

# Non-bank Financial Intermediation and Capital Flows: Evidence from Emerging Market Economies

Horacio A. Aguirre (BCRA), Rodrigo Pérez Artica (UNS, CONICET)

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BANCO CENTRAL  
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**1 | NBFi, “pipes” and capital flows**

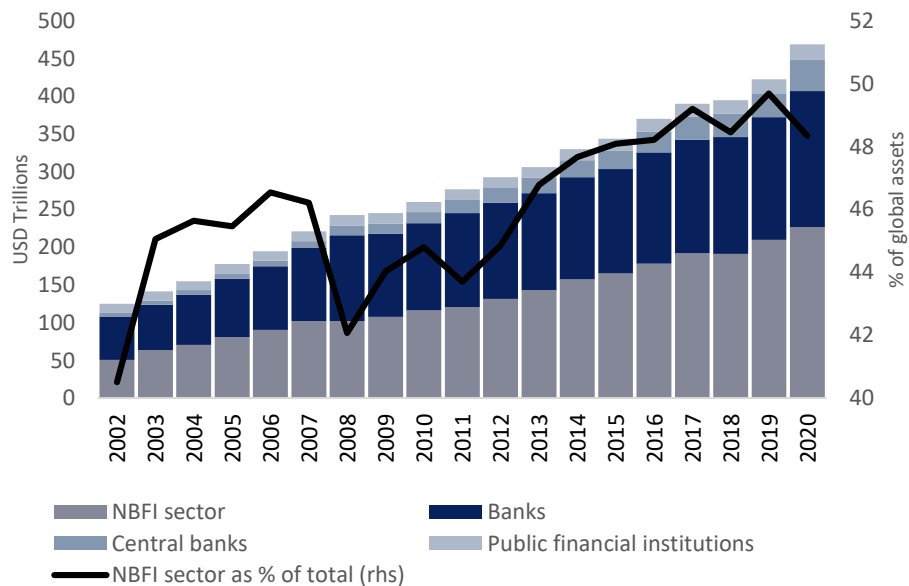
**2 | Our econometric approach:**

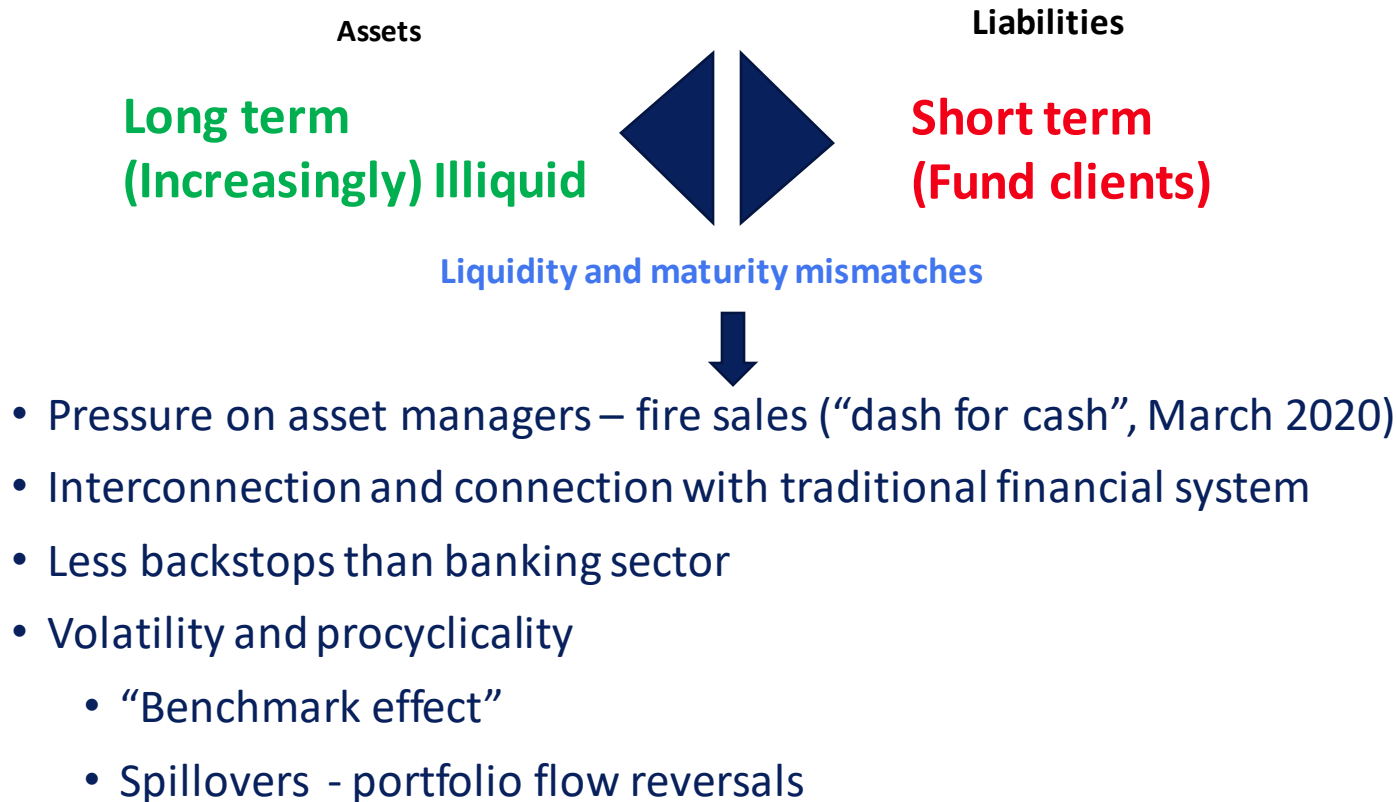
- a) NBFi as continuous variable;
- b) NBFi as a categorical variable;
- c) event studies

**3 | Concluding remarks /looking ahead**

**Note: all views expressed are the authors' own and do not necessarily represent those of BCRA**

## Global financial assets held by sector and share of NBFI holdings



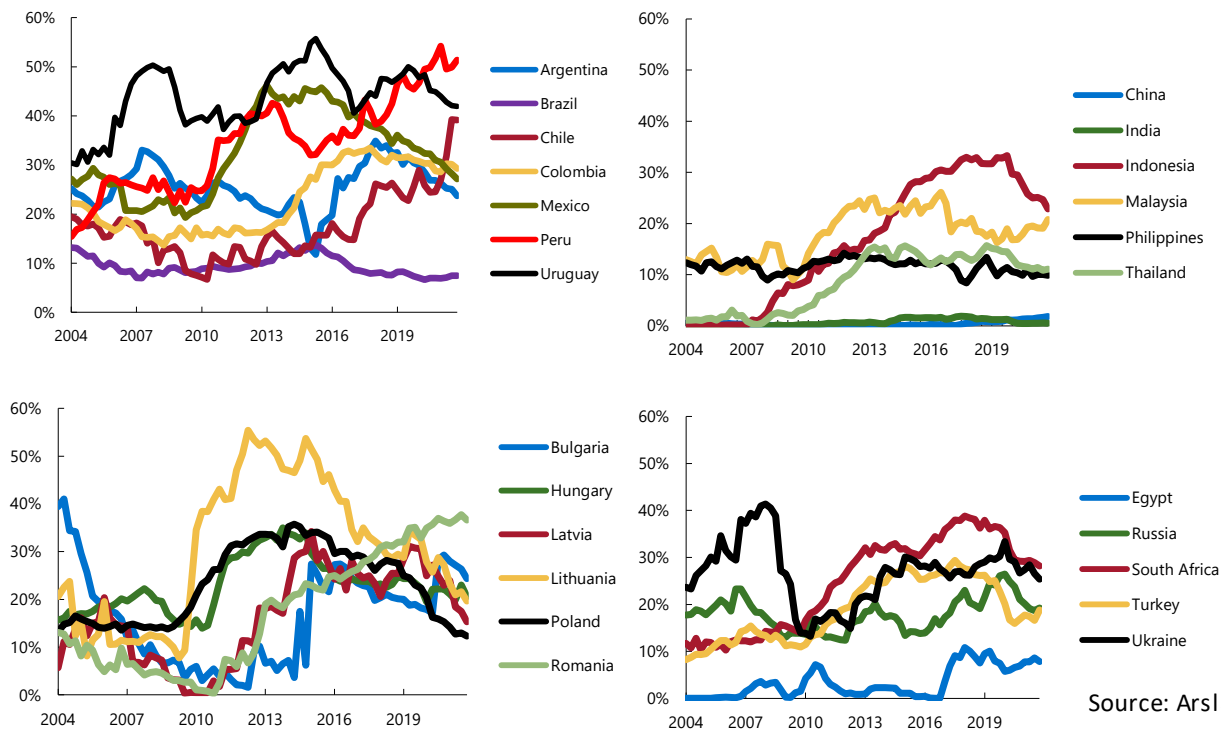




- Increasing share of open-ended funds specialized in bonds, more sensitive to global financial shocks (Brandao-Marques et al, 2022)
- Converse et al (2020): higher share of ETF increased transmisión of global shocks
- Cerutti et al (2019): more reliance on global mutual funds, more sensitivity to global conditions
- “Benchmark effect” and procyclicality: Raddatz et al (2017), Arslanalp et al (2020)
- Push, pull and pipes: García Lopez and Stracca (2020), Ramos Francia et al (2021), Eguren et al (2020), Carney (2019)

