Cross-Border Spillovers from Mutual Fund Activity

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The views expressed herein are those of the authors and should not be attributed to the IMF, its Executive Board, or its management.

Motivation

- Mutual funds are important players in the global financial intermediation process.
- Mutual fund flows affect asset returns especially in smaller, less liquid markets such as EM bonds or US HY bonds (GFSR April 2015).
- Bond prices and liquidity decline more in stress periods when ownership by mutual funds is higher or more concentrated (GFSR October 2015).

Questions

- What are the systemic implications of global mutual fund investment retrenchment (pulling of the plug)?

- How can we track sequence of redemptions triggered by a pulling of the plug from DM to EMEs?

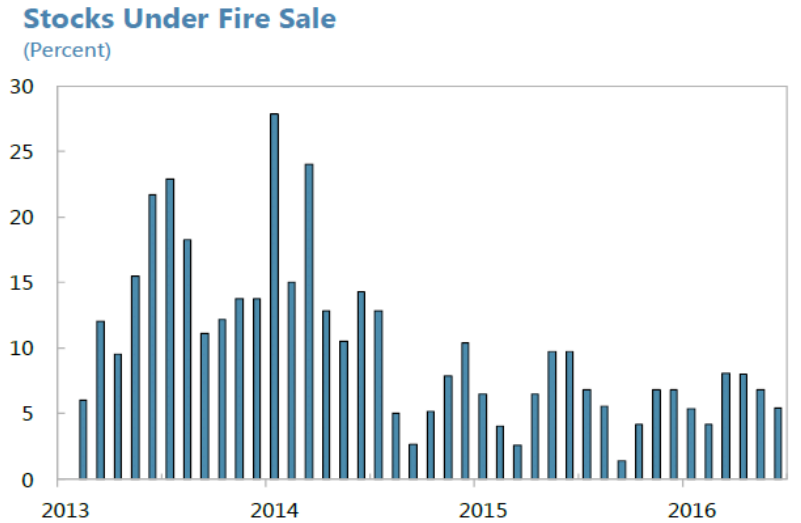
What we do

- Measure country-level mutual fund allocations using EPFR Global mutual fund data and IMF's CPIS data.
- Account for role of off-shore financial centers.
- Use network approach by Espinosa-Vega and Solé (2011).
- Simulate shock triggered by funds domiciled in AE or EM.
- Calculate contagion and vulnerability indexes.

Previous work

Mutual fund fire sales—Coval and Stafford (2007)

- Focus on funding shocks to U.S. mutual fund.
- Propose a measure of price pressure—a function of funding shocks that originate from investor base (fire sales).
- Find that forced sales => costly fire sales in terms of deviations of the stock's fair value.
- Can be used for surveillance (IMF 2016).



Sources: SVS; IMF staff calculations. Note: The chart shows the percentage of stocks owned by Chilean mutual funds that are experiencing a fire sale according to Coval and Stafford's (2007) definitition.

Previous work

Investors vs Fund Managers—Raddatz and Schmukler (RS 2012)

- Look at cross-country mutual fund investments (EPFR data).
- Disentangle the effects of ultimate investors and fund managers in response to changes in fund returns and country-specific stress events.
- Mutual funds display procyclical behavior and may amplify effects of financial shocks.
- Bond funds retrench more in response to country-specific and global crises than equity funds.

Previous work

Jotikasthira, Lundblad, and Ramadorai (JLR 2012)

- Build on CS and use mutual fund level data (EPFR Global).
- Focus on a flow metric: Flow-Implied Fund Allocation (FIFA) changes.
- FIFA explains return co-movement among emerging markets.
- Low FIFA induces drop in equity prices across EMEs.
- Global mutual funds not a stabilizing force.

