Is capital flow management effective? Evidence based on U.S. monetary policy shocks

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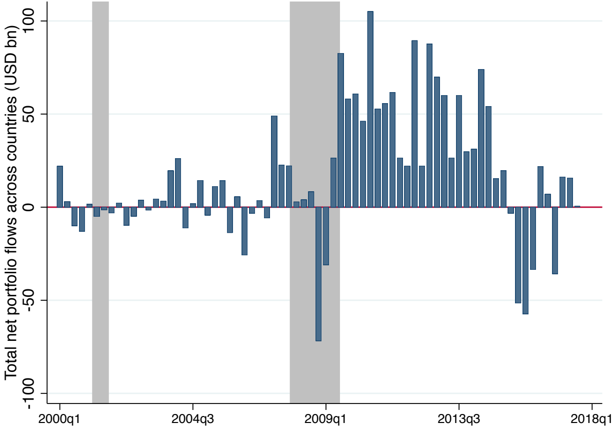
[1] The views expressed herein are my own and do not necessarily reflect those of the Hong Kong Monetary Authority.

Strong portfolio flows into EMEs since crisis



Source: IMF. Countries include: Argentina, Brazil, Chile, China, Columbia, India, Indonesia, South Korea, Malaysia, Peru, Philippines, Russia, South Africa, Thailand and Turkey. Portfolio flows are mostly flows into bond and equity markets.

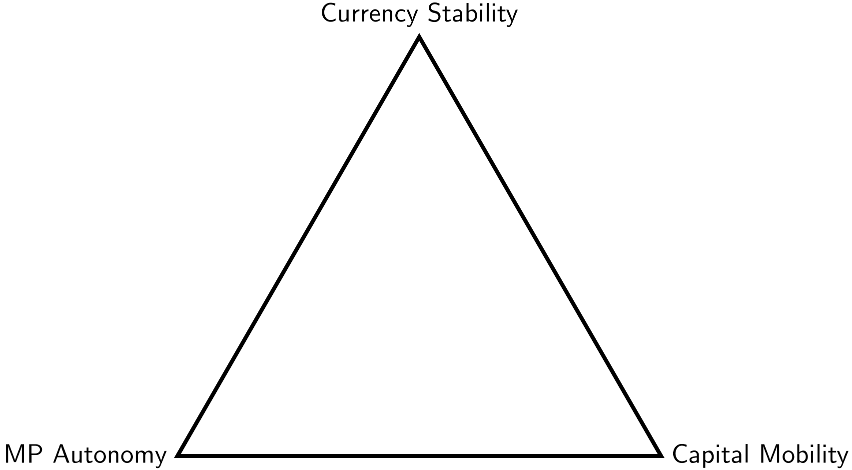
Causes and concerns

- EMEs are relatively unscathed during the crisis.
- EMEs grew faster, their external positions (current account, FX reserves) has gotten stronger, institutions (e.g., central banks) have become more credible.
- Accomodative monetary policies in Advanced Economies ("AEs") make EME investments attractive: "reach for yield".

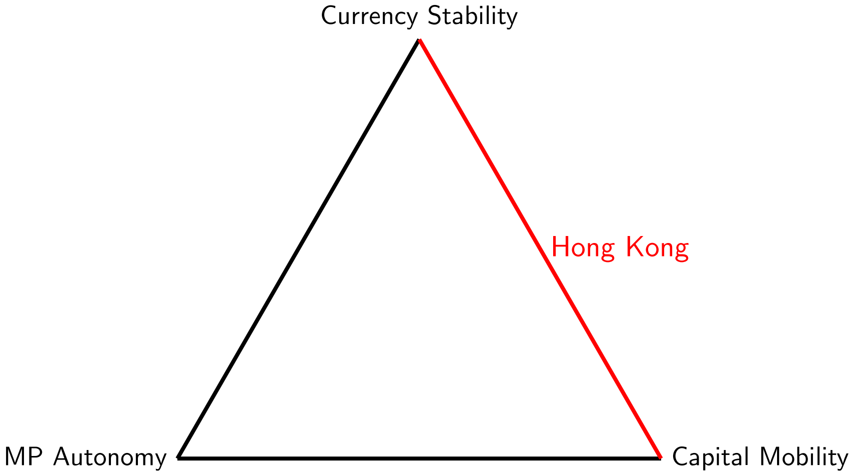
Key concern:

Capital outflows can occur abruptly, leading to financial instability.