**Higher NBFI: a) higher sensitivity of capital flows to the global financial cycle; b) (generally) lower sensitivity to domestic factors; c) procyclicality of flows.**

## Foreign NBFI holdings of EMEs government debt



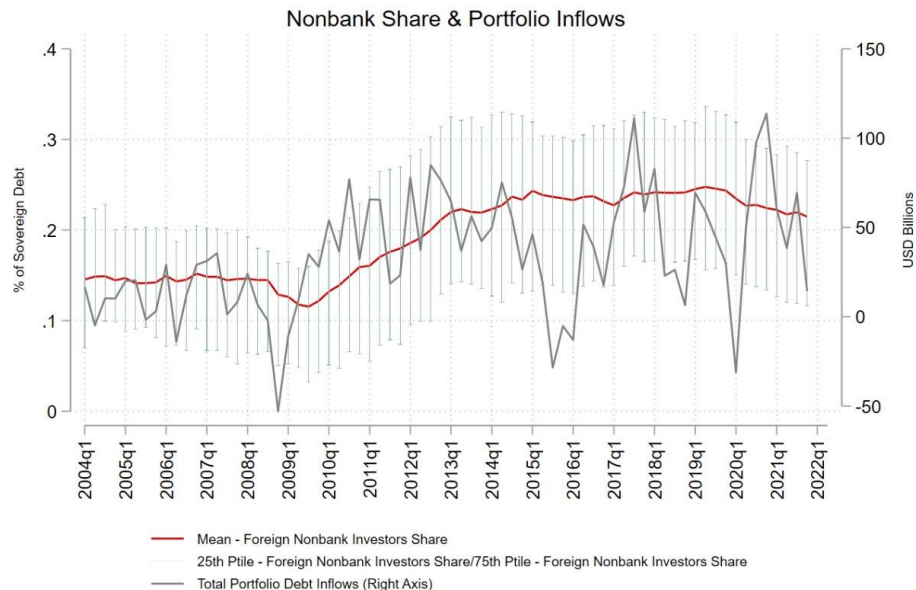
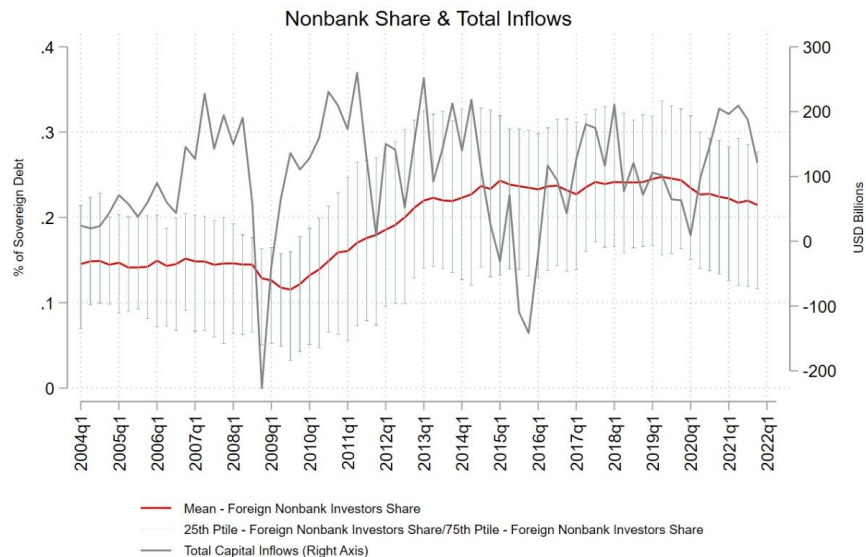
Source: Arslanalp and Tsuda (2014)

## Foreign NBFi holdings of EMEs government debt – summary statistics

Country	Mean	Std. Deviation	Coef. Variation	Max	Min	Change	Average	
							2004-09	2010-21
Argentina	26%	0,0469	0,183371	35%	12%	-6%	26%	25%
Brazil	9%	0,0191	0,203703	14%	7%	-44%	9%	9%
Bulgaria	16%	0,0993	0,607414	41%	2%	-38%	17%	16%
Chile	17%	0,0675	0,390489	39%	7%	101%	15%	18%
China	0%	0,0047	1,179504	2%	0%	238%	0%	0%
Colombia	23%	0,0679	0,298261	33%	14%	32%	18%	25%
Egypt	3%	0,0327	0,978225	11%	0%	17853%	1%	4%
Hungary	23%	0,0563	0,244733	35%	14%	31%	18%	25%
India	1%	0,0061	0,912481	2%	0%	3422%	0%	1%
Indonesia	17%	0,1204	0,713868	33%	0%	76775%	2%	24%
Latvia	17%	0,0962	0,577392	34%	0%	168%	10%	20%
Lithuania	30%	0,1470	0,485322	55%	8%	-5%	13%	39%
Malaysia	18%	0,0466	0,2599	26%	9%	60%	12%	21%
Mexico	32%	0,0852	0,262446	46%	19%	0%	24%	37%
Peru	34%	0,0951	0,276519	54%	15%	233%	24%	40%
Philippines	12%	0,0131	0,112285	14%	8%	-20%	11%	12%
Poland	23%	0,0795	0,344989	36%	12%	-7%	15%	27%
Romania	17%	0,1213	0,704534	38%	0%	180%	7%	22%
Russia	18%	0,0350	0,195123	26%	12%	8%	18%	18%
South Africa	25%	0,0973	0,392024	39%	10%	140%	13%	31%
Thailand	9%	0,0555	0,640407	16%	0%	894%	2%	12%
Turkey	19%	0,0653	0,345271	29%	8%	128%	12%	22%
Ukraine	27%	0,0663	0,247349	41%	13%	7%	31%	25%
Uruguay	44%	0,0617	0,140605	56%	30%	38%	40%	46%

Source: Arslanalp and Tsuda (2014)

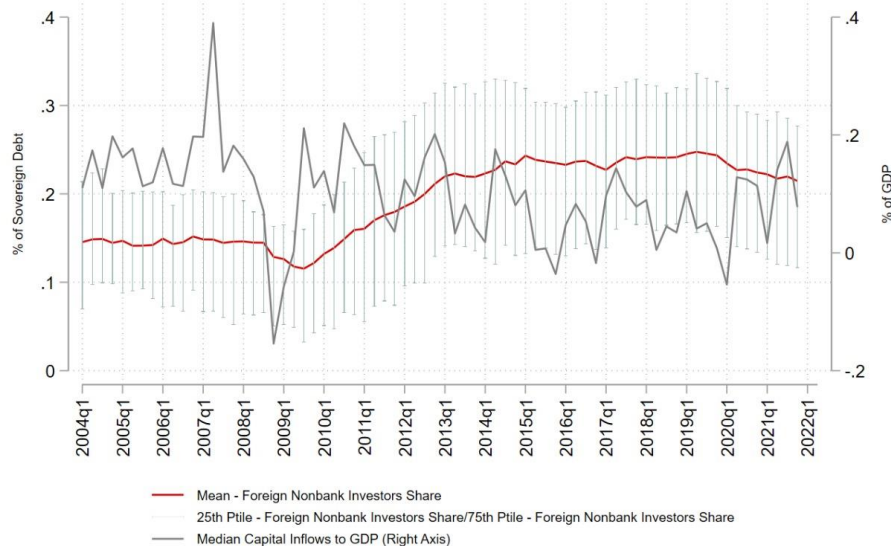
## Foreign NBFI holdings of government debt and capital inflows



