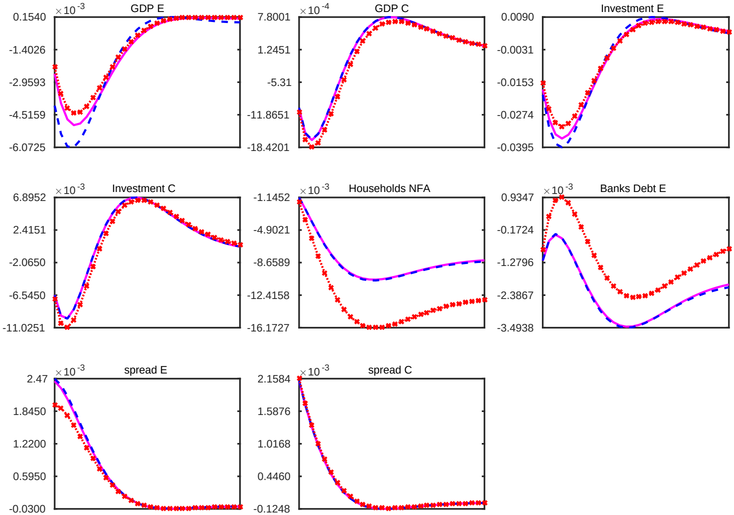

Implications .

- Floating and pegged exchange rates almost identical in response to external financial shocks
- Taylor rule has no advantages
- Highlights the ‘dilemma’ of EME macro policy
- Does this imply monetary policy useless?

FIT policy is quite arbitrary .

- Look at Ramsey optimal policy
- This is a cooperative monetary policy
- Does not make use of capital controls or macro-prudential tools
- Follows a 'timeless' perspective
- Does assume full commitment

Optimal (Non-)Cooperative Policy

$$\max_{\mathcal{Y}_t} E_0 \sum_{i=0}^{\infty} \beta_{CB}^{i} \left(n\, U\left(C^{e}_{t+i}, H^{e}_{t+i}\right) + (1-n)\, U\left(C^{c}_{t+i}, H^{c}_{t+i}\right)\right) \quad (7)$$

subject to equilibrium conditions and resource constraints. $\mathcal{Y}_t$ is the vector of endogenous variables.

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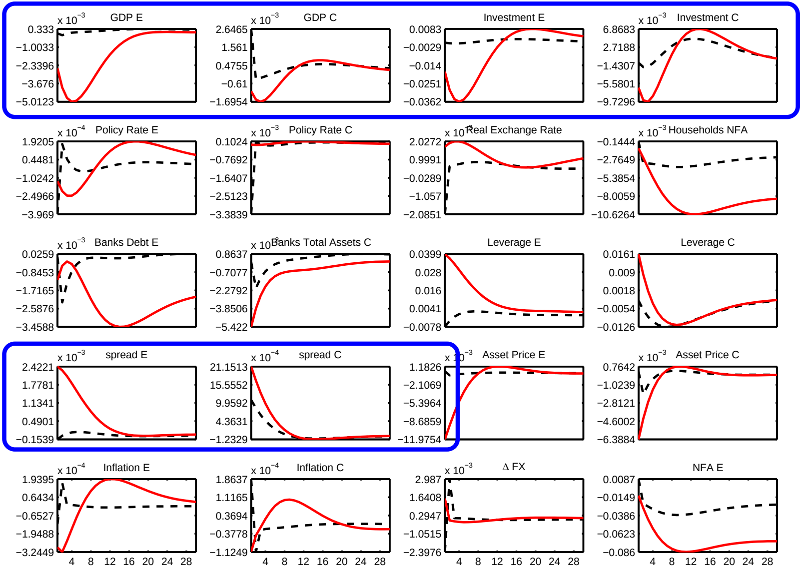
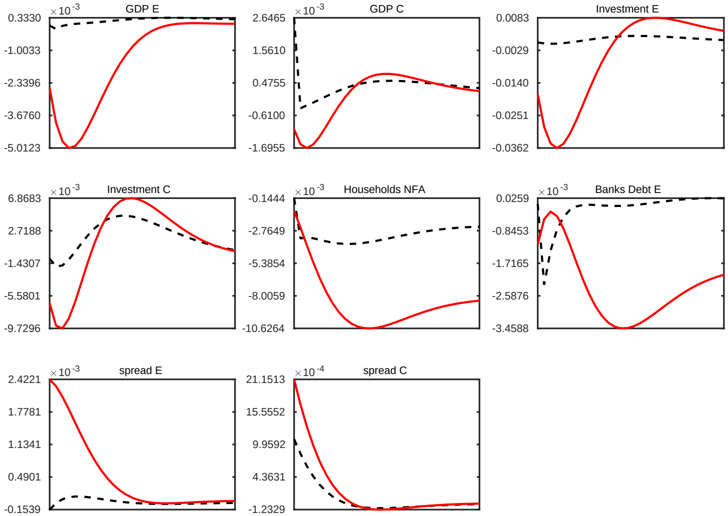
Financial shock in centre country. Solid=baseline; dashed=Ramsey .