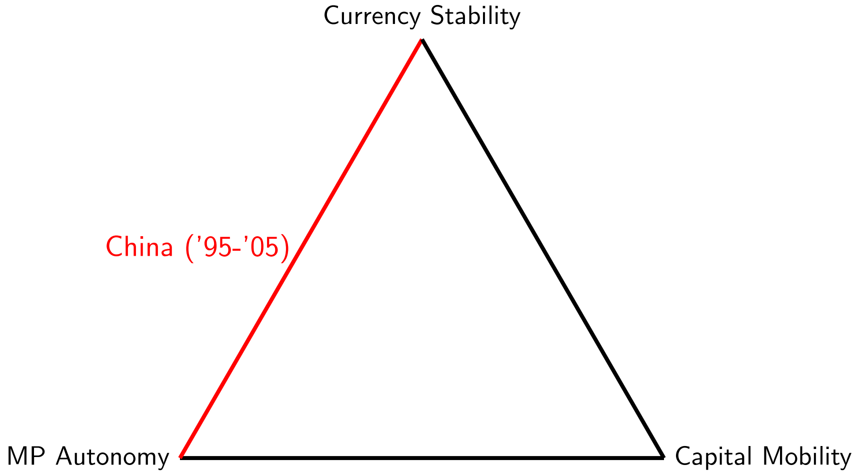
The Mundell-Fleming Trilemma



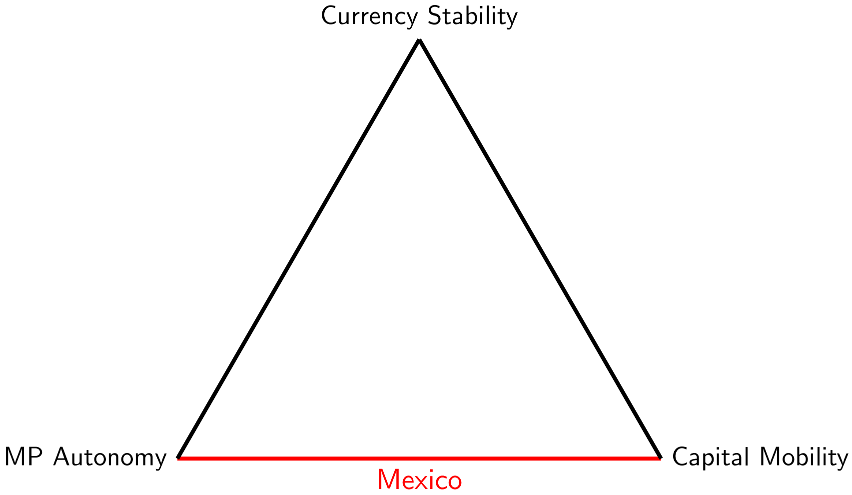
The Mundell-Fleming Trilemma



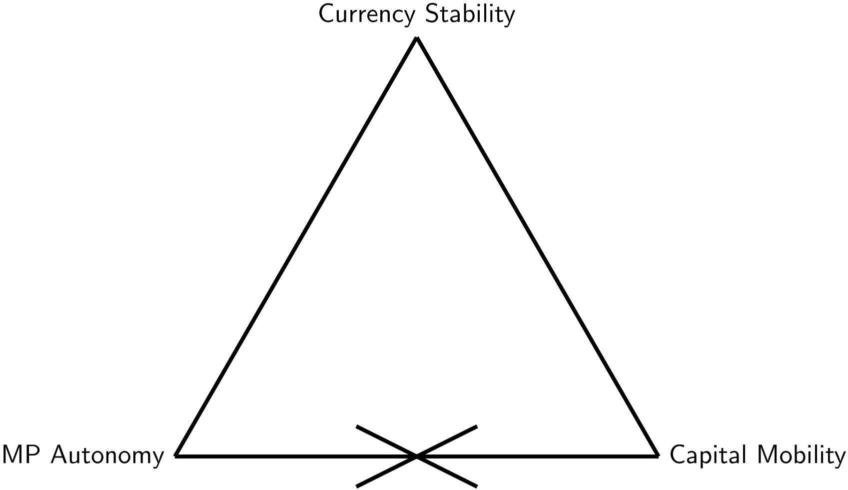
The Mundell-Fleming Trilemma



The Mundell-Fleming Trilemma



Recent view: Dilemma and Global shocks



Policy response to excessive capital flows

- Global factors such as risk appetite of AE investors drive capital flows.
- A floating exchange rate inadequate as a stabilizer: Davis and Presno (2017), IMF (2011), Ostry, Ghosh, Chamon and Qureshi (2012).
- Impact of "terms of trade shocks" and "financial shocks" very different.
- Several EMEs are not in a floating regime.

Policy recommendation:

If capital flows management (CFM) are effective, impose them countercyclically.

Key research questions

Does the average EME following this policy recommendation and use CFMs countercyclically?

- Fernandez et al. (2015) vs Zhou (2017) and Parischa et al. (2018).

Are CFMs generally effective in tempering capital flows?

- Edison and Reinhart (2001), Forbes et al. (2015) vs Ostry et al. (2012).

Our answer to both questions: **Yes.**

Why might CFMs not be effective?

- Exploitation of loopholes.
- Implementation failures.
- Not calibrated properly—e.g., measures are too weak, or timing is wrong.
- **Endogeneity** (a problem for the econometrian):
  - CFMs may temper volatile capital flows, but...
  - ...countries with more volatile capital flows are more likely to impose CFMs.

OLS of capital flows on CFMs yields nothing

Dependent variable: portfolio flows	
CFM	0.011
	(0.026)
Inflation diff.	0.035
	(0.036)
Growth diff.	0.042
	(0.045)
Current account	0.006
	(0.040)
Currency depreciation	-0.061
	(0.057)
Observations	795
Countries	15
R^2	0.113

Our solution to the endogeneity problem

Uses exogenous U.S. monetary policy shocks as instruments.