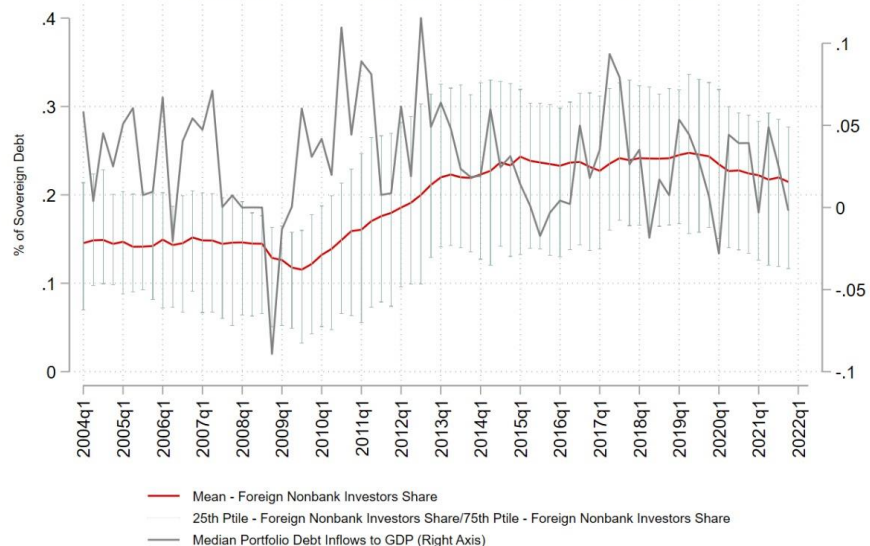


## Foreign NBFI holdings of government debt and capital inflows

Nonbank Share & Median Total Inflows/GDP




Nonbank Share & Median Portfolio Debt Inflows/GDP



- Panel data regression (Prais-Winsten panel-corrected standard error regression), 24 countries, 2004-2021, quarterly data.
- Dependent variable: capital inflows (“gross” flows, change in foreign liabilities; normalized by GDP)
- Independent variables: push, pull and “pipe” (NBFI) factors. Country and time fixed effects.

**NBFI**

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- Levels and interaction with: push (VIX), pull (growth)
  - Levels of foreign NBFI debt holdings
  - Dummy for countries with highest 10%, 20% or 30% foreign NBFI debt holdings

- Estimated for 2004-2021 and sub-periods
- Event studies around GFC and Covid-19

## Baseline (1)

$$y_{it} = \beta_0 + \beta_1 vix_{t-1} + \beta_2 growth_{it-1} + \beta_3 NBFI_{it-1} + \beta_4 NBFI_{it-1} * vix_{t-1} + \beta_5 NBFI_{it-1} * growth_{it-1} + \sum \alpha_i C_i + e_{it}$$

Extended versions, adding: (2) year fixed-effects, (3) controls for the global financial cycle (proxies for the global interest rate and global growth), (4) domestic assets' risks (current account balance, country risk spread as measured by the EMBI index, annual inflation, reserve assets)

$$\begin{aligned} y_{it} = & \beta_0 + \beta_1 vix_{t-1} + \beta_2 growth_{it-1} + \beta_3 NBFI_{it-1} + \beta_4 NBFI_{it-1} * vix_{t-1} + \beta_5 NBFI_{it-1} * growth_{it-1} + \beta_6 global\ r_{t-1} \\ & + \beta_7 global\ growth_{t-1} + \beta_8 CAB_{it-1} + \beta_9 EMBI_{it-1} + \beta_{10} Inflation_{it-1} + \beta_{11} reserve\ assets_{it-1} + \sum \alpha_i C_i \\ & + \sum \beta_t T_t + e_{it} \end{aligned}$$

	OLS - AR(1) Total Inflows	OLS - AR(1) Gov. Inflows	OLS - AR(1) Corp. Inflows	OLS - AR(1) Bank Inflows
VARIABLES	Post-2004	Post-2004	Post-2004	Post-2004
L.NBFI	-0.828*** (0.247)	-0.871*** (0.251)	-0.0383 (0.0339)	-0.0218 (0.0285)
L.NBFI*VIX	0.00731 (0.00898)	0.00991 (0.00953)	-0.000121 (0.00134)	-0.00106 (0.00113)
L.NBFI*Growth	3.606** (1.772)	2.928 (1.793)	0.0951 (0.285)	0.483** (0.241)
Observations	1,166	1,112	1,105	1,113
R-squared	0.231	0.230	0.148	0.057
Number of countrycode	22	21	21	21

VARIABLES	2004-2009	2004-2009	2004-2009	2004-2009
L.NBFI	-0.289 (0.260)	-0.361 (0.266)	-0.195** (0.0759)	0.00109 (0.0614)
L.NBFI*VIX	-0.0244*** (0.00683)	-0.0246*** (0.00822)	0.00126 (0.00166)	-0.00191 (0.00176)
L.NBFI*Growth	0.869 (1.825)	1.136 (1.875)	0.231 (0.486)	0.693 (0.507)
Observations	415	399	392	400
R-squared	0.561	0.595	0.224	0.108
Number of countrycode	20	19	19	19

Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES
Domestic Risk Control	YES	YES	YES	YES

	OLS - AR(1) Total Inflows	OLS - AR(1) Gov. Inflows	OLS - AR(1) Corp. Inflows	OLS - AR(1) Bank Inflows
VARIABLES	Post-2010	Post-2010	Post-2010	Post-2010
L.NBFI	-1.081*** (0.396)	-1.103*** (0.412)	-0.00621 (0.0485)	-0.0301 (0.0401)
L.NBFI*VIX	0.0287** (0.0118)	0.0337*** (0.0127)	-0.00165 (0.00193)	-0.000465 (0.00142)
L.NBFI*Growth	2.450 (2.194)	1.875 (2.289)	0.164 (0.363)	-0.152 (0.304)
Observations	751	713	713	713
R-squared	0.301	0.287	0.167	0.179
Number of countrycode	21	20	20	20

VARIABLES	Post-2015	Post-2015	Post-2015	Post-2015
L.NBFI	-0.991*** (0.354)	-1.041*** (0.354)	-0.0117 (0.0615)	0.0168 (0.0224)
L.NBFI*VIX	0.0205** (0.00825)	0.0272*** (0.0100)	-0.00284 (0.00220)	0.000589 (0.000805)
L.NBFI*Growth	4.998 (3.863)	5.392 (3.800)	1.258* (0.716)	-0.529* (0.287)

Observations	360	342	342	342
R-squared	0.368	0.352	0.158	0.154
Number of countrycode	20	19	19	19
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES
Domestic Risk Control	YES	YES	YES	YES
R2-Overall	0.231	0.230	0.148	0.0565

	OLS - AR(1) Total Inflows	OLS - AR(1) Gov. Inflows	OLS - AR(1) Corp. Inflows	OLS - AR(1) Bank Inflows
VARIABLES	Post-2004	Post-2004	Post-2004	Post-2004
L.NBFI	-0.00481 (0.150)	-0.101 (0.164)	-0.00435 (0.0539)	0.0222 (0.0270)
L.NBFI*VIX	-0.0144** (0.00660)	-0.0138** (0.00669)	-0.000127 (0.00199)	0.000774 (0.00117)
L.NBFI*Growth	0.193 (1.519)	1.113 (1.624)	-0.103 (0.545)	-0.603** (0.246)
Observations	427	427	427	427
R-squared	0.320	0.325	0.307	0.165
Number of countrycode	7	7	7	7

VARIABLES	2004-2009	2004-2009	2004-2009	2004-2009
L.NBFI	0.602 (0.411)	0.820* (0.424)	-0.0447 (0.0777)	-0.165** (0.0774)
L.NBFI*VIX	-0.0332*** (0.00925)	-0.0367*** (0.00990)	-0.00135 (0.00128)	0.00376** (0.00159)
L.NBFI*Growth	-4.778 (2.977)	-5.427* (3.106)	0.179 (0.626)	0.554 (0.669)
Observations	161	161	161	161
R-squared	0.519	0.530	0.347	0.192
Number of countrycode	7	7	7	7
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES
Domestic Risk Control:	YES	YES	YES	YES

