Do Capital Controls Limit Inflow Surges?

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Umang Rawat

Joint work with Apoorv Bhargava, Romain Bouis, Annamaria Kokenyne, Manuel Perez Archila, and Ratna Sahay

Motivation and Research Questions

1. **Timing**. Do countries respond to inflow surges by introducing capital controls?

2. **Effectiveness**. Are capital controls effective in limiting future surges?

3. **Spillovers**. Are there any multilateral spillovers from capital control actions to other countries?

Data and Descriptive Statistics

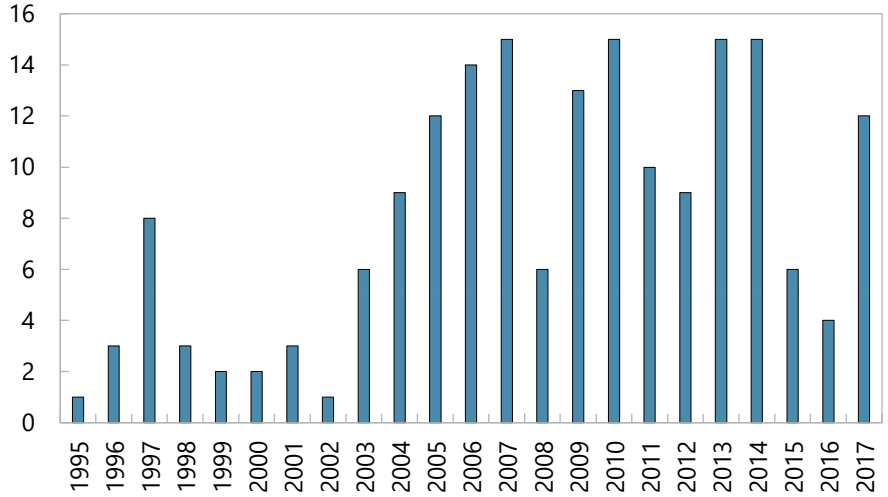
Data

- 40 AE and EMDE's over 1995 – 2018; quarterly data
- **Capital Flows** – We use gross private non-resident inflows i.e. non-resident capital inflows – non-resident capital outflows (as a percent of GDP)
- **Capital Controls** – Narrative approach using changes section of AREAER to construct an 'actions' database; each policy change has a unique classification along the following dimensions:
  - *Direction of flows*. Controls on resident liabilities (non-resident inflows) and their repayments (non-resident outflows)
  - *Direction of change*. Easing or tightening of restrictions. Tightening measures on non-resident inflows and non-resident outflows outside of crisis events.
  - *Asset class*. Four asset classes are considered – Equity, Debt, FDI, and Other flows (commercial and financial credits)
  - *Type of instrument*. Quantitative (e.g. limits), price-based (e.g. taxes and URR), and administrative/monitoring (e.g. authorizations, notifications)
- Overall, 184 measures identified across 4 asset classes

Tightenings of capital controls on nonresidents have progressively increased since early 2000s

Number of tightened capital controls on nonresident inflows

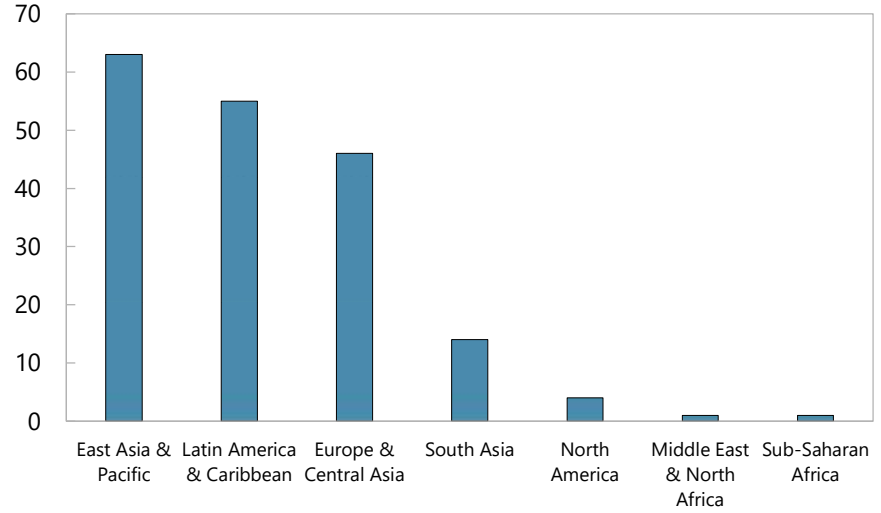
(Annual)



Sources: AREAER database, IMF; and Authors' calculations.