- An important "push" factor of financial cycles (Rey, 2013); generally not influenced by EMEs capital flows or CFMs.
- CFMs instrumented by U.S. MP shocks used to identify the causal effect of CFMs on portfolio flows.

Focus on quarterly changes of the number of CFMs from Parischa et al. (2018).

- Most studies use annual data that captures whether CFMs exist; tend to use "0" or "1" variables.
- Parischa et al.'s (2018) measure captures the intensive margin and has time variation.

Results preview

1. The average EME adjusts CFMs countercyclically in response to U.S. MP shocks: inflow tightening controls imposed upon "easing" shocks.
2. More inflow tightening actions → slower portfolio inflows.
3. Asymmetry 1: CFMs respond to easing U.S. MP shocks, not tightening ones.
   - "Prevention" rather than "Hotel California"; 2.5-lemma by Han and Wei (2018).
4. Asymmetry 2: In response easing U.S. MP shocks, CFM typically focuses on moderating inflows from nonresidents, rather than residents.

Data: changes in CFMs

Parischa et al. (2018):

- 18 countries from 2001Q1 to 2015Q4.
- Argentina, Brazil, Chile, China, Columbia, Egypt, India, Indonesia, South Korea, Malaysia, Mexico, Morocco, Peru, Philippines, Russia, South Africa, Thailand and Turkey.
- Exclude Egypt, Mexico and Morocco in regression analysis: little CFM changes.

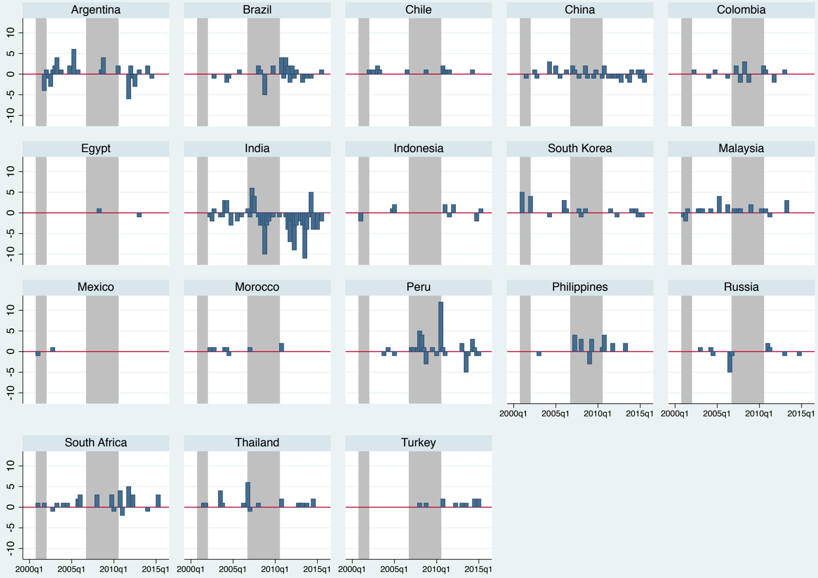
Data: changes in CFMs

- $IE_{c,t}$ is the number of **I**nflow **E**asing CFMs on nonresidents;
- $IT_{c,t}$ is the number of **I**nflow **T**ightening CFMs on nonresidents;
- $OE_{c,t}$ is the number of **O**utflow **E**asing CFMs on residents;
- $OT_{c,t}$ is the number of **O**utflow **T**ightening CFMs on residents.

Data: changes in CFMs

- $NIT_{c,t} \equiv IT_{c,t} - IE_{c,t}$ is the net number of inflow tightening actions applied on nonresidents;
- $NOE_{c,t} \equiv OE_{c,t} - OT_{c,t}$ is the net number of outflow easing actions applied on residents;
- $NNKIR_{c,t} \equiv NIT_{c,t} + NOE_{c,t}$ is the "net-net" change in capital inflow reducing measures

$NNKIR_{c,t}$



Argentina
Brazil
Chile
China
Colombia
Egypt
India
Indonesia
South Korea
Malaysia
Mexico
Morocco
Peru
Philippines
Russia
South Africa
Thailand
Turkey
10
5
0
-5
-10
2000q1
2005q1
2010q1
2015q1

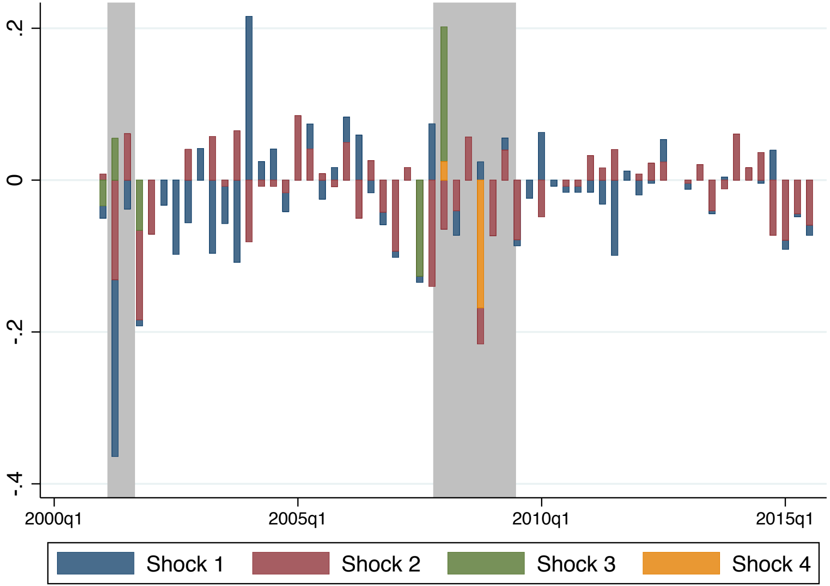
Event study method (Gurkaynak, Sack and Wright 2005, Hanson and Stein, 2015, Gilchrist et al., 2015)