	OLS - AR(1) Total Inflows	OLS - AR(1) Gov. Inflows	OLS - AR(1) Corp. Inflows	OLS - AR(1) Bank Inflows
VARIABLES	Post-2010	Post-2010	Post-2010	Post-2010
L.NBFI	-0.182 (0.154)	-0.235 (0.163)	0.0344 (0.0698)	0.0782** (0.0375)
L.NBFI*VIX	0.00892 (0.00614)	0.0123** (0.00617)	-0.00119 (0.00276)	-0.00223 (0.00173)
L.NBFI*Growth	0.627 (1.398)	1.229 (1.445)	0.0142 (0.752)	-0.730** (0.349)
Observations	266	266	266	266
R-squared	0.471	0.458	0.331	0.222
Number of countrycode	7	7	7	7

VARIABLES	Post-2015	Post-2015	Post-2015	Post-2015
L.NBFI	-0.671** (0.293)	-0.656** (0.291)	0.102 (0.106)	-0.0452 (0.0615)
L.NBFI*VIX	0.0335*** (0.0105)	0.0303*** (0.0109)	-0.00131 (0.00391)	0.00539** (0.00229)
L.NBFI*Growth	7.120* (4.240)	7.548* (4.056)	-0.346 (1.371)	-0.635 (0.568)
Observations	126	126	126	126
R-squared	0.731	0.729	0.289	0.201
Number of countrycode	7	7	7	7
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES
Domestic Risk Controls	YES	YES	YES	YES
R2-Overall	0.320	0.325	0.307	0.165

## NBFI and capital flows

	OLS - AR(1) Total Inflows	OLS - AR(1) Gov. Inflows	OLS - AR(1) Corp. Inflows	OLS - AR(1) Bank Inflows
VARIABLES	2004-2021	2004-2021	2004-2021	2004-2021
L.NBFI	-0.372 (0.447)	-0.901*** (0.256)	0.138 (0.107)	0.275 (0.228)
L.NBFI*VIX	0.0379** (0.0163)	0.0155 (0.0102)	0.00158 (0.00448)	-0.00243 (0.00981)
L.NBFI*Growth	-1.814 (3.331)	2.462 (2.043)	-1.027 (0.936)	-1.942 (2.049)
Observations	1,170	990	1,052	1,113
R-squared	0.192	0.260	0.222	0.251
Number of countrycode	22	19	20	21

VARIABLES	2004-2009	2004-2009	2004-2009	2004-2009
L.NBFI	-0.0587 (0.871)	-0.277 (0.259)	-0.0908 (0.268)	-0.440 (0.573)
L.NBFI*VIX	0.0352* (0.0212)	-0.0113 (0.00832)	0.0116** (0.00495)	0.0159 (0.0193)
L.NBFI*Growth	-11.51** (5.205)	-0.921 (1.679)	-0.726 (1.888)	-0.911 (3.996)
Observations	419	353	377	400
R-squared	0.596	0.684	0.555	0.443
Number of countrycode	20	17	18	19
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES
Domestic Risk Control:	YES	YES	YES	YES

## NBFI as continuous variable. Total flows, 2004-2021

	OLS - AR(1) Total Inflows	OLS - AR(1) Gov. Inflows	OLS - AR(1) Corp. Inflows	OLS - AR(1) Bank Inflows
VARIABLES	Post-2010	Post-2010	Post-2010	Post-2010
L.NBFI	-1.136 (0.739)	-1.036** (0.449)	-0.0840 (0.135)	0.189 (0.282)
L.NBFI*VIX	0.0319 (0.0200)	0.0351** (0.0140)	-0.00787 (0.00555)	-0.0184* (0.00960)
L.NBFI*Growth	4.198 (4.956)	1.489 (2.441)	1.029 (0.880)	-1.417 (1.614)
Observations	751	637	675	713
R-squared	0.110	0.309	0.235	0.362
Number of countrycode	21	18	19	20

VARIABLES	Post-2015	Post-2015	Post-2015	Post-2015
L.NBFI	0.114 (1.075)	-0.892** (0.384)	0.0252 (0.136)	0.199 (0.255)
L.NBFI*VIX	-0.00115 (0.0233)	0.0320*** (0.0123)	-0.00915* (0.00482)	0.00344 (0.00768)
L.NBFI*Growth	9.862 (13.53)	7.003* (3.805)	2.069 (1.477)	-2.243 (2.005)
Observations	360	306	324	342
R-squared	0.074	0.423	0.353	0.392
Number of countrycode	20	17	18	19
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES
Domestic Risk Controls	YES	YES	YES	YES
R2-Overall	0.192	0.260	0.222	0.251

	(4)	(8)	(12)	(16)
	OLS - AR(1)	OLS - AR(1)	OLS - AR(1)	OLS - AR(1)
	Total Inflows	Gov. Inflows	Corp. Inflows	Bank Inflows
VARIABLES	Post-2004	Post-2004	Post-2004	Post-2004
L.NBFI	0.113 (0.256)	-0.0279 (0.163)	0.0129 (0.0885)	-0.210 (0.221)
L.NBFI*VIX	-0.00805 (0.0134)	-0.00198 (0.00646)	0.00420 (0.00388)	0.0132 (0.0117)
L.NBFI*Growth	0.791 (2.904)	-0.720 (1.552)	-1.480* (0.873)	0.120 (2.648)
Observations	427	427	427	427
R-squared	0.533	0.255	0.219	0.126
Number of countrycode	7	7	7	7
VARIABLES	2004-2009	2004-2009	2004-2009	2004-2009
L.NBFI	-1.382 (1.005)	0.431 (0.439)	-0.296 (0.260)	-1.614 (1.089)
L.NBFI*VIX	0.0159 (0.0250)	-0.0202** (0.00894)	0.00364 (0.00469)	0.0358 (0.0261)
L.NBFI*Growth	6.670 (6.819)	-4.141 (2.899)	1.760 (2.216)	7.591 (6.932)
Observations	161	161	161	161
R-squared	0.509	0.359	0.454	0.123
Number of countrycode	7	7	7	7
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES
Domestic Risk Control:	YES	YES	YES	YES