Previous work

Investor base and fund focus—Brandão-Marques et al (2015)

- Study mutual funds behavior and the stability of portfolio flows to EM, also using EPFR data.
- Differences between equity and bond mutual fund:
  - ✓ bond funds substantially more sensitive to global financial shocks and engage more strongly in return chasing.
- Implications for the volatility of capital flow to EMEs:
  - ✓ Rising share of bond flows to EM may have made portfolio flows to EMs more procyclical.

Previous work

- Recognizes the need to track funding shocks to mutual funds.
- Has advanced our understanding of price-pressures and increased correlations divorced from fundamentals.
- Global mutual funds are not a stabilizing force in EMEs.
- Cash hoarding by managers amplifies shock (Morris et al 2017).
- Does not explore the potential destabilizing nature of a ***retrenchment*** of global mutual fund flows.

Our work

- Measure bilateral country exposures through mutual fund investments, based on monthly estimated allocation data for bonds and equity funds.
- EPFR Global, from Jan. 2000-Jan. 2017
  - ✓over 62,500 funds with over $25 trillion in total assets.
  - ✓about 99 percent of all EM (Emerging markets) equity funds.
  - ✓70-75 percent of the total funds in developed European markets.
  - ✓around 90 percent of the total funds in U.S.
  - ✓85-90 percent of Canadian mutual fund assets and
  - ✓55 percent of Japanese domestic investment trusts.

Our work

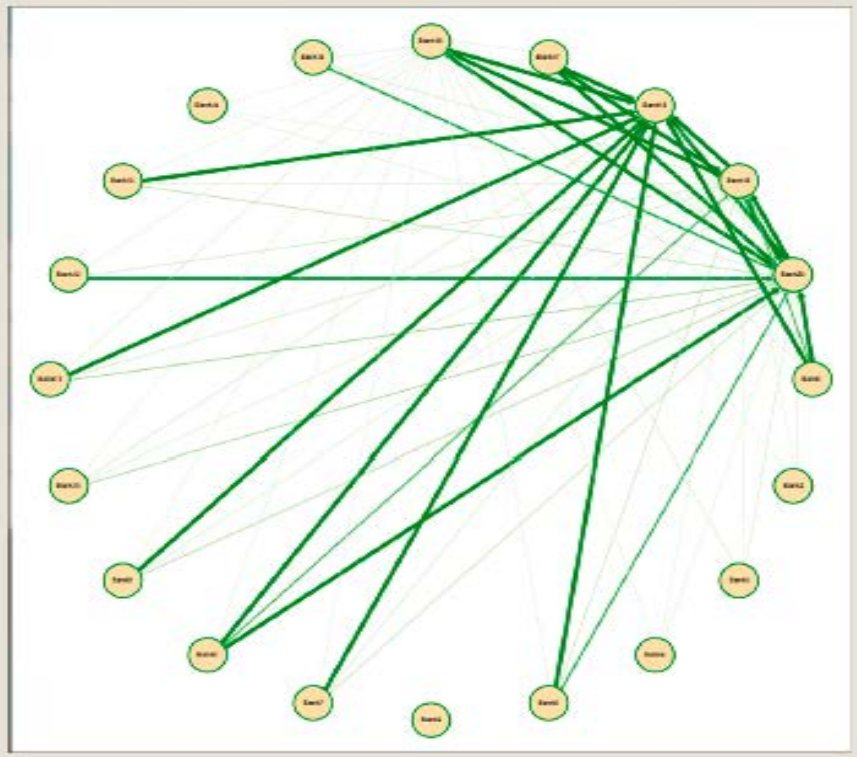
- **First stop**: adjust data for presence of off-shore centers … they can distort mutual funds' actual bilateral exposures
- Significant fraction of portfolio investment is conducted through off-shore financial centers (OFCs).
- Problem may be more severe for EMEs. Solution:
  - Use IMF's CPIS data.
  - Assign proportionally OFC exposures according to ultimate investors.
  - Use total portfolio investment (stocks) instead of equity/debt because of mutual fund investment classified as equity in BOP.