- Changes in 2-year U.S. Treasury yield during a 30-minute window that surrounds FOMC announcements.

Quarterly data:

- Two regular meetings in a quarter; nonregular meetings held during recessions (three meetings in four quarters and four meetings in two quarters).
- Use MP shocks in the two regular meetings.

U.S. monetary policy shocks

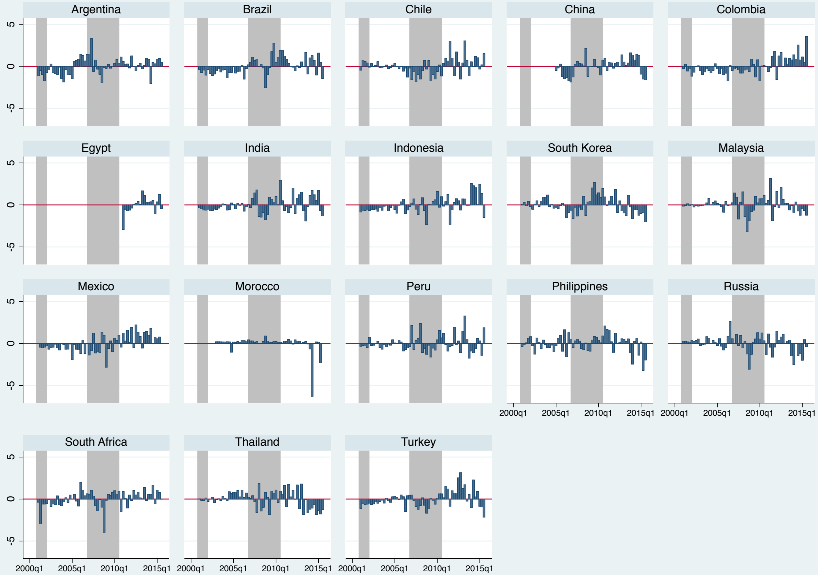


Data: Capital flows

IMF capital flow data: Portfolio, FDI, Derivatives and Others.

- Focus on portfolio flows data: most likely to flee.
- Liabilities ($P^L_{c,t}$): net portfolio inflows by nonresidents;
- Assets ($P^A_{c,t}$): net portfolio outflows by residents;
- Net inflows ($P^N_{c,t}$): liabilities minus assets.

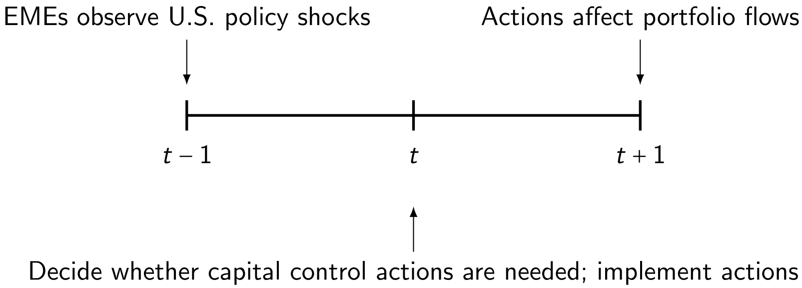
Z-scores of $P^N_{c,t}$



Data: other macro variables

- Inflation: year-on-year change in CPI
- Real GDP growth
- CA balance in U.S. dollars
- Nominal exchange rate: units of the local currency per U.S. dollar

Illustration of identification strategy



First stage:

$$
\begin{aligned}
NNKIR_{c,t} &= \theta_c + \gamma_1 y^1_{t-1} + \gamma_2 y^2_{t-1} + \Gamma' \mathbf{Z}_{c,t-1} + \xi_{c,t} \\
\mathbf{Z}_{c,t-1} &\equiv \left[\pi_{c,t-1}, g_{c,t-1}, \Delta(CA/GDP^*)_{c,t-1}, \Delta \ln s_{c,t-1}\right]'
\end{aligned}
$$

Second stage:

$$
\begin{aligned}
P^N_{c,t+1} &= \alpha_c + \beta \widehat{NNKIR}_{c,t} + \Psi' \widetilde{\mathbf{Z}}_{c,t} + \sum_{i=0}^{3} \phi_i P^N_{c,t-i} + \varepsilon_{c,t+1} \\
\widetilde{\mathbf{Z}}_{c,t} &\equiv \left[\pi_{c,t} - \pi^{U.S.}_{c,t}, g_{c,t} - g^{U.S.}_{c,t}, \Delta(CA/GDP^*)_{c,t}, \Delta \ln s_{c,t}\right]'
\end{aligned}
$$

Efficient GMM is used to estimate the over-identified model.