	OLS - AR(1)	OLS - AR(1)	OLS - AR(1)	OLS - AR(1)
	Total Inflows	Gov. Inflows	Corp. Inflows	Bank Inflows
VARIABLES	Post-2010	Post-2010	Post-2010	Post-2010
L.NBFI	0.391 (0.240)	-0.0624 (0.154)	0.0502 (0.113)	0.160 (0.111)
L.NBFI*VIX	-0.0294** (0.0118)	0.0179*** (0.00601)	-0.00139 (0.00474)	-0.00344 (0.00590)
L.NBFI*Growth	-1.768 (2.625)	-1.798 (1.289)	-2.401** (0.961)	-0.988 (1.192)
Observations	266	266	266	266
R-squared	0.652	0.473	0.248	0.454
Number of countrycode	7	7	7	7
VARIABLES	Post-2015	Post-2015	Post-2015	Post-2015
nonbank = L,	-0.416 (0.450)	-0.159 (0.340)	0.00874 (0.187)	-0.405** (0.188)
nonbank_vix = L,	0.0337* (0.0172)	0.0339*** (0.0122)	0.00976 (0.00700)	0.0294*** (0.00728)
nonbank_growth = L,	-0.319 (5.012)	-0.547 (3.889)	-0.275 (2.185)	2.147 (2.175)
Observations	126	126	126	126
R-squared	0.678	0.624	0.337	0.588
Number of countrycode	7	7	7	7
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES
Domestic Risk Controls	YES	YES	YES	YES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Total			Government					Corporate				Banks			
VARIABLES																
L.High NBFI 2007 10%				-0.185** (0.0919)				-0.176* (0.106)	0.0127 (0.0145)	0.00955 (0.0144)	0.0121 (0.0155)	-0.0182 (0.0185)	0.00167 (0.0169)	0.00429 (0.0167)	-0.00453 (0.0174)	
L.High NBFI 2007 10%*VIX	-0.000622 (0.00166)	-0.000441 (0.00160)	-0.000498 (0.00158)	-0.000335 (0.00218)	-8.07e-05 (0.00166)	-0.000287 (0.00172)	-0.000635 (0.00161)	-0.00109 (0.00231)	0.000124 (0.000493)	6.12e-05 (0.000483)	6.41e-05 (0.000523)	0.000633 (0.000566)	-0.00102** (0.000418)	-0.00103** (0.000417)	-0.00103** (0.000416)	-0.000702 (0.000463)
L.High NBFI 2007 10%*Growth	0.476 (0.512)	0.711 (0.482)	0.685 (0.470)	1.539** (0.605)	0.787* (0.442)	0.927** (0.437)	0.858** (0.408)	1.470*** (0.436)	-0.0639 (0.105)	-0.0381 (0.121)	-0.0531 (0.119)	0.0622 (0.173)	0.192 (0.127)	0.196 (0.125)	0.195 (0.123)	0.176 (0.134)
R-squared	0.414	0.421	0.424	0.460	0.465	0.470	0.472	0.492	0.197	0.216	0.226	0.275	0.110	0.115	0.123	0.150
L.High NBFI 2007 20%		-0.0697 (0.0671)		-0.234* (0.120)		-0.0860 (0.0699)	-0.0851 (0.0688)		-0.0151 (0.0126)	-0.00170 (0.0128)		0.0135 (0.0204)		-0.00763 (0.0115)		-0.00910 (0.0160)
L.High NBFI 2007 20%*VIX	7.09e-05 (0.00167)	0.000422 (0.00163)	0.000390 (0.00160)	0.000929 (0.00209)	7.19e-05 (0.00168)	0.000146 (0.00167)	6.68e-05 (0.00163)	-0.000144 (0.00207)	0.000402 (0.000422)	0.000303 (0.000415)	0.000314 (0.000421)	0.000590 (0.000445)	-0.000387 (0.000256)	-0.000409 (0.000258)	-0.000409 (0.000262)	-0.000172 (0.000337)
L.High NBFI 2007 20%*Growth	0.682 (0.518)	0.852* (0.509)	0.840* (0.489)	1.943** (0.772)	0.681 (0.483)	0.763 (0.498)	0.742 (0.470)	1.766** (0.755)	0.0259 (0.104)	0.0527 (0.113)	0.0497 (0.105)	0.161 (0.171)	0.129 (0.0931)	0.138 (0.0948)	0.133 (0.0949)	0.118 (0.124)
R-squared	0.416	0.424	0.427	0.472	0.465	0.471	0.473	0.503	0.197	0.217	0.227	0.279	0.100	0.105	0.112	0.143
L.High NBFI 2007 30%	-0.0943 (0.0759)			-0.204 (0.154)		-0.0739 (0.0796)	-0.0691 (0.0801)		0.00256 (0.0143)		0.00820 (0.0154)	0.0115 (0.0226)	-0.0446* (0.0242)		-0.0457* (0.0240)	
L.High NBFI 2007 30%*VIX	-0.00305** (0.00154)	-0.00276* (0.00154)	-0.00278* (0.00152)	-0.00265 (0.00182)	-0.00320* (0.00178)	-0.00317* (0.00179)	-0.00322* (0.00178)	-0.00420* (0.00220)	0.000266 (0.000451)	0.000193 (0.000451)	0.000231 (0.000446)	0.000565 (0.000514)	-0.000294 (0.000338)	-0.000307 (0.000336)	-0.000309 (0.000343)	-0.000205 (0.000378)
L.High NBFI 2007 30%*Growth	0.626 (0.554)	0.680 (0.563)	0.648 (0.558)	2.516** (0.979)	0.604 (0.553)	0.585 (0.574)	0.584 (0.561)	2.243** (0.923)	0.0694 (0.120)	0.0678 (0.118)	0.0592 (0.108)	0.184 (0.185)	0.0855 (0.0794)	0.0888 (0.0793)	0.0849 (0.0814)	0.115 (0.141)
Observations	463	463	463	376	425	425	425	338	431	431	431	354	425	425	425	336
R-squared	0.419	0.426	0.429	0.494	0.467	0.472	0.475	0.524	0.198	0.217	0.227	0.280	0.111	0.117	0.123	0.161
Number of countrycode	24	24	24	20	23	23	23	19	23	23	23	19	22	22	22	18
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	NO	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES
GFC Controls	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
Domestic Risk Controls	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES



# NBFI and capital flows

# NBFI as categorical variable. Portfolio flows, 2012q3-2017q2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Total				Government				Corporate				Banks			
VARIABLES																
L.High NBFI 2012 10%			0.00729 (0.223)		0.123 (0.227)		0.136 (0.226)	0.0846 (0.205)	-0.0173 (0.0317)		-0.0189 (0.0318)				-0.0605** (0.0250)	
L.High NBFI 2012 10%*VIX	0.00102 (0.0142)	0.00108 (0.0134)	0.000966 (0.0135)	0.00405 (0.0123)	-0.00112 (0.0142)	-0.00105 (0.0142)	-0.00108 (0.0142)	0.00271 (0.0129)	0.00213 (0.00168)	0.00197 (0.00166)	0.00182 (0.00159)	0.00160 (0.00153)	0.00221 (0.00146)	0.00243 (0.00154)	0.00244 (0.00154)	0.00267* (0.00157)
L.High NBFI 2012 10%*Growth	-2.368 (4.542)	-3.521 (4.337)	-3.500 (4.363)	-1.929 (4.122)	-1.460 (4.365)	-2.283 (4.252)	-2.292 (4.262)	-1.543 (4.008)	-0.798 (0.502)	-0.727 (0.458)	-0.694 (0.442)	-0.322 (0.456)	-0.133 (0.393)	-0.106 (0.434)	-0.107 (0.435)	0.0422 (0.442)
R-squared	0.123	0.171	0.171	0.301	0.094	0.128	0.128	0.299	0.169	0.204	0.208	0.250	0.133	0.177	0.177	0.233
L.High NBFI 2012 20%	-0.0754 (0.138)	-0.0418 (0.135)	-0.0405 (0.136)		-0.128 (0.135)					0.0193 (0.0224)	0.0202 (0.0229)	0.0532* (0.0299)		-0.0550*** (0.0165)	-0.0552*** (0.0165)	-0.0521*** (0.0148)
L.High NBFI 2012 20%*VIX	0.00475 (0.00825)	0.00415 (0.00822)	0.00407 (0.00824)	0.00548 (0.00726)	0.00594 (0.00811)	0.00572 (0.00827)	0.00570 (0.00827)	0.00701 (0.00757)	-0.00159 (0.00130)	-0.00165 (0.00125)	-0.00156 (0.00128)	-0.00155 (0.00133)	0.000601 (0.000497)	0.000626 (0.000512)	0.000631 (0.000513)	0.000860 (0.000632)
L.High NBFI 2012 20%*Growth	2.505 (1.736)	1.270 (1.761)	1.240 (1.774)	0.500 (1.591)	2.860 (2.037)	2.097 (2.070)	2.087 (2.088)	0.903 (1.891)	-0.0979 (0.355)	-0.228 (0.361)	-0.305 (0.358)	-0.255 (0.355)	0.289** (0.140)	0.194 (0.148)	0.195 (0.149)	0.273 (0.167)
R-squared	0.115	0.151	0.151	0.291	0.096	0.124	0.124	0.294	0.164	0.200	0.205	0.251	0.132	0.172	0.172	0.231
L.High NBFI 2012 30%	-0.131 (0.106)	-0.132 (0.101)	-0.129 (0.101)			-0.00855 (0.101)		0.0181 (0.0917)		0.0157 (0.0149)	0.0165 (0.0138)	0.0521** (0.0236)	-0.0360** (0.0143)			-0.0467*** (0.0156)
L.High NBFI 2012 30%*VIX	0.00190 (0.00569)	0.00157 (0.00546)	0.00145 (0.00549)	0.00358 (0.00507)	0.00407 (0.00612)	0.00358 (0.00609)	0.00356 (0.00609)	0.00613 (0.00549)	-0.00118* (0.000713)	-0.00124* (0.000711)	-0.00119* (0.000713)	-0.00127 (0.000867)	0.000375 (0.000595)	0.000450 (0.000594)	0.000454 (0.000596)	0.000761 (0.000732)
L.High NBFI 2012 30%*Growth	-0.675 (1.121)	-0.883 (1.007)	-0.939 (1.018)	-1.579* (0.859)	-0.563 (1.107)	-0.815 (1.082)	-0.827 (1.088)	-1.968** (1.004)	-0.363* (0.218)	-0.303 (0.235)	-0.355 (0.226)	-0.288 (0.223)	0.0359 (0.126)	0.0857 (0.122)	0.0866 (0.123)	0.158 (0.128)
Observations	480	480	480	396	440	440	440	356	460	460	460	376	440	440	440	356
R-squared	0.114	0.162	0.163	0.312	0.089	0.123	0.123	0.308	0.168	0.201	0.206	0.251	0.125	0.170	0.171	0.232
Number of countrycode	24	24	24	21	22	22	22	19	23	23	23	20	22	22	22	19
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	NO	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES
GFC Controls	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
Domestic Risk Controls	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES

# NBFI and capital flows

# NBFI as categorical variable. Portfolio flows, 2017q3-2021q4

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Total		Government				Corporate				Banks					
VARIABLES																
L.High NBFI 2017 10%	0.131 (0.0882)	0.134 (0.0879)	-0.0911 (0.0916)	-0.271** (0.114)	0.0980 (0.0885)			-0.208* (0.114)		0.0102 (0.00875)				0.0127* (0.00706)	0.00839 (0.0143)	-0.0205 (0.0180)
L.High NBFI 2017 10%*VIX	-0.000335 (0.00352)	-0.000540 (0.00351)	0.00987* (0.00507)	0.00783* (0.00428)	-0.000304 (0.00357)	-0.000459 (0.00356)	0.00912* (0.00496)	0.00873** (0.00409)	-0.000299 (0.000318)	-0.000233 (0.000306)	-0.000151 (0.000839)	-0.000454 (0.000918)	-0.000229 (0.000279)	-0.000222 (0.000256)	-0.000287 (0.000619)	-0.000507 (0.000673)
L.High NBFI 2017 10%*Growth	-0.576 (1.037)	-0.770 (1.025)	6.819* (3.779)	3.267 (2.546)	-0.542 (1.042)	-0.774 (1.039)	7.115* (3.824)	2.704 (2.539)	-0.0367 (0.0596)	-0.0159 (0.0667)	-0.263 (0.256)	0.146 (0.328)	-0.0594 (0.0656)	-0.0705 (0.0599)	-0.0566 (0.182)	0.212 (0.231)
R-squared	0.128	0.159	0.286	0.556	0.137	0.160	0.271	0.545	0.211	0.230	0.358	0.365	0.110	0.128	0.362	0.400
L.High NBFI 2017 20%										0.0416*** (0.0121)	0.0459** (0.0210)			0.00588 (0.00650)		
L.High NBFI 2017 20%*VIX	-0.00263 (0.00191)	-0.00267 (0.00189)	0.00604 (0.00406)	0.00575* (0.00336)	-0.00191 (0.00180)	-0.00180 (0.00178)	0.00640* (0.00334)	0.00748*** (0.00245)	-0.00109*** (0.000272)	-0.00108*** (0.000266)	-0.000377 (0.000731)	-0.000672 (0.000760)	0.000155 (0.000108)	0.000169 (0.000111)	0.000337 (0.000243)	0.000348 (0.000257)
L.High NBFI 2017 20%*Growth	-0.415 (0.285)	-0.413 (0.277)	3.515 (2.785)	1.919 (1.944)	-0.284 (0.248)	-0.281 (0.250)	4.685* (2.746)	2.638 (1.804)	-0.132** (0.0552)	-0.131** (0.0536)	-0.942** (0.443)	-0.627 (0.438)	-0.00926 (0.0217)	-0.00673 (0.0223)	-0.00393 (0.137)	0.0688 (0.161)
R-squared	0.133	0.165	0.275	0.543	0.140	0.164	0.271	0.549	0.225	0.244	0.364	0.374	0.112	0.130	0.360	0.397
L.High NBFI 2017 30%	0.0591 (0.0438)	0.00768 (0.0365)	-0.0732 (0.104)	-0.248* (0.130)	0.0469 (0.0439)	0.0433 (0.0434)			0.00714 (0.0135)	-0.00137 (0.00833)					-0.0126 (0.0105)	-0.0332** (0.0164)
L.High NBFI 2017 30%*VIX	0.00185 (0.00123)	0.00180 (0.00123)	0.00437 (0.00292)	0.00354 (0.00347)	0.00120 (0.00119)	0.00112 (0.00118)	0.00543** (0.00260)	0.00663** (0.00298)	0.000439 (0.000295)	0.000384 (0.000295)	-0.000533 (0.000790)	-0.000968 (0.000811)	0.000123 (9.57e-05)	0.000137 (9.96e-05)	0.000225 (0.000213)	0.000128 (0.000317)
L.High NBFI 2017 30%*Growth	-0.168 (0.219)	-0.161 (0.214)	4.058 (2.899)	2.465 (2.336)	-0.178 (0.194)	-0.161 (0.191)	4.519* (2.641)	2.522 (2.191)	-0.00114 (0.0610)	-0.00771 (0.0597)	-1.008** (0.498)	-0.790 (0.520)	-0.0118 (0.0247)	-0.0103 (0.0257)	-0.0208 (0.148)	0.0339 (0.175)
Observations	394	394	192	160	379	379	184	152	380	380	184	152	361	361	176	144
R-squared	0.125	0.156	0.271	0.528	0.134	0.157	0.284	0.528	0.216	0.237	0.439	0.456	0.112	0.130	0.361	0.401
Number of countrycode	24	24	24	20	23	23	23	19	23	23	23	19	22	22	22	18
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	NO	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES
GFC Controls	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
Domestic Risk Controls	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES

Do countries with high NBFi participation behave differently after sudden stop episodes?

I ) Regressions for high and low-NBFi countries:

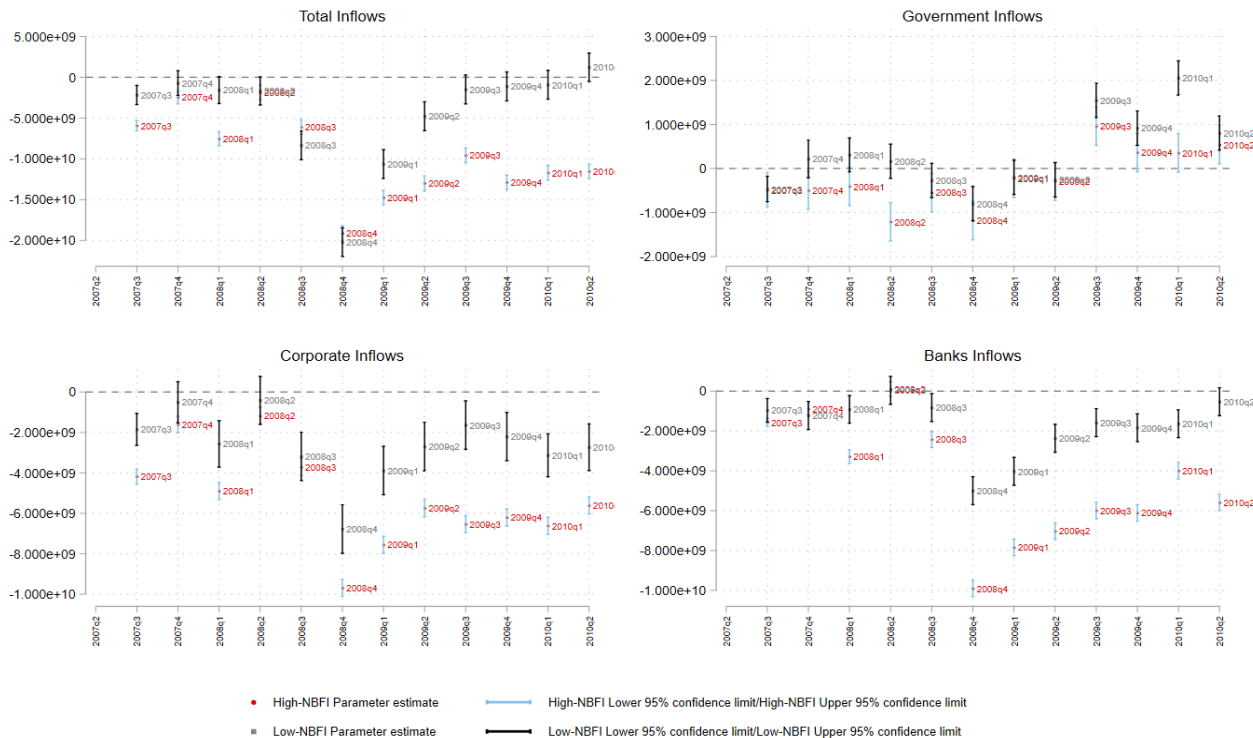
$$y_{it} = \sum_{i=1}^N \alpha_i C_i + \sum_{t=1}^T \beta_t T_t + e_{it}$$