Tightened capital controls on nonresident inflows

(by Region, from 1995-2018)

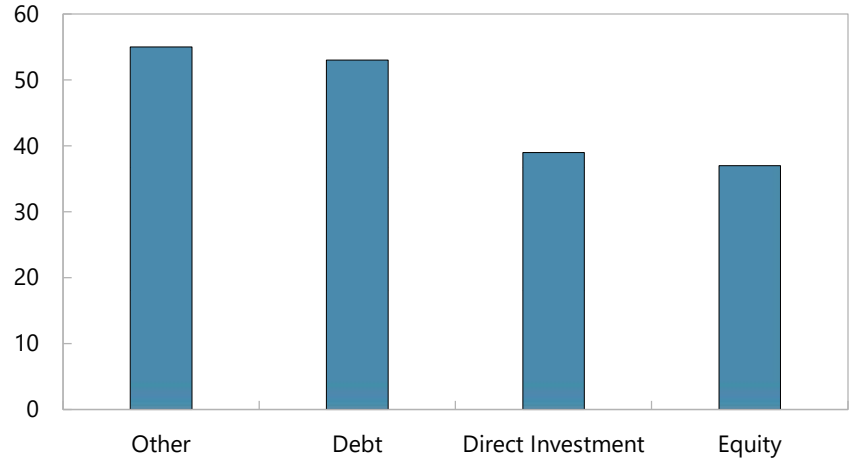


Sources: AREAER database, IMF; and Authors' calculations.

While heterogenous by type, tightenings on nonresident inflows are evenly distributed across the four asset classes.

Number of tightened capital controls on nonresident inflows by targeted assets

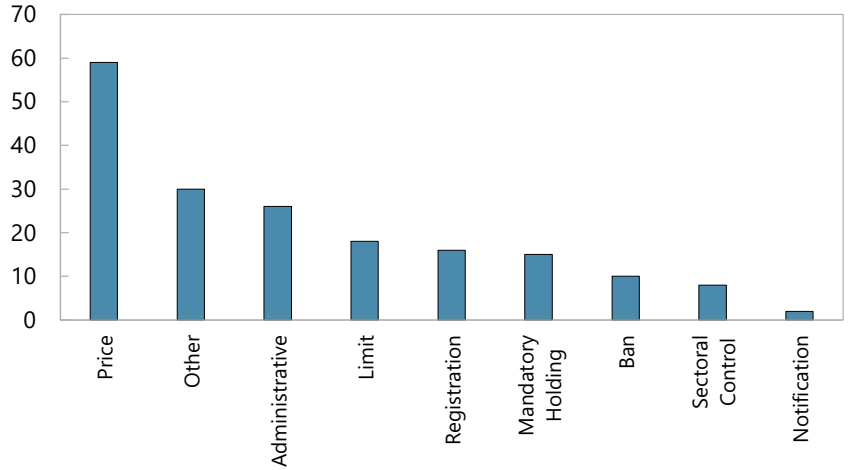
(From 1995-2018)



Sources: AREAER database, IMF; and Authors' calculations.

Number of tightened capital controls on nonresident inflows by type

(From 1995-2018)



Sources: AREAER database, IMF; and Authors' calculations.