First stage regression results

	Dependent variable			
	$NNKIR_{c,t}$			$WNNKIR_{c,t}$
	(1)	(2)	(3)	(4)
y^1_{t-1}	0.239	-0.274		-0.006
	(0.335)	(0.307)		(0.308)
y^2_{t-1}	-1.429*	-1.713**		-1.701***
	(0.834)	(0.762)		(0.594)
Δr^{shadow}_{t-1}			-0.052	
			(0.037)	
$\pi_{c,t-1}$		-0.019	-0.025	-0.042**
		(0.021)	(0.022)	(0.018)
$g_{c,t-1}$		0.077***	0.071***	0.081***
		(0.023)	(0.024)	(0.018)
$\Delta(CA/GDP^*)_{c,t-1}$		0.028	0.034	0.026
		(0.035)	(0.034)	(0.031)
$\Delta i_{c,t-1}$		-0.009	-0.013	0.023
		(0.031)	(0.031)	(0.019)
$\Delta \ln s_{c,t-1}$		-0.176***	-0.172***	-0.167***
		(0.033)	(0.033)	(0.034)
Observations	870	841	841	841
Countries	15	15	15	15
Standard error type	Driscoll and Kraay (1998) (12 quarters)			
R^2	0.006	0.046	0.039	0.046

Key results

	Dependent variable		
	$P^N_{c,t+1}$		$\left(\frac{P^N}{GDP^*}\right)_{c,t+1}$
	No instruments	Key result: GMM-FE	Key result: GMM-FE
	(1)	(2)	(3)
$NNKIR_{c,t}$	0.011	-0.403***	-0.354***
	(0.026)	(0.108)	(0.111)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	0.035	-0.008	-0.008
	(0.036)	(0.029)	(0.032)
$g_{c,t} - g^{U.S.}_{c,t}$	0.042	0.079***	0.068**
	(0.045)	(0.031)	(0.031)
$\Delta\left(CA/GDP^*\right)_{c,t}$	0.006	0.002	0.002
	(0.040)	(0.034)	(0.026)
$\Delta \ln s_{c,t}$	-0.061	-0.038	-0.054
	(0.057)	(0.045)	(0.039)
lagged dependent variable	four lags included		
Observations	795	795	795
Countries	15	15	15
Standard error type	Driscoll and Kraay (1998) (12 quarters)		
S-H $J-$statistics p-value	n/a	0.675	0.593

Robustness checks

Excluding FOMC meetings that cited foreign developments Go
Using weighted version of $NNKIR_{c,t}$ Go
Longer-term monetary policy shocks Go
Parsing out macroprudential policies Go
Excluding China from the sample Go
Separate results for debt and equity portfolio flows Go
Before and after crisis Go
Summed monetary policy shocks Go

Summary of key results

Does the average EME use CFMs countercyclically?

- Yes. A one percentage point easing U.S. monetary policy shock ⇒ 1.7 standard deviation increase in net-net inflow reducing measures.

Are CFMs generally effective in tempering capital flows?

- Yes. A one standard deviation increase in net-net inflow reducing measures ⇒ 0.4 standard deviation decrease in net-net portfolio inflows.

These findings are quite robust. But what's behind these results?

Two interesting asymmetries to be explored

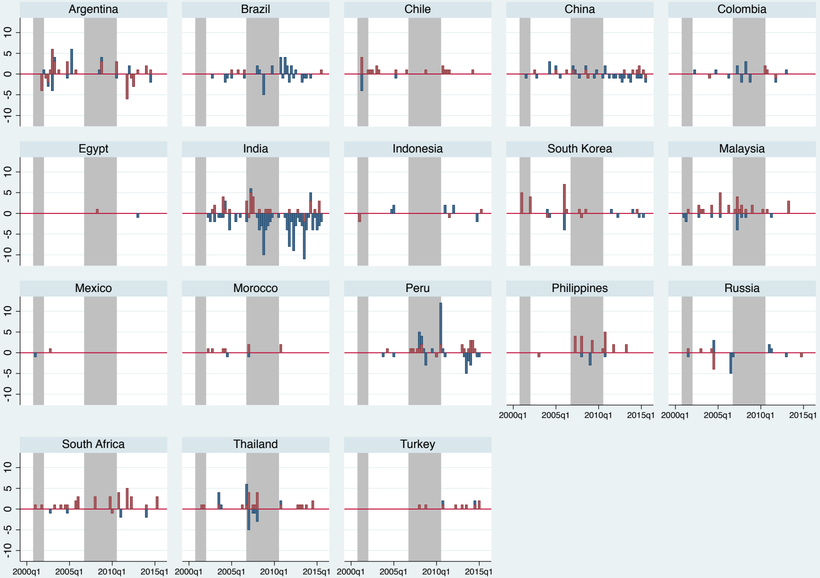
Easing shocks are different than tightening shocks (Han and Wei, 2018):

- $y^{i-}_{t-1} \equiv y^{i}_{t-1}\mathbf{1}(y^{i}_{t-1} \leq 0)$
- $y^{i+}_{t-1} \equiv y^{i}_{t-1}\mathbf{1}(y^{i}_{t-1} > 0)$

CFMs imposed on nonresidents are different from those imposed on residents. $NNKIR_{c,t}$ is the sum of:

- $NIT_{c,t}$: Changes in net inflow tightening on nonresidents
- $NOE_{c,t}$: Changes in net outflow easing on residents
- Which one is driving the results?