II) Regression for the whole sample:

$$y_{it} = \sum_{i=1}^N \alpha_i C_i + \sum_{t=1}^T \beta_t T_t + \sum_{t=1}^T \gamma_t NBFI_i T_t + e_{it}$$

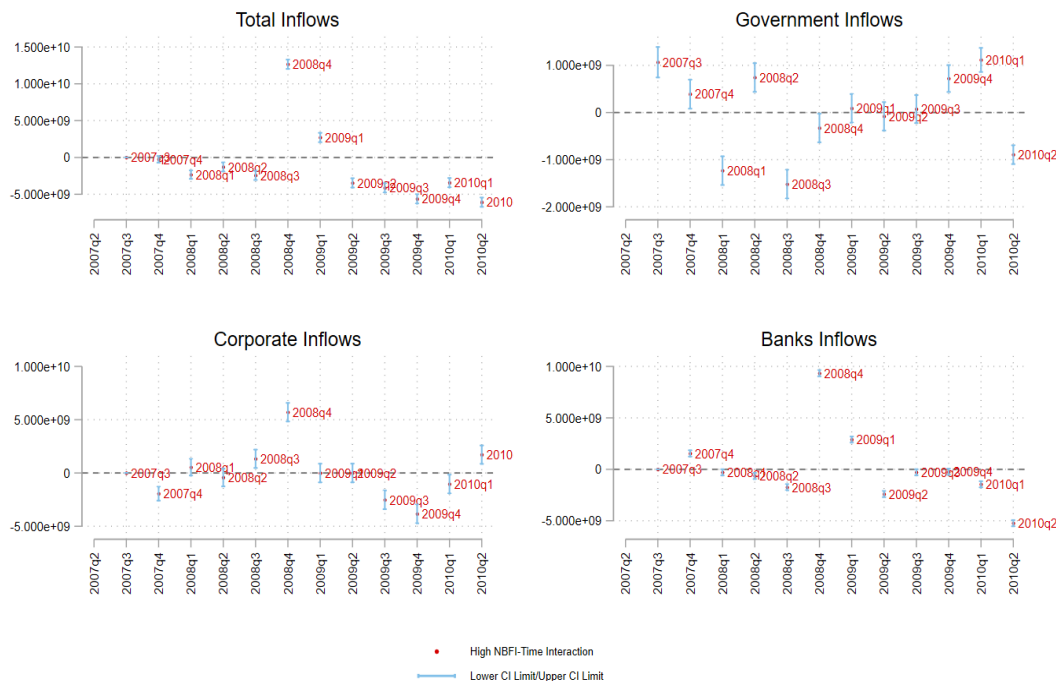
## Time effects for High- and Low-NBFI countries during GFC. Total Inflows

Higher 30% vs Rest



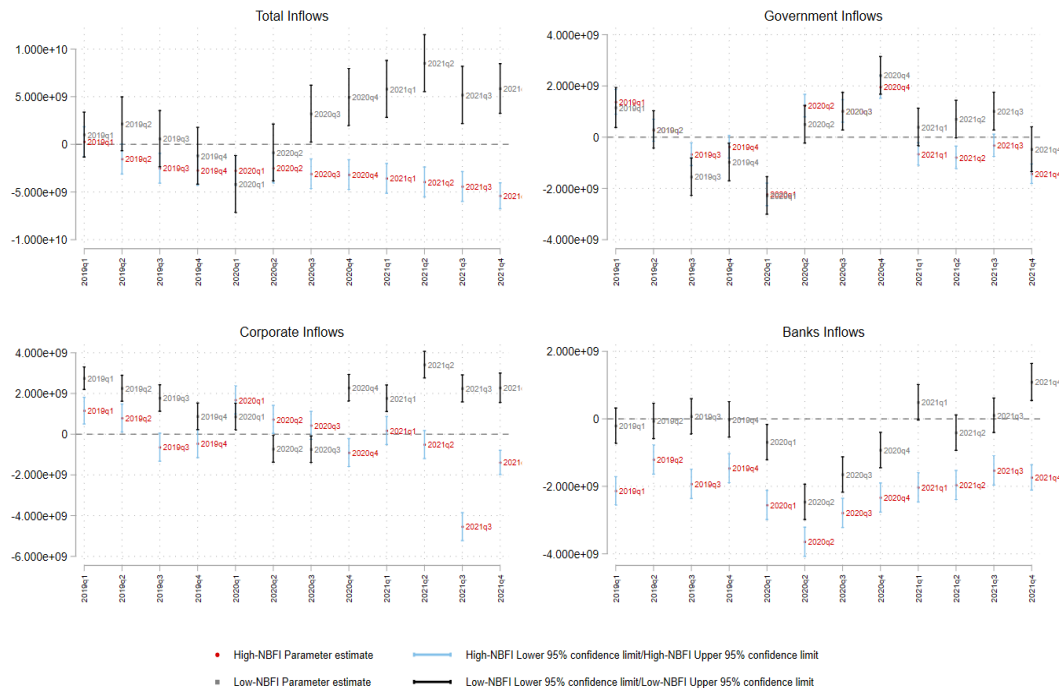
## Interaction terms for High NBFI during GFC. Total Inflows

Higher 30% vs Rest



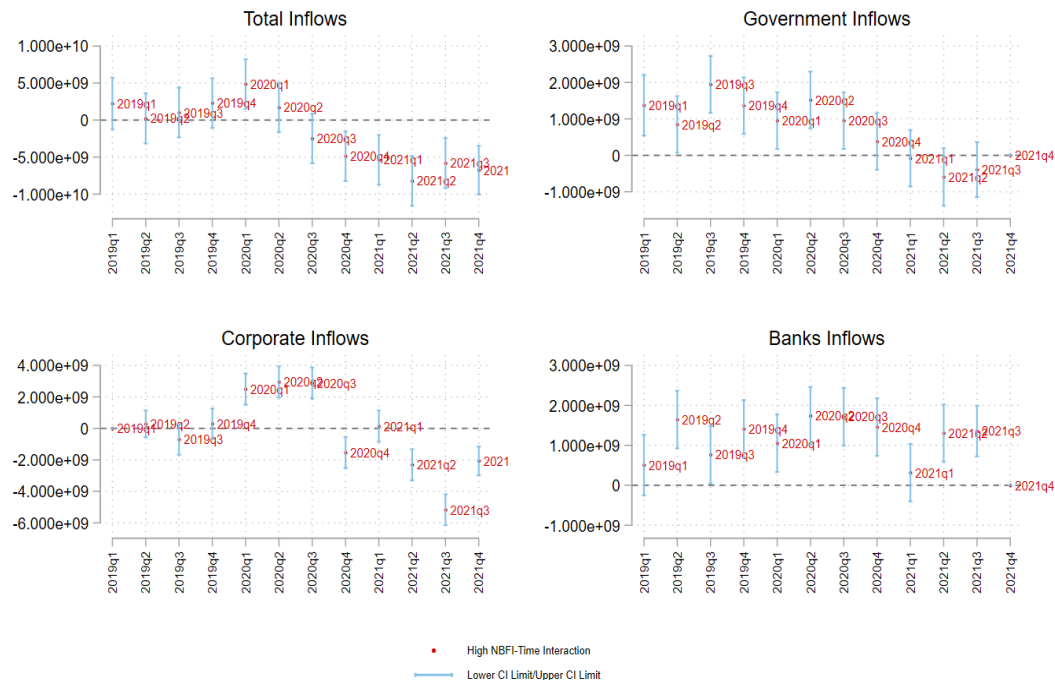
## Time effects for High- and Low-NBFI countries during Covid-19 crisis. Total Inflows