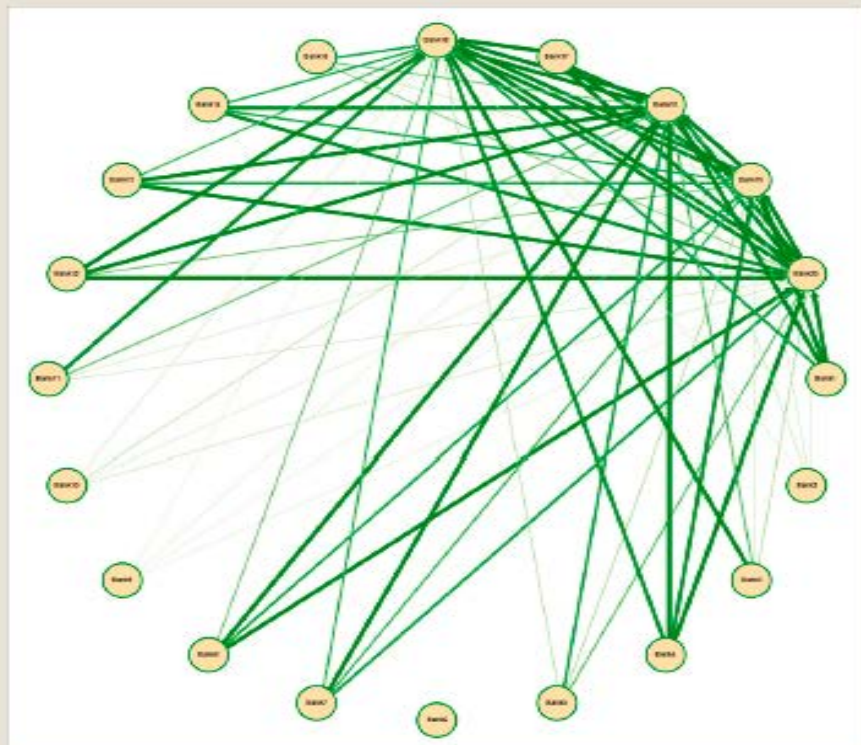
Adjusting for OFC makes a difference

Figure 1. Mutual Funds' Equity Investment Network Structures as of August 2008.

August 2008
Without OFCs adjustment

August 2008
Adjusting by OFCs





Equity funds more important since GFC

Equity Mutual Funds (in percent of recipient country GDP)

July, 2007	Advanced Europe	Japan	United States	Large EME's	Other EME's
Advanced Europe	-	0.02	4.16	0.03	0.05
Japan	1.84	-	4.71	0.05	0.04
United States	1.04	0.01	-	0.02	0.03
Large EME's	1.96	0.03	2.58	-	0.06
Other EME's	1.81	0.02	2.88	0.03	-
September, 2016	**Advanced Europe**	**Japan**	**United States**	**Large EME's**	**Other EME's**
Advanced Europe	-	0.15	4.39	0.06	0.08
Japan	2.41	-	7.48	0.07	0.07
United States	3.01	0.44	-	0.08	0.08
Large EME's	1.22	0.12	2.51	-	0.05
Other EME's	0.84	0.07	1.94	0.04	-

Bond funds also became more important but still lag equity funds

Bond Mutual Funds (in percent of recipient country GDP)

July, 2007	**Advanced Europe**	**Japan**	**United States**	**Large EME's**	**Other EME's**
Advanced Europe	-	0.00	0.14	0.00	0.01
Japan	0.18	-	0.15	0.00	0.01
United States	0.23	0.00	-	0.00	0.01
Large EME's	0.17	0.00	0.14	-	0.01
Other EME's	0.42	0.01	0.27	0.01	-

September, 2016	**Advanced Europe**	**Japan**	**United States**	**Large EME's**	**Other EME's**
Advanced Europe	-	0.18	1.27	0.10	0.12
Japan	0.60	-	0.66	0.02	0.02
United States	2.00	0.21	-	0.07	0.08
Large EME's	0.37	0.07	0.29	-	0.04
Other EME's	1.32	0.17	1.13	0.07	-