$NIT_{c,t}$ and $NOE_{c,t}$



$NIT_{c,t}$ and $NOE_{c,t}$: First stage regressions

	Dependent variable			
	$NNKIR_{c,t}$		$NIT_{c,t}$	$NOE_{c,t}$
	(1)	(2)	(3)	(4)
y^{1}_{t-1}	-0.274			
	(0.307)			
y^{2}_{t-1}	-1.713**			
	(0.762)			
y^{1-}_{t-1}		0.392	0.065	0.563
		(0.514)	(0.548)	(0.787)
y^{1+}_{t-1}		-1.162	-0.829	-0.754
		(0.982)	(0.722)	(0.758)
y^{2-}_{t-1}		-2.436**	-0.862*	-2.018
		(0.956)	(0.453)	(1.449)
y^{2+}_{t-1}		-0.794	0.492	-1.366
		(2.178)	(1.958)	(1.322)
$\pi_{c,t-1}$	-0.019	-0.019	-0.062**	0.016
	(0.021)	(0.021)	(0.029)	(0.036)
$g_{c,t-1}$	0.077***	0.084***	0.054**	0.025
	(0.023)	(0.023)	(0.026)	(0.031)
$\Delta(CA/GDP^{*})_{c,t-1}$	0.028	0.029	-0.019	0.019
	(0.035)	(0.036)	(0.039)	(0.020)
$\Delta \ln s_{c,t-1}$	-0.176***	-0.176***	-0.085**	-0.143***
	(0.033)	(0.034)	(0.035)	(0.033)
Observations	841	841	841	841
Countries	15	15	15	15
Standard error type	Driscoll and Kraay (1998) (12 quarters)			
R^2	0.046	0.047	0.016	0.028

$NIT_{c,t}$: Key results

	Dependent variable			
	$P^L_{c,t+1}$			$\left(\frac{P^L}{GDP^*}\right)_{c,t+1}$
	Key result	"concerns abroad" FOMC meetings removed	$WNIT_{c,t}$ as causal variable	Key result
	(1)	(2)	(3)	(4)
$NIT_{c,t}$	-0.861***	-0.612***		-0.755***
	(0.247)	(0.227)		(0.251)
$WNIT_{c,t}$			-0.865***	
			(0.242)	
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	-0.061	-0.052	-0.093*	-0.077*
	(0.053)	(0.043)	(0.055)	(0.045)
$g_{c,t} - g^{U.S.}_{c,t}$	0.069	0.025	0.064	0.066
	(0.048)	(0.033)	(0.044)	(0.048)
$\Delta\left(CA/GDP^*\right)_{c,t+1}$	0.038	0.049**	0.037	0.037
	(0.026)	(0.021)	(0.025)	(0.027)
$\Delta \ln s_{c,t}$	-0.073*	-0.049	-0.061	-0.094**
	(0.044)	(0.037)	(0.041)	(0.043)
lagged dependent variable	four lags included			
Observations	795	753	795	795
countries	15	15	15	15
Standard error type	Driscoll and Kraay (1998) (12 quarters)			
S-H $J-$statistics p-value	0.812	0.828	0.807	0.829

Caveats

Our findings don't say which CFMs are optimal under which conditions; implementation challenges are not considered (Mendoza 2016).

We also do not capture the costs of capital controls, such as:

- Loss of market efficiency introduced by capital controls,
- Financial stability risks such as migrations of activities to shadow banks (Alfaro et al., 2017),
- Spillovers to international trade (Wei and Zhang, 2007),

Conclusions

- Large capital flows are disruptive to EMEs; “surge” usually followed by “sudden stop”.
- Floating exchange rates not the panacea to financial shocks.
- CFMs is an effective policy response. In a properly identified model,
  - EMEs adjust CFMs countercyclically in response to U.S. monetary policy shocks;
  - Significant causal effects of CFMs on portfolio capital flows.
- The underlying mechanism has asymmetries:
  - Inflow tightening measures on nonresidents increased following easing U.S. MP shocks and they reduce nonresident flows.