Surges of Capital Inflows

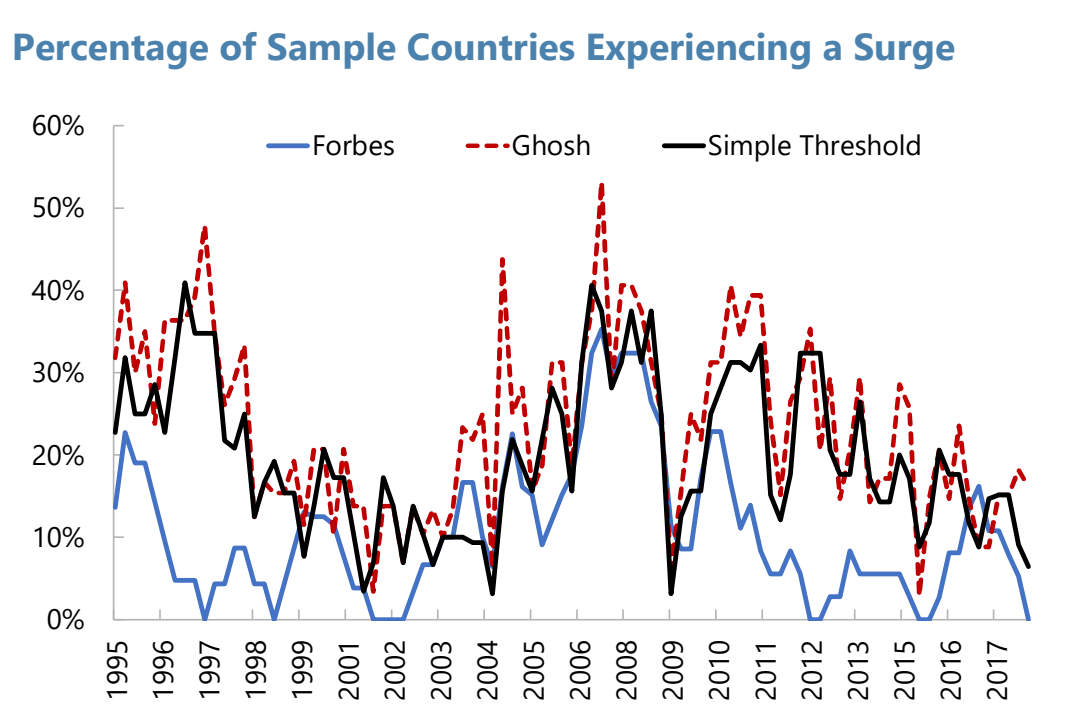
Three approaches are used to identify nonresident capital inflow surges:

1) Forbes and Warnock's (2012, 2021) definition – surge when 3 conditions are met: (i) y-o-y changes in 4-qtr gross capital inflows > historical average by 2 std. dev, (ii) episode lasts for all consecutive quarters for which y-o-y change in capital flows > historical average by 1 std. dev, and (iii) the length of the episode is greater than one quarter;

2) Ghosh et al.'s (2014) approach – surge when capital flow observation lies in the top 30th percentile of both the country-specific and the full distribution of capital flows, expressed in percent of GDP;

3) Simple threshold definition of surges for the gross total nonresident inflows (5 percent of GDP).

Despite low correlation, the different surge measures display similar broad trends



Sources: Financial Flow Analytics, IMF; and Authors' calculations.

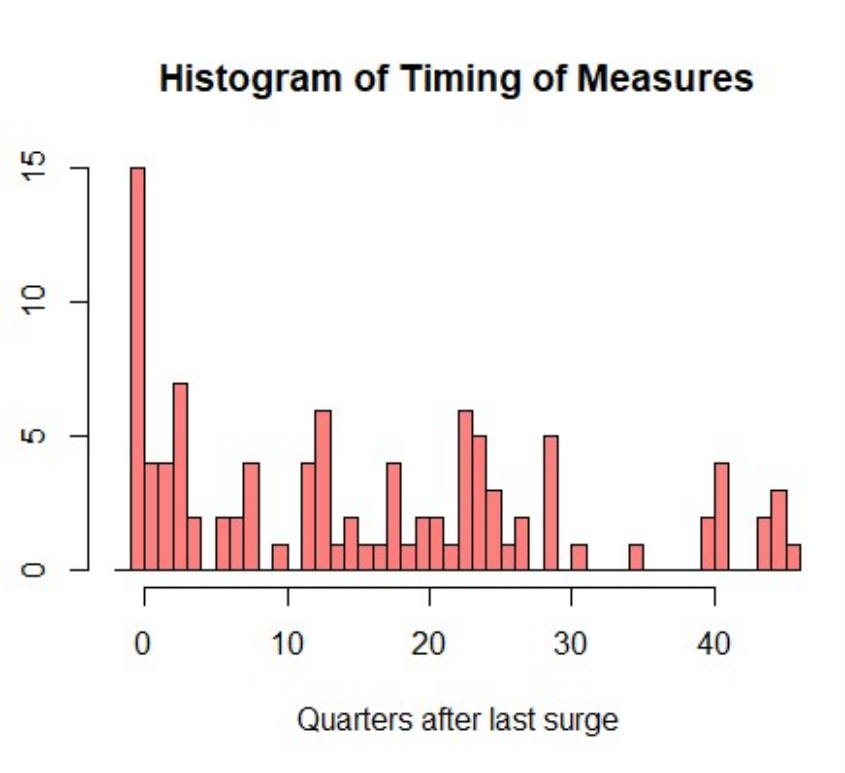
Are capital controls tightened in response to/or in anticipation of inflow surges?