How the data look like

Cross-border equity mutual fund investments (September 2016, millions of US dollars)

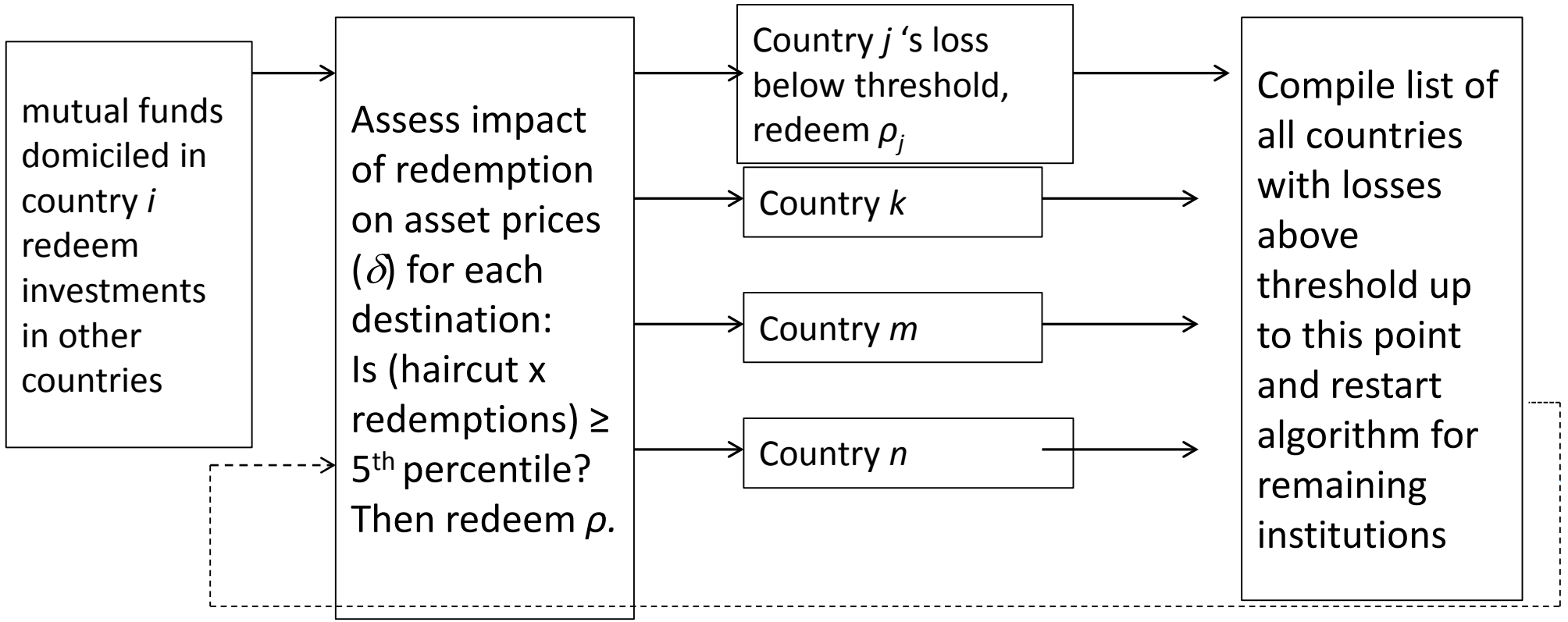
	Austria	Belgium	Brazil	Chile	China	Finland	France	Germany	Greece	Hungary	India	…
Austria		246.64	0.58	41.62	47.07	56.34	620.78	804.72	5.26	2.64	0.50	…
Belgium	191.39		2.02	153.36	169.98	230.29	3,363.27	3,134.05	19.51	9.76	1.79	…
Brazil	478.50	1,460.84		337.69	371.93	449.39	3,215.40	4,221.35	43.08	21.59	5.42	…
Chile	43.81	176.28	0.85		58.77	55.83	361.61	492.84	5.35	2.68	0.78	…
China	2,615.36	10,057.34	32.74	2,387.20		3,315.04	19,664.22	29,116.08	303.88	152.38	46.77	…
Finland	126.50	718.10	1.34	101.94	112.52		2,019.69	2,031.34	12.93	6.48	1.19	…
France	1,539.88	9,298.42	15.67	1,248.25	1,359.88	1,871.57		25,366.15	158.54	79.39	14.49	…
Germany	1,385.62	8,503.72	13.78	1,233.27	1,280.39	1,719.14	22,893.84		155.15	77.92	14.17	…
Greece	40.04	95.23	0.36	19.64	25.54	26.94	437.63	325.13		1.26	0.25	…
Hungary	35.78	63.41	0.20	13.70	16.51	19.38	136.98	190.68	1.77		0.16	…
India	880.34	3,528.88	9.08	871.93	1,332.28	1,271.69	7,669.96	9,783.01	108.46	54.81		…
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋱

Simulate contagion effects from a pulling of the plug in network of funds in 29 countries.

- Propose method to assess potential cross-country contagion and vulnerability patterns associated with global mutual fund retrenchments, ensuing fire sales, and portfolio rebalancing.
- Set up builds on Espinosa-Vega and Sole's network analysis.
- Analyze the potential impact of a retrenchment by mutual funds domiciled in country *j*, as a block, from country *i*.

How it works

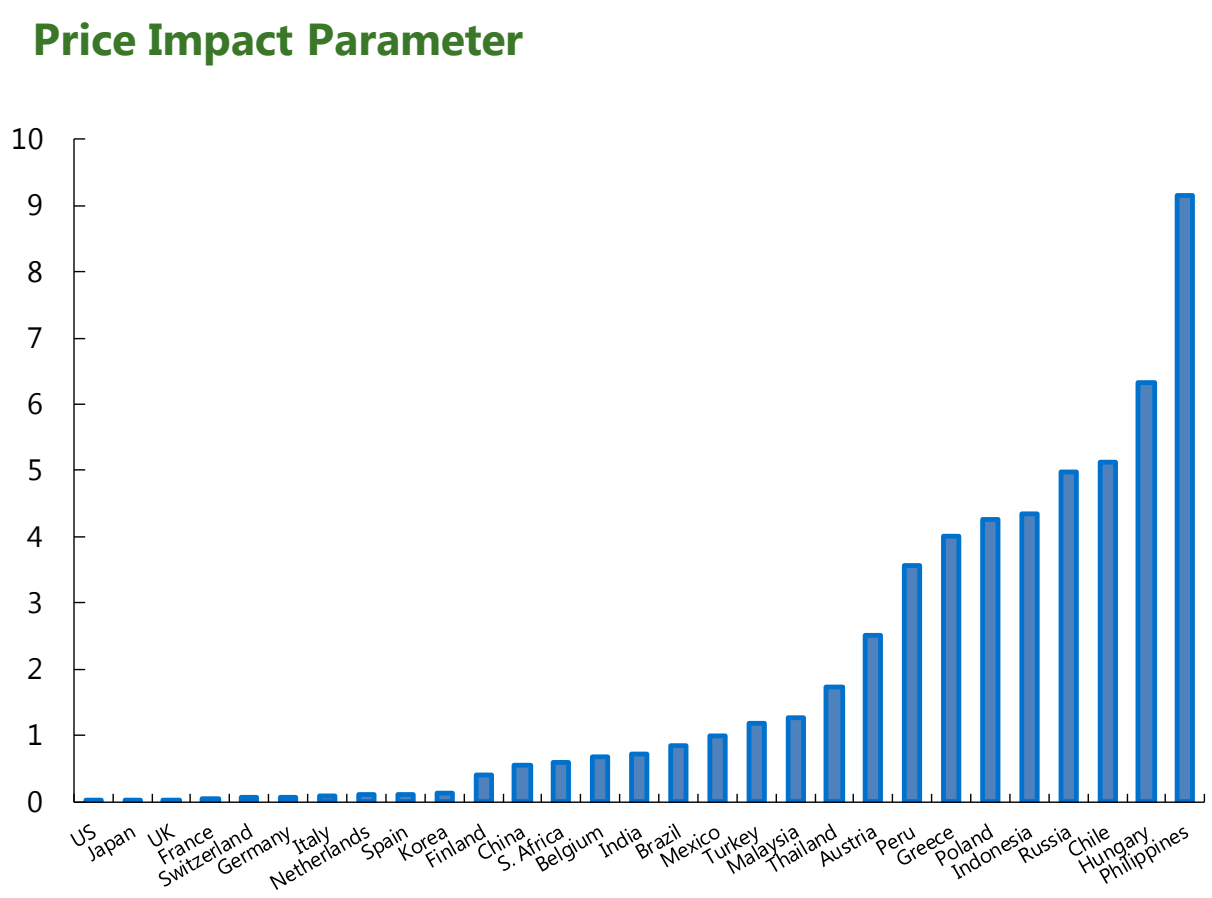
- Stressing the network:



How to calibrate the fire sale (δ_i)?

- For equity, price impact of $1M US dollar sale, in percent based on stock market returns and volume (follow Amihud 2002).

- Assume losses for bonds higher ($\delta_i(b)=2\delta_i(e)$).



Example: All DM's pull the plug to other DM's

- Consider case of bond exposures on November, 2015.

	DM1	DM2	EM1	EM2	…	DM10	DM11
DM1	-	792	2	172	…	1,138	2,770
DM2	889	-	3	298	…	1,943	5,085
EM1	352	979	-	252	…	1,699	11,897
EM2	86	241	1	-	…	472	2,712
⋮	⋮	⋮	⋮	⋮	⋱	⋮	⋮
DM10	1,406	3,609	12	879	…	-	38,923
DM11	6,847	20,247	63	5,146	…	54,584	-

- All DMs plug the plug to all other DMs. $\rho = 0.34$ (for simplicity).

Example: All DM's pull the plug to other DM's

- DM2 is immediately above the worst weekly drop: first week drop is 0.34*(889 + … + 1,934 + 5,085)*1.34/1000 = 12.28>5.3.

	Price impact	Worst drop	Step 0	Step 1	Step 2	Step 3	Step 4
DM2	1.34	5.30	12.28	16.10	20.16	20.16	20.16
EM1	1.70	5.45	0.00	3.91	5.87	5.87	5.87
EM2	10.25	2.15	0.00	5.80	8.52	8.52	8.52

- EM1 suffers nothing in week 1 (assumption) but in week 2 prices drop because a number of DM's have breached the worst drop limit and pull the plug on EMs as well.

EMs mutual funds do not add to contagion

- Results: Contagion path for bond funds (November 2015)

Pull the plug only on DMs

Trigger	Step 1	Step 2	Step 3
All Developed Markets	DM1	EM2	EM9
	DM2	EM3	DM8
	DM5	EM5	EM11
		EM7	
		DM6	
		EM10	
		EM12	
		EM13	
		EM14	
		DM9	