Financial shock in centre country. Solid=baseline; dashed=Ramsey .



Conclude from this

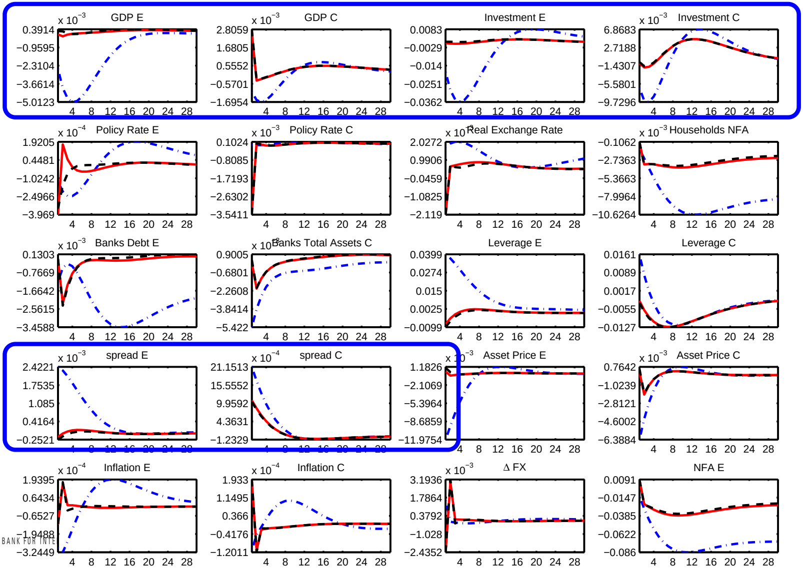
- An optimal cooperative monetary policy can greatly reduce effects of financial shocks
- Eliminates most of spillovers to EME
- Requires sharp deviation from FIT rule
- But, while monetary policy is effective, does this eliminate the argument for self-oriented policy?

But what if monetary policy is set non-cooperatively?

- Look at Non-cooperative policy
  - Open Loop Nash game
  - Each policy-maker chooses PPI inflation, taking others as given
- For our calibration, Nash equilibrium is very similar to Ramsey optimum
- A Nash equilibrium can eliminate spillovers and greatly dampen the financial shock

Financial shock in centre country.

dot-dashed=Taylor, dashed=Nash, solid=Ramsey



Financial shock in centre country.

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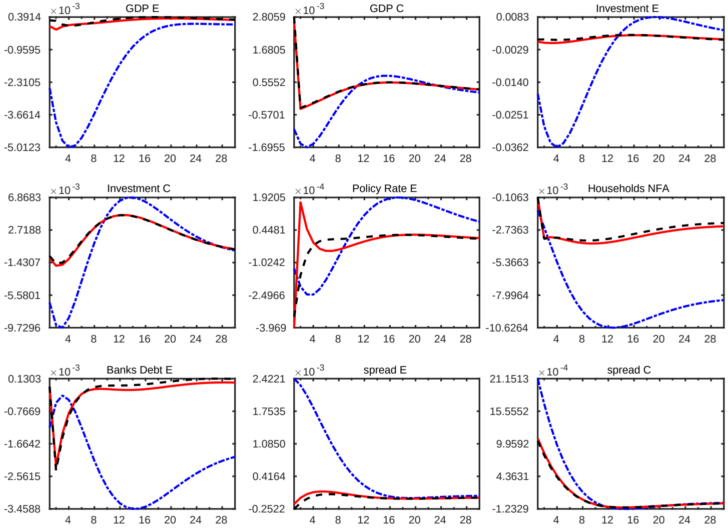

Conclusions

- We provide further evidence of sizable spillovers of US monetary policy to EMEs and retrenchment in capital flows
- Financial frictions reduce the shock-absorbing role of the exchange rate: From Trilemma to Dilemma
- Monetary policy is harder in open economies under financial frictions: But can still design policy to mitigate spillovers
- Self-oriented policy can do a lot if takes financial factors into consideration: Harder Trilemma not quite Dilemma.

Follow-up project

- Address Engel's (2015) stylized facts: excess currency returns correlates positively with interest rate differentials in the short run and negatively in the long run.
- The theoretical idea is taken from Gabaix and Maggiori (2015): Risk bearing ability of financial intermediaries drives UIP deviations ρ_{t+1}

$$\widetilde{\rho}_{t+1} \equiv \frac{1}{b}\left[\widetilde{\psi}_t^C \gamma + \psi^C \widetilde{\gamma}_t - a\widetilde{\Omega}_{t+1}\right]$$

where $\gamma \approx$ leverage and

$$\widetilde{\Omega}_{t+1} = \sum_{j=0}^{\infty} \varpi \widetilde{\gamma}_{t+1+j}.$$

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Thank you!