Robustness: excl. "foreign" FOMC meetings

Back

	Dependent variable		
	$P^N_{c,t+1}$		$\left(\frac{P^N}{GDP^*}\right)_{c,t+1}$
	Key result	"concerns abroad" FOMC meetings removed	"concerns abroad" FOMC meetings removed
	(1)	(2)	(3)
$NNKIR_{c,t}$	-0.403***	-0.259**	-0.236**
	(0.108)	(0.116)	(0.110)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	-0.008	-0.009	-0.013
	(0.029)	(0.028)	(0.027)
$g_{c,t} - g^{U.S.}_{c,t}$	0.079***	0.066**	0.060**
	(0.031)	(0.029)	(0.029)
$\Delta\left(CA/GDP^*\right)_{c,t}$	0.002	0.019	0.021
	(0.034)	(0.034)	(0.028)
$\Delta \ln s_{c,t}$	-0.038	-0.014	-0.024
	(0.045)	(0.043)	(0.041)
lag of dependent variable	four lags included		
Observations	795	753	753
Countries	15	15	15
Standard error type	Driscoll and Kraay (1998) (12 quarters)		
S-H $J-$statistics p-value	0.675	0.742	0.737

Robustness: Weighted $NNKIR_{c,t}$

Back

	Dependent variable		
	$P^N_{c,t+1}$		$\left(\frac{P^N}{GDP^*}\right)_{c,t+1}$
	Key result (1)	$WNNKIR_{c,t}$ as causal variable (2)	$WNNKIR_{c,t}$ as causal variable (3)
$NNKIR_{c,t}$	-0.403***		
	(0.108)		
$WNNKIR_{c,t}$		-0.443***	-0.377***
		(0.118)	(0.118)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	-0.008	-0.022	-0.017
	(0.029)	(0.030)	(0.033)
$g_{c,t} - g^{U.S.}_{c,t}$	0.079***	0.088***	0.073**
	(0.031)	(0.030)	(0.031)
$\Delta\left(CA/GDP^*\right)_{c,t+1}$	0.002	0.011	0.006
	(0.034)	(0.033)	(0.026)
$\Delta \ln s_{c,t}$	-0.038	-0.033	-0.048
	(0.045)	(0.043)	(0.039)
lag of dependent variable	four lags included		
Observations	795	795	795
Countries	15	15	15
Standard error type	Driscoll and Kraay (1998) (12 quarters)		
S-H $J-$statistics p-value	0.675	0.705	0.608

Robustness: Longer-term monetary policy shocks

Back

	Dependent variable		
	$NNKIR_{c,t+1}$	$P^N_{c,t+1}$	$\left(\frac{P^N}{GDP^*}\right)_{c,t+1}$
	First stage	GMM-FE	GMM-FE
	(1)	(2)	(3)
y^1_{t-1}	-0.569		
	(1.148)		
y^2_{t-1}	-3.232***		
	(0.587)		
e^1_{t-1}	-1.693		
	(1.547)		
e^2_{t-1}	-0.521***		
	(0.140)		
$\pi_{c,t-1}$	0.007		
	(0.027)		
$g_{c,t-1}$	0.089**		
	(0.035)		
$\Delta\,(CA/GDP^*)_{c,t-1}$	-0.010		
	(0.044)		
$\Delta \ln s_{c,t-1}$	-0.234***		
	(0.028)		
$NNKIR_{c,t}$		-0.320***	-0.200**
		(0.107)	(0.081)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$		0.062***	0.050***
		(0.017)	(0.013)
$g_{c,t} - g^{U.S.}_{c,t}$		0.034	0.040
		(0.029)	(0.026)
$\Delta\,(CA/GDP^*)_{c,t}$		-0.098***	-0.092***
		(0.029)	(0.026)
$\Delta \ln s_{c,t}$		-0.175***	-0.166***
		(0.034)	(0.031)
lagged dependent variable	four lags included		
Observations	511	511	511
Countries	15	15	15
Standard error type	Driscoll and Kraay (1998) (12 quarters)		
S-H $J-$statistics p-value		0.864	0.871

Back

	Dependent variable			
	$P^N_{c,t+1}$			$(\frac{P^N}{GDP^*})_{c,t+1}$
	Key result	Prudential Tightening	Prudential policy-free $NNKIR_{c,t}$	Prudential policy-free $NNKIR_{c,t}$
	(1)	(2)	(3)	(4)
$NNKIR_{c,t}$	-0.403***			
	(0.108)			
$NPT_{c,t}$		-0.242		
		(0.160)		
$NNKIR^{noprud}_{c,t}$			-0.524***	-0.463**
			(0.177)	(0.181)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	-0.008	0.019	0.025	0.017
	(0.029)	(0.031)	(0.022)	(0.025)
$g_{c,t} - g^{U.S.}_{c,t}$	0.079***	0.067**	0.065**	0.051*
	(0.031)	(0.031)	(0.034)	(0.030)
$\Delta(CA/GDP^*)_{c,t}$	0.002	-0.003	-0.015	-0.015
	(0.034)	(0.027)	(0.039)	(0.031)
$\Delta \ln s_{c,t}$	-0.038	-0.047	-0.072*	-0.069*
	(0.045)	(0.054)	(0.037)	(0.039)
lagged dependent variable	four lags included			
Observations	795	714	714	714
Countries	15	14	14	14
Standard error type	Driscoll and Kraay (1998) (12 quarters)			
S-H J-statistics p-value	0.675	0.618	0.697	0.650