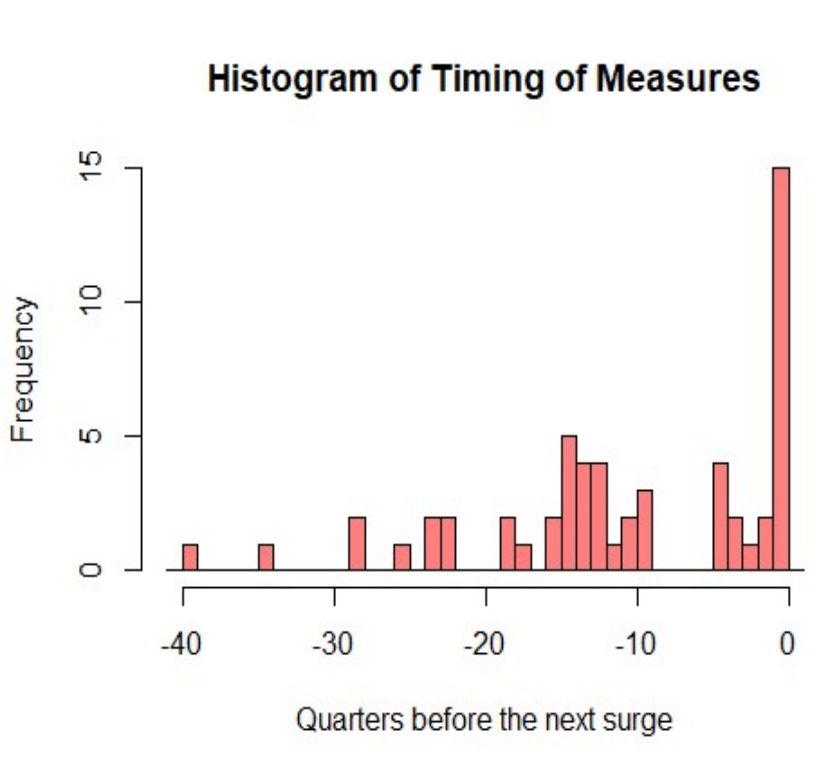
The 2012 IMF Institutional View on the Liberalization and Management of Capital Controls (IV) proposes that CFMs and CFM/MPMs may be appropriate during inflow surges; the 2022 revision of the IV proposes that CFM/MPMs may additionally be appropriate outside surges in the case of high stock vulnerabilities, the latter possibly arising either without a surge or in the aftermath of a surge.

CFMs are defined as measures that are designed to limit capital flows. These include (i) residency-based measures (which we call capital controls in our analysis; and (ii) other CFMs, which do not discriminate by residency but are nonetheless designed to limit capital flows.

Controls are not only tightened around inflow surges

Distribution of the Timing of Introduction of Tightening with respect to Surges





Is tightening of capital controls effective in limiting future surges?

Effects of Capital Controls on Probability of Surges (at aggregate level)

- We estimate a fixed-effects logit model where the dependent variable takes the value one if the period is an inflow surge, and zero otherwise

$$\text{Prob}\left(InflowSurge_{i,t}\right) = \text{F}\left(\beta_1 Control_{\,i,t-1,t-4} + \beta_2 DiffGDPgrowth_{i,t-1} + \beta_3 DiffIR_{i,t-1} + \theta X_{i,t-1} + \gamma_i + \theta_t + \varepsilon_{i,t}\right)$$

- Control is a dummy variable equal to one if the country introduces capital controls on non-resident inflows (and/or on non-resident outflows, outside of crises) in the past four quarters.
- Other controls include pull factors (growth and interest rate differential from the U.S), FX reserves to GDP, country risk index, and Fernandez et. al. (2018) index of capital restrictions on non-resident inflows.
- Country and time fixed effects are included.

