Asset Fire Sales and Purchases and the International Transmission of Funding Shocks

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  - Kaminsky and Reinhart (2000), Kaminsky, Lyons and Schmukler (2004), Boyer, Kumagai and Yuan (2006), Hau and Rey (2008a, 2008b).

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  - Mutual (and hedge) funds are often forced to redeem investments in response to funding shocks from their investor base.
  - Correlated forced redemptions (or 'fire sales') across institutions holding a particular stock lead to significant (but temporary) price falls.

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  - Do correlated fire sales across global funds that own a market lead to significant price movements in that market?
  - Does this mechanism help predict when correlations between developed and emerging markets will increase?

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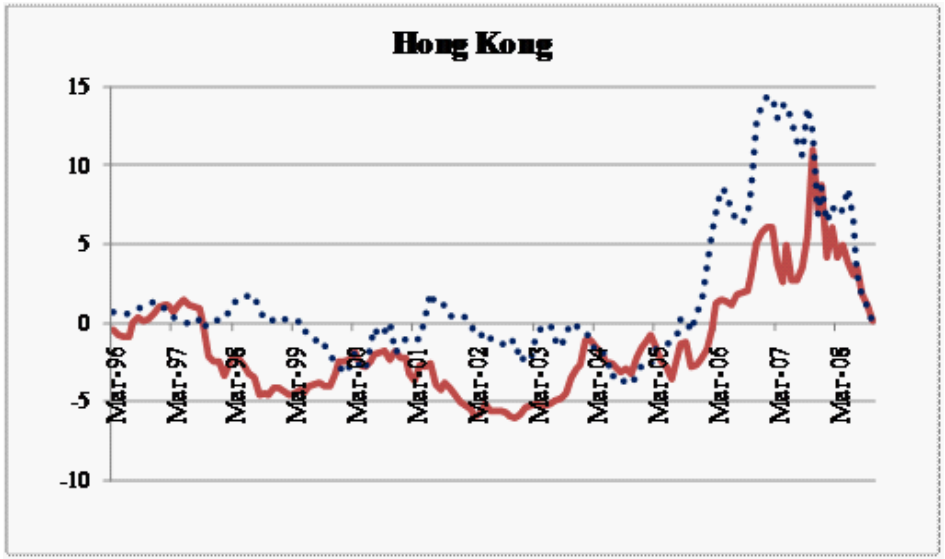
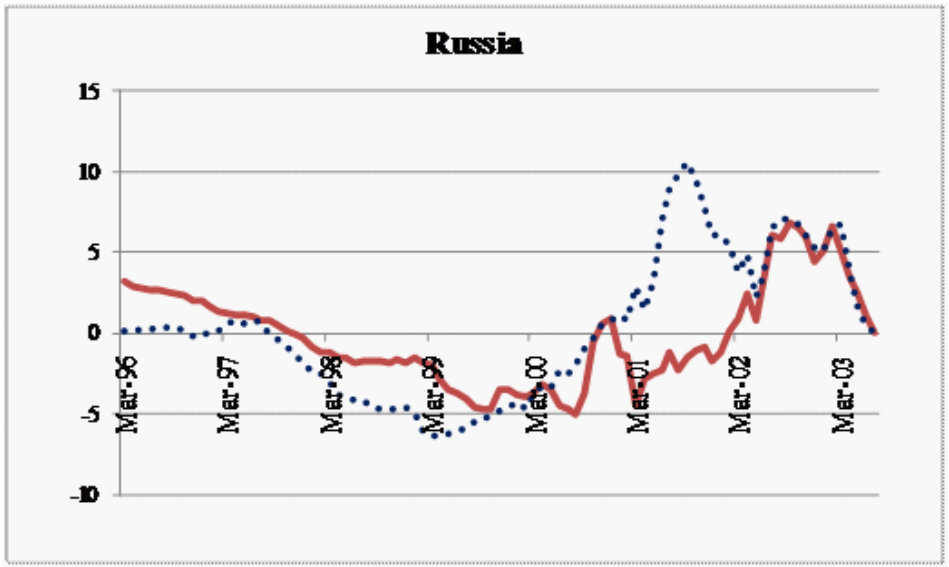
5. Do global funds attempt to offset the price impact of fire sales?

The Data

- Global fund data from Emerging Portfolio Fund Research (EPFR)
  - Sample period: February 1996 to October 2008.
  - Monthly data, on 1,097 global funds which invest in emerging markets, domiciled predominately in the U.S.(50-60%), U.K.(8-9%) and Luxembourg (15-25%).
  - Total net asset values (*TNA*); fund returns; inflow or outflow from the funds; percentage of fund assets allocated to each country.
  - *TNA* and return data compared to CRSP mutual fund database, cross-sectional correlation close to 1.
- S&P Emerging Markets Database (EMDB) and the World Bank's World Development Indicators Database.
  - Country index return, market capitalization, and trading volume.

Comparison with US Treasury (TIC) Data





Summary Statistics

	Holding (% of Market Capitalization)		
Country	Number of Funds	Mean	Standard Deviation
Argentina	248	2.55	2.54
Brazil	352	4.00	1.29
Chile	253	1.95	0.73
China	614	1.40	1.02
Colombia	139	0.69	0.62
Czech Republic	246	3.88	2.23
Hong Kong	646	2.30	0.85
Hungary	275	9.22	3.69
India	518	3.82	1.28
Indonesia	461	3.77	1.56
Israel	269	1.62	0.87
Jordan	32	0.11	0.11
Malaysia	450	1.83	0.93
Mexico	315	5.83	1.62
Morocco	55	0.38	0.25
Pakistan	118	1.18	1.27
Philippines	348	2.73	1.08
Poland	262	5.20	2.65
Russia	358	3.92	1.32
South Africa	271	1.59	0.62
South Korea	567	4.98	2.04
Taiwan	569	2.88	1.46
Thailand	468	3.86	1.46
Turkey	285	3.44	1.53
Venezuela	151	2.35	2.34
Average	307	3.02	1.41

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$$flow_{j,t} = a + \sum_{k=1}^{12} b_k \cdot flow_{j,t-k} + \sum_{h=1}^{12} c_h \cdot R_{j,t-h}$$

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  - R^2 of 27%, using Fama-Macbeth (1973) regressions.