Robustness: excluding China from the sample

Back

	Dependent variable		
	$P^N_{c,t+1}$		$(\frac{P^N}{GDP^*})_{c,t+1}$
	Key result	China excluded	China excluded
	(1)	(2)	(3)
$NNKIR_{c,t}$	-0.403***	-0.429***	-0.400***
	(0.108)	(0.129)	(0.131)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	-0.008	-0.020	-0.028
	(0.029)	(0.028)	(0.028)
$g_{c,t} - g^{U.S.}_{c,t}$	0.079***	0.073**	0.061*
	(0.031)	(0.033)	(0.034)
$\Delta(CA/GDP^*)_{c,t}$	0.002	0.002	0.000
	(0.034)	(0.037)	(0.029)
$\Delta lns_{c,t}$	-0.038	-0.038	-0.062
	(0.045)	(0.047)	(0.040)
lagged dependent variable	four lags included		
Observations	795	756	756
Countries	15	14	14
Standard error type	Driscoll and Kraay (1998) (12 quarters)		
S-H J-statistics p-value	0.675	0.661	0.570

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Regressor	Dependent variable				
	$P^N_{c,t+1}$	$P^{ND}_{c,t+1}$	$P^{NE}_{c,t+1}$	$(\frac{P^{ND}}{GDP^*})_{c,t+1}$	$(\frac{P^{NE}}{GDP^*})_{c,t+1}$
	Key result	Net debt flows	Net equity flows	Net debt flows	Net equity flows
	(1)	(2)	(3)	(4)	(5)
$NNKIR_{c,t}$	-0.429***	-0.436***	-0.390***	-0.730***	-0.306***
	(0.129)	(0.152)	(0.100)	(0.201)	(0.074)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	-0.020	-0.009	0.239***	-0.018	0.175***
	(0.028)	(0.017)	(0.039)	(0.022)	(0.032)
$g_{c,t} - g^{U.S.}_{c,t}$	0.073**	0.111**	0.065*	0.155**	0.032
	(0.033)	(0.048)	(0.038)	(0.071)	(0.033)
$\Delta(CA/GDP^*)_{c,t}$	0.002	0.020	0.064*	0.020	0.044*
	(0.037)	(0.029)	(0.037)	(0.040)	(0.026)
$\Delta \ln s_{c,t}$	-0.038	0.058***	0.005	0.054*	0.005
	(0.047)	(0.017)	(0.023)	(0.029)	(0.019)
lag of dependent variable	four lags included				
Observations	756	308	285	308	285
Countries	14	13	13	13	13
Standard error type	Driscoll and Kraay(1998)(12 quarters)				
S-H J-statistics p-value	0.661	0.882	0.937	0.854	0.970

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Regressor	Dependent variable				
	$P^N_{c,t+1}$			$(\frac{P^N}{GDP^*})_{c,t+1}$	
	Key result	Subsample 1	Subsample 2	Subsample 1	Subsample 2
	(1)	(2)	(3)	(4)	(5)
$NNKIR_{c,t}$	-0.403***	-0.396***	-0.369**	-0.645***	-0.217
	(0.108)	(0.110)	(0.153)	(0.107)	(0.136)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	-0.008	-0.018**	0.066***	-0.029**	0.056***
	(0.029)	(0.009)	(0.025)	(0.012)	(0.019)
$g_{c,t} - g^{U.S.}_{c,t}$	0.079***	0.032	0.042	0.033	0.052
	(0.031)	(0.045)	(0.035)	(0.049)	(0.032)
$\Delta(CA/GDP^*)_{c,t}$	0.002	0.066***	-0.098***	0.084***	-0.087***
	(0.034)	(0.019)	(0.034)	(0.027)	(0.032)
$\Delta \ln s_{c,t}$	-0.038	0.043***	-0.178***	0.045***	-0.160***
	(0.045)	(0.009)	(0.039)	(0.013)	(0.040)
lag of dependent variable	four lags included				
Observations	795	284	511	284	511
Countries	15	15	15	15	15
Standard error type	Driscoll and Kraay(1998)(12 quarters)				
S-H J-statistics p-value	0.675	0.828	0.710	0.820	0.748

Robustness: using sum of monetary policy shocks

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	Dependent variable		
	$P^N_{c,t+1}$		$\left(\frac{P^N}{GDP^*}\right)_{c,t+1}$
		summed shocks	summed shocks
	(1)	(2)	(3)
$NNKIR_{c,t}$	-0.403***	-0.233*	-0.157
	(0.108)	(0.120)	(0.109)
$\pi_{c,t} - \pi^{U.S.}_{c,t}$	-0.008	0.008	0.014
	(0.029)	(0.032)	(0.033)
$g_{c,t} - g^{U.S.}_{c,t}$	0.079***	0.082**	0.068**
	(0.031)	(0.038)	(0.037)
$\Delta\left(CA/GDP^*\right)_{c,t}$	0.002	0.002	0.003
	(0.034)	(0.029)	(0.022)
$\Delta \ln s_{c,t}$	-0.038	-0.029	-0.041
	(0.045)	(0.044)	(0.039)
lag of dependent variable	four lags included		
Observations	795	759	759
Countries	15	15	15
Standard error type	Driscoll and Kraay (1998) (12 quarters)		
S-H $J-$statistics p-value	0.675	0.554	0.493