Tightening of controls on nonresident inflows reduces probability of future surge

	Forbes Definition			Ghosh Definition			Simple Threshold		
VARIABLES	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Whether tightening in the past 4 qtrs	-0.423			-0.516**			-0.382**		
	(0.268)			(0.244)			(0.159)		
DiffGDPGrowth	0.180***	0.183***	0.184***	0.0726	0.0702	0.0753	0.111***	0.110***	0.111***
	(0.0611)	(0.0608)	(0.0611)	(0.0561)	(0.0559)	(0.0564)	(0.0352)	(0.0352)	(0.0353)
DIffIR	0.0585***	0.0583***	0.0555**	0.0264*	0.0228*	0.0255*	0.0127	0.0118	0.0120
	(0.0219)	(0.0219)	(0.0219)	(0.0136)	(0.0136)	(0.0136)	(0.00840)	(0.00840)	(0.00840)
Composite Risk Index	0.121***	0.123***	0.121***	0.163***	0.160***	0.162***	0.114***	0.115***	0.114***
	(0.0299)	(0.0298)	(0.0299)	(0.0273)	(0.0273)	(0.0274)	(0.0167)	(0.0167)	(0.0167)
Foreign Exchange reserves as % of GDP	-0.00275	-0.00277	-0.00268	0.00104	0.00130	0.00123	-0.00241	-0.00237	-0.00238
	(0.00295)	(0.00306)	(0.00299)	(0.00243)	(0.00246)	(0.00243)	(0.00156)	(0.00157)	(0.00157)
Inflow restrictions index (Fernandez et.al.)	-0.238	-0.635	-0.413	-0.211	-0.551	-0.315	0.356	0.125	0.210
	(0.605)	(0.603)	(0.622)	(0.513)	(0.505)	(0.515)	(0.352)	(0.346)	(0.352)
Sum of net tightening in past 4 qtrs		-0.0485			-0.0398			-0.0416*	
		(0.0314)			(0.0300)			(0.0237)	
Sum of tightenings in past 4 qtrs			-0.145*			-0.211**			-0.106*
			(0.0826)			(0.0896)			(0.0557)
Sum of easings in past 4 qtrs			0.0398			0.0286			0.0330
			(0.0334)			(0.0319)			(0.0240)
Observations	2,382	2,382	2,382	2,196	2,196	2,196	2,643	2,643	2,643
Number of panels	33	33	33	32	32	32	37	37	37

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Effect of capital control on Asset-specific Surges

- We re-estimate a fixed-effects logit model using a three-dimensional (country-time-asset) panel.

$$\text{Prob}\left(InflowSurgeAsset_{i,n,t}\right) = \text{F}\left(\beta_1 ControlAsset_{i,n,t-1,t-4} + \beta_2 DiffGDPgrowth_{i,t-1} + \beta_3 DiffIR_{i,t-1} + \text{B}X_{i,t-1} + \gamma_i + \theta_t + \mu_n + \varepsilon_{i,t}\right)$$

- *InflowAssetSurge* is the surge defined at asset level, *ControlAsset* is a dummy variable equal to one if the country introduces capital controls on non-resident inflows in the specific asset class in the past four quarters. The other controls are as before, and we also add asset fixed effects μ_n.

The effectiveness of controls is stronger when restrictions are directly mapped to the asset category

	Forbes			Ghosh		
VARIABLES	(1)	(2)	(3)	(1)	(2)	(3)
Whether tightening in the past 4 qtrs	-0.335*			-0.322**		
	(0.182)			(0.139)		
DiffGDPGrowth	0.0715***	0.0722***	0.0730***	0.0266	0.0273	0.0275
	(0.0256)	(0.0255)	(0.0256)	(0.0195)	(0.0195)	(0.0196)
DIffIR	0.0407***	0.0401***	0.0399***	0.00472	0.00420	0.00435
	(0.00686)	(0.00687)	(0.00686)	(0.00504)	(0.00504)	(0.00505)
Foreign Exchange reserves as % of GDP	0.000759	0.000816	0.000813	-0.000909	-0.000880	-0.000878
	(0.00125)	(0.00126)	(0.00125)	(0.000935)	(0.000939)	(0.000938)
Composite Risk Index	0.0928***	0.0939***	0.0933***	0.0181**	0.0179*	0.0179*
	(0.0120)	(0.0121)	(0.0121)	(0.00922)	(0.00923)	(0.00923)
Inflow restrictions index at asset/flow level (Fernandez et.al.)	-0.687***	-0.778***	-0.743***	-0.263*	-0.342**	-0.315**
	(0.181)	(0.180)	(0.182)	(0.140)	(0.139)	(0.140)
Sum of net tightening in past 4 qtrs		-0.0996**			-0.119***	
		(0.0440)			(0.0360)	
Sum of tightenings in past 4 qtrs			-0.216*			-0.229**
			(0.111)			(0.0906)
Sum of easings in past 4 qtrs			0.0862*			0.106***
			(0.0467)			(0.0379)
Observations	9,359	9,359	9,359	9,759	9,759	9,759
Number of panels	128	128	128	135	135	135

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Are there spillovers to other countries from the tightening of capital controls?