Pull the plug on DMs and EMs

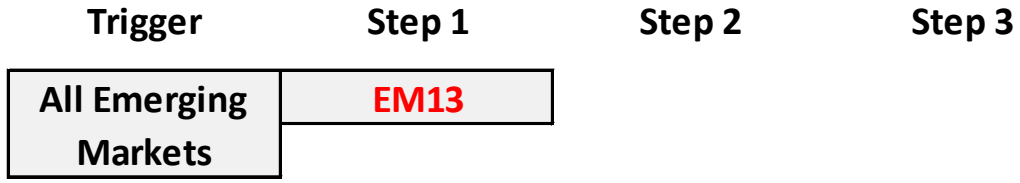
Trigger	Step 1	Step 2	Step 3
All Developed Markets	DM1	DM6	DM8
	DM2	DM9	
	EM1		
	EM2		
	EM3		
	DM5		
	EM5		
	EM7		
	EM9		
	EM10		
	EM11		
	EM12		
	EM13		
	EM14		
	EM15		
	EM16		
	EM17		

- Effects for equity funds even smaller.

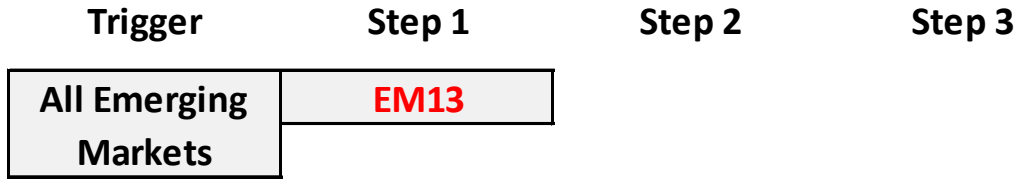
EMs mutual funds are not a source of spillovers

- Results: Contagion path for bond funds (November 2015)