Asset Fire Sales and Purchases

Decile	Flow (%)	% Countries Expanded	% Countries Reduced	% Countries Eliminated
1 (Inflows)	13.55	78.58	19.91	1.50
2	3.35	62.77	35.72	1.50
3	1.13	53.95	44.75	1.30
4	0.16	47.86	50.97	1.17
5	-0.05	47.47	51.42	1.11
6	-0.54	45.43	52.90	1.67
7	-1.29	42.38	55.71	1.91
8	-2.39	37.89	60.29	1.83
9	-4.41	32.50	65.55	1.95
10 (Outflows)	-12.61	21.58	75.10	3.31
1-10	26.16	57.00	-55.19	-1.81
t-statistic	--	(40.36)	(-39.63)	(-5.17)

Predicted Asset Fire Sales and Purchases

Decile	E[Flow] (%)	% Countries Expanded	% Countries Reduced	% Countries Eliminated
1 (Inflows)	4.64	59.09	39.45	1.46
2	1.57	53.17	45.26	1.57
3	0.53	50.08	48.61	1.31
4	-0.07	48.44	50.14	1.42
5	-0.55	46.00	52.57	1.43
6	-1.05	45.29	52.97	1.74
7	-1.62	44.38	53.85	1.77
8	-2.33	43.23	54.90	1.87
9	-3.38	41.65	56.07	2.28
10 (Outflows)	-6.35	39.27	58.32	2.40
1-10	10.99	19.82	-18.87	-0.94
t-statistic	--	(11.66)	(-11.35)	(-4.10)

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- In maths, $\text{At-Risk}_{k,t} = \sum_{j=1}^{N} flow^{*}_{j,t} \cdot allocation_{j,k,t-1} \cdot TNA_{j,t-1}$

At-Risk Across Country-Months: Magnitudes

At-Risk Quintile	At-Risk Measured as % of Market Capitalization	At-Risk Measured as % of Average Monthly Volume	Holding of Sample Funds as % of Market Capitalization
1 (Positive)	0.219	8.055	4.814
2	0.049	2.451	2.733
3	0.008	0.586	1.380
4	-0.012	-0.758	1.624
5 (Negative)	-0.109	-3.375	3.879
1-5	0.328	11.430	0.935
t-statistic	--	(24.39)	(5.32)

At-Risk and Price Effects

Quintile Calendar Portfolio	Average Return (%)		
	All	G7 Premium > 0	G7 Premium < 0
1 (Positive)	1.91	5.35	-2.83
2	1.38	4.53	-2.98
3	0.54	3.76	-3.92
4	0.63	3.82	-3.78
5 (Negative)	0.63	4.04	-4.09
1-5	1.28	1.30	1.26
t-statistic	(2.58)	(2.37)	(1.62)

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- Switching beta: Q1-Q5 long-short portfolio has positive beta in good times, negative beta in bad times.
- More formal calendar-time regressions confirm this.

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- Related to Calvo's (2005) argument about leveraged foreign investors.
- Similar findings (and explanation) in Boyer, Kumagai and Yuan (2006) for correlations of returns on investable emerging market indices with G-7 returns.

Calendar-Time Regressions

	At-Risk Sort	At-Risk Sort	Predicted At-Risk Sort	Predicted At-Risk Sort
Intercept	0.013**	-0.001	-0.001	-0.017*
	(0.005)	(0.008)	(0.006)	(0.009)
G7 Risk Premium	0.005		-0.038	
	(0.091)		(0.160)	
Positive G7 Risk Premium		0.510***		0.542**
		(0.191)		(0.261)
Negative G7 Risk Premium		-0.324**		-0.400*
		(0.140)		(0.241)
N	150	150	139	139
R-squared	0.00	0.04	0.00	0.05

Robustness Checks

1. Is this driven by fund holdings or fund flows?
   a. We repeat analysis for portfolios of countries that are most (Q1) and least (Q5) held by global funds.
      * Positive beta in both states (upside and downside), and no alpha. Different mechanism.
2. Perhaps dividing into positive and negative G-7 returns does not actually capture times of 'distress'.
   a. We estimate a two-state regime-switching model for the G-7 risk premium to check if our results still hold up.
      * Results are robust.

Do Global Funds Try to Offset These Price Effects?

Trading Cost Estimates: Elkins-McSherry.

Decile	Flow (%)	Countries Expanded	Countries Reduced or Eliminated
1 (Inflows)	13.55	56.16	61.32
2	3.35	55.36	57.67
3	1.13	55.90	56.85
4	0.16	57.63	58.39
5	-0.05	58.21	58.21
6	-0.54	56.36	55.82
7	-1.29	56.72	55.28
8	-2.39	58.36	55.73
9	-4.41	58.66	56.22
10 (Outflows)	-12.61	61.33	55.78
1-10	26.16	-5.17	5.54
t-statistic	--	(-4.56)	(5.65)

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5. Also find that global funds attempt to offset price impact of fire sales. Clearly they are unable to offset this completely.