Spillover effect of tightening capital control

$$\text{Prob}(InflowSurge_{i,t}) = \beta_1 Control_{\ i,t-1,t-4} + \beta_2 Control_{\ s^{-i},t-1,t-4} + \beta_3 DiffGDPgrowth_{i,t-1} + \beta_4 DiffIR_{i,t-1} + \theta X_{i,t-1} + \gamma_i + \theta_t + \varepsilon_{i,t}$$

- We add the term $Control_{\ s^{-i},t-1,t-4}$ which captures controls introduced in similar countries within a group (and hence the cause of spillovers)

$$Control_{s^{-i}} = \frac{\sum_{j=s^{-i}} y_j \, control_j}{\sum_{j=s^{-i}} y_j}$$

- The countries are grouped based on (i) region; (ii) return; and (iii) risk
- An additional large EME based spillover; assuming that most important spillovers of capital control actions are likely to stem from the BRICS (Brazil, Russia, India, China and South-Africa) countries

There is evidence of multilateral spillovers from capital control actions, pointing to the need for coordination

	Forbes Definition							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sum of own tightenings in past 4 qtrs	-0.136*		-0.140*		-0.144*		-0.152*	
	(0.0827)		(0.0823)		(0.0827)		(0.0811)	
Sum of own easings in past 4 qtrs	0.0358		0.0379		0.0421		0.0425	
	(0.0338)		(0.0336)		(0.0336)		(0.0340)	
L. DiffGDPGrowth	0.200***	0.196***	0.186***	0.181***	0.182***	0.176***	0.187***	0.181***
	(0.0628)	(0.0621)	(0.0612)	(0.0606)	(0.0612)	(0.0607)	(0.0620)	(0.0612)
L. DIffIR	0.0526**	0.0579***	0.0563***	0.0621***	0.0553**	0.0613***	0.0528**	0.0595***
	(0.0219)	(0.0219)	(0.0218)	(0.0218)	(0.0220)	(0.0220)	(0.0222)	(0.0222)
Composite Risk Index	0.120***	0.124***	0.112***	0.116***	0.118***	0.121***	0.111***	0.115***
	(0.0302)	(0.0300)	(0.0301)	(0.0299)	(0.0301)	(0.0299)	(0.0302)	(0.0299)
Foreign Exchange reserves as % of GDP	-0.00215	-0.00214	-0.00228	-0.00227	-0.00291	-0.00291	-0.00275	-0.00272
	(0.00288)	(0.00288)	(0.00294)	(0.00294)	(0.00301)	(0.00302)	(0.00291)	(0.00291)
Inflow restrictions index (Fernandez et.al.)	-0.347	-0.375	-0.434	-0.467	-0.403	-0.422	-0.494	-0.504
	(0.626)	(0.589)	(0.628)	(0.591)	(0.623)	(0.588)	(0.630)	(0.592)
Region based spillover: Tightenings	0.0345	0.0356						
	(0.0234)	(0.0234)						
Region based spillover: Easings	-0.0150*	-0.0154*						
	(0.00857)	(0.00857)						
Risk based spillover: Tightenings			0.0931**	0.0948**				
			(0.0381)	(0.0377)				
Risk based spillover: Easings			-0.0221	-0.0228				
			(0.0151)	(0.0152)				
Return based spillover: Tightenings					0.108	0.105		
					(0.0791)	(0.0791)		
Return based spillover: Easings					-0.00996	-0.0105		
					(0.0100)	(0.0102)		
BRICS based spillover: Tightenings							0.0877*	0.0858*
							(0.0473)	(0.0470)
BRICS based spillover: Easings							0.0294	0.0274
							(0.0181)	(0.0180)
Observations	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382
Number of panels	33	33	33	33	33	33	33	33

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Conclusion

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- Measurement of capital controls is challenging - we contribute to the literature by using a granular data on capital control actions in a group of 40 EMEs
- The literature has defined surges in various ways – we look at several definition of surges both at aggregate and asset level to assess the effectiveness of capital controls
- Countries don't tighten controls only around inflow surges (as prescribed by the 2012 IV)
- Tightening of capital controls reduces the probability of future surges both at aggregate and asset level (results more significant at asset level)
- Beyond its impact in achieving domestic stabilization goals by limiting inflow surges, capital controls can also have adverse spillovers

Thank you!