Pull the plug only on EMs



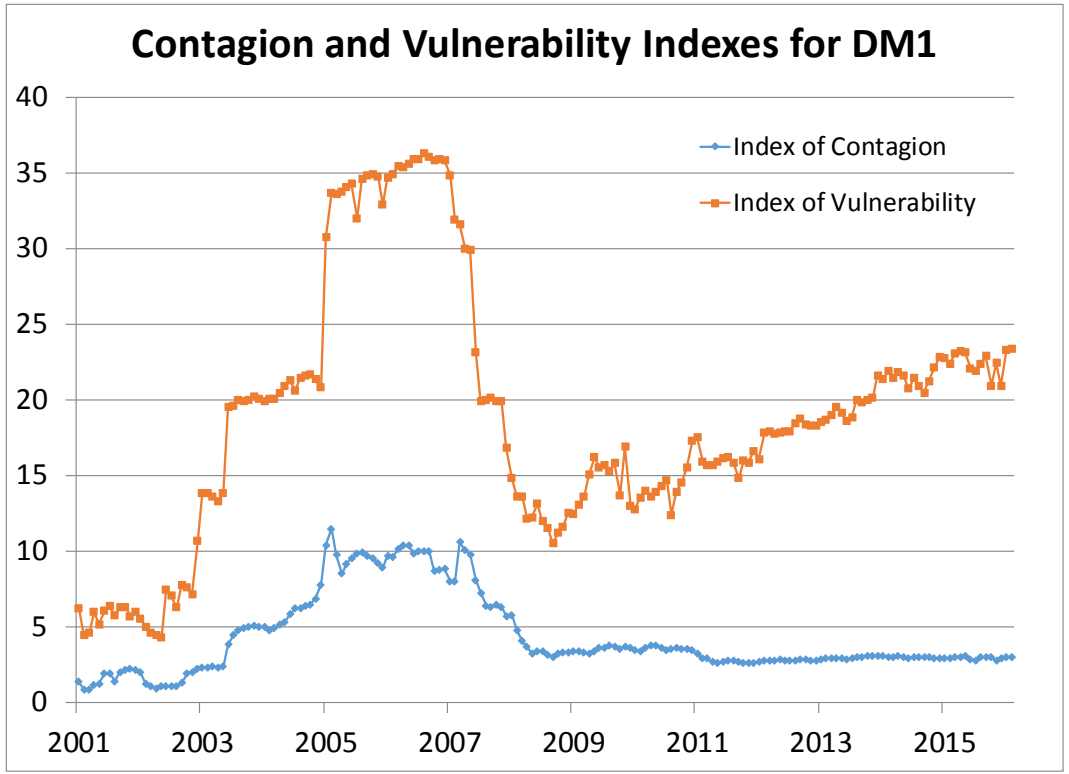
Pull the plug on DMs and EMs

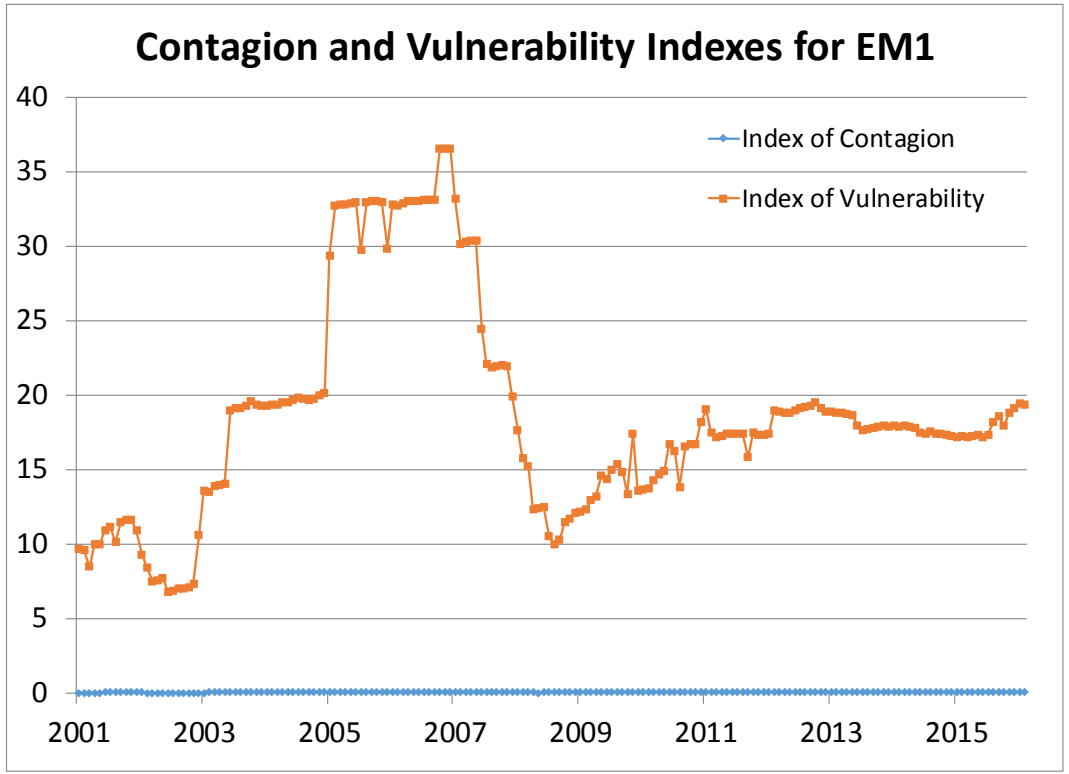


- For equity funds, there are no effects.

Time-varying surveillance indicators: Examples

- Indexes of contagion and vulnerability for equity mutual funds assuming ρ =0.35 and δ =0.5 and using VaR of flows as threshold measure.





Work in progress

- Refine measures of price impact in simulations, especially for bonds.
- Choose and refine measure of buffer.
- Calculate vulnerability and contagion indexes with country-specific δ (should be lower for countries with deeper markets).
- What are the macroprudential implications?

Conclusion

- Important to account for role of OFC when measuring mutual fund flows and exposures.
- Exposures are on the rise for equity and bond funds.
- Role of EME's is still negligible as source or amplifiers of shocks through asset fire sale channel.
- EMEs and smaller AEs are vulnerable but more work needs to be done in order to build sensible vulnerability indexes.

THANK YOU