Higher 30% vs Rest



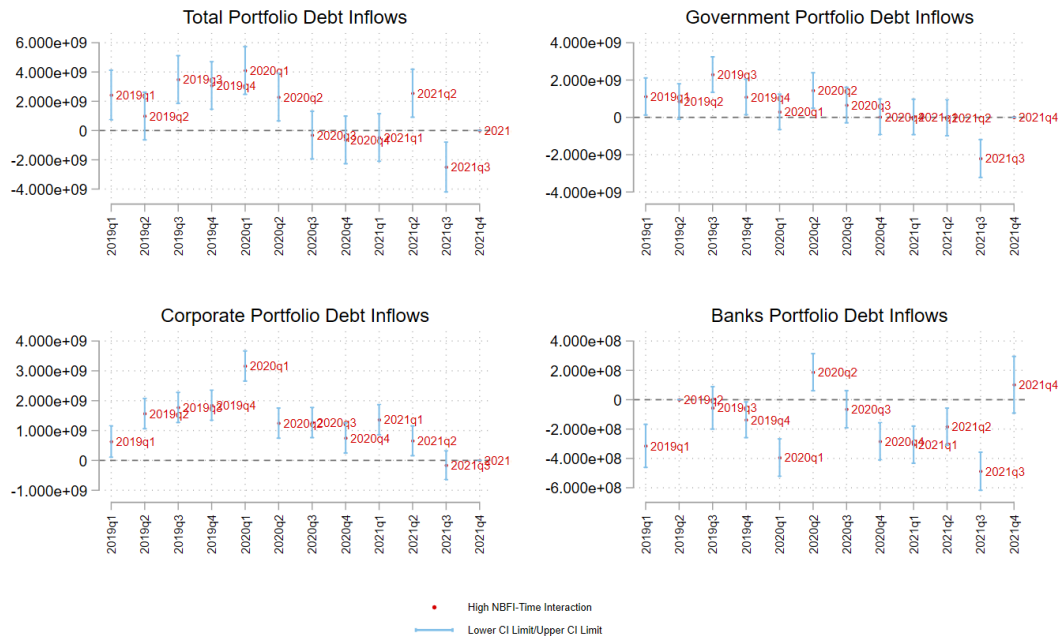
## Interaction terms for High-NBFI during Covid-19 crisis. Total Inflows

Higher 30% vs Rest



## Interaction terms for High-NBFI during Covid-19 crisis. Portfolio flows

Portfolio Debt. Higher 30% vs Rest





- We analyze the interaction of foreign NBFi holdings of government debt with global risk aversion and domestic growth, in 24 EMEs, 2004-2021, using quarterly data.
- We estimate panel data models (autocorrelation and cross-country correlation), flows by sectors (total, government, corporate and banking), time and country fixed effects.
- NBFi: continuous (%holdings) and categorical (dummy for highest decile/s) variable.

Evidence of “pipes” as determinants of capital flows:

- foreign NBFi holdings are generally associated to capital flows;
- links between NBFi and global determinants of flows: in some cases, NBFi make them more sensitive to global risk aversion, and less so to domestic growth; in others, macro procyclicality. Varies by periods and type of flows
- Event studies: GFC and Covid-19. Stronger evidence of a more significant role of NBFi in amplifying outflows in the latter: countries with a higher share of government debt held by NBFi show consistently higher outflows across several sectors.

Findings

NBFI as  
continuous  
variable

- **Portfolio flows: NBFI linked to higher sensitivity of flows to global risk aversion and to domestic growth in 2004-2009.** Latin America: in 2004-2021 and 2004-2009, NBFI also interacts negatively with global risk aversion.
- **Total flows: NBFI linked to lower inflows but less sensitivity to global risk aversion.** Since 2015: some indication of total flows more sensitive to VIX as NBFI increases; higher response to local growth (procyclicality of NBFI flows). Latin America: higher foreign NBFI, lower inflows as VIX increases after 2010.

NBFI as  
categorical  
variable

- **2007-2012: NBFI increases portfolio flows procyclicality, both financial and real (especially flows to governments and banks).** Post-GFC (esp 2012-17): NBFI makes flows to corporates more sensitive to global financial conditions, and less to domestic growth (consistent with growing role of foreign corporate debt in EMEs after the GFC).
- **Total flows: NBFI linked to domestic procyclicality during GFC and aftermath (esp. governments).** Post-GFC, no clear link of NBFI, push or pull factors (consistent with loans to no-banks less sensitive to global financial conditions after GFC; Avdjiev et al., 2020). 2018-2021, some evidence of higher sensitivity of flows to corporate to global financial conditions.

- Use alternative data base (Avdjiev et al., 2018)
- Refine definition and use of NBFI as continuous / categorical variable
- Unify sampling periods across exercise
- Economic significance
- Quantile regressions, capturing more extreme inflow/outflow episodes vis-a-vis average ones
- Go beyond estimations by period and employ interactions with dummy variables at the time of sudden stops (in general, to refine the analysis by distinguishing inflow and outflow episodes)
- Focus on Diff-in-diff exercises, more controls (including country\*time FE). Better pinpoint the likely influence of NBFI on capital flows at the time of the Covid-19 crisis and other episodes.

**Thank you!**

# Annex

Total inflows to selected EMEs, 2007q3-2012q2								
	(1)	(2)	(3)	(3)	(5)	(6)	(7)	(8)
	Total Inflows		Gov. Inflows		Corporate Inflows		Bank Inflows	
VARIABLES	2007q3- 2012q2	2007q3- 2012q2	2007q3- 2012q2	2007q3- 2012q2	2007q3- 2012q2	2007q3- 2012q2	2007q3- 2012q2	2007q3- 2012q2
L.High NBFi 2007 10%				-0.786** (0.375)				-0.196** (0.0841)
L.High NBFi 2007 10%*VIX	0.00211 (0.00383)	0.00416 (0.00405)	0.00328 (0.00224)	0.00333 (0.00245)	-0.00206 (0.00244)	0.00214 (0.00281)	-0.00219 (0.00209)	0.000813 (0.00275)
L.High NBFi 2007 10%*Growth	1.313 (1.001)	1.750** (0.799)	3.447** (1.488)	3.742** (1.545)	0.00430 (0.529)	0.322 (0.528)	0.759 (0.625)	0.594 (0.478)
R-squared	0.354	0.483	0.588	0.586	0.251	0.450	0.559	0.653
L.High NBFi 2007 20%		-0.233* (0.131)	-0.0445 (0.0781)		-0.000647 (0.0654)	-0.135* (0.0705)	0.0567 (0.0756)	0.0746 (0.111)
L.High NBFi 2007 20%*VIX	0.00269 (0.00306)	0.00308 (0.00294)	0.00194 (0.00228)	0.00157 (0.00300)	-0.000102 (0.00179)	0.00222 (0.00168)	0.000840 (0.00203)	0.00209 (0.00209)
L.High NBFi 2007 20%*Growth	0.331 (0.815)	0.580 (0.782)	1.339** (0.579)	2.370* (1.220)	-0.0686 (0.432)	0.162 (0.461)	-0.311 (0.549)	-0.610 (0.489)
R-squared	0.358	0.460	0.594	0.602	0.243	0.449	0.567	0.649
L.High NBFi 2007 30%		-0.176 (0.135)	-0.184 (0.116)					0.153 (0.111)
L.High NBFi 2007 30%*VIX	0.00193 (0.00334)	0.00175 (0.00280)	-0.00100 (0.00289)	-0.00259 (0.00340)	0.00115 (0.00154)	0.00241* (0.00132)	-0.000722 (0.00229)	0.000371 (0.00183)
L.High NBFi 2007 30%*Growth	-0.0922 (0.797)	0.339 (0.855)	1.312** (0.650)	3.630** (1.683)	-0.364 (0.402)	-0.0424 (0.458)	-0.557 (0.610)	-1.119** (0.570)
Observations	465	376	278	211	409	332	380	311
R-squared	0.351	0.461	0.608	0.651	0.245	0.448	0.560	0.651
Number of countrycode	24	20	14	11	22	18	19	16
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES	YES	YES	YES	YES
Domestic Risk Controls	NO	YES	NO	YES	NO	YES	NO	YES

Total Capital Flows to selected EMEs, 2012q3-2017q2								
	(1)	(2)	(3)	(3)	(5)	(6)	(7)	(8)
	Total Inflows		Gov. Inflows		Corporate Inflows		Bank Inflows	
VARIABLES	2012q3- 2017q3	2012q3- 2017q3	2012q3- 2017q3	2012q3- 2017q3	2012q3- 2017q3	2012q3- 2017q3	2012q3- 2017q3	2012q3- 2017q3
L.High NBFI 2012 10%				-0.176 (0.540)	0.0559 (0.100)			-0.137 (0.369)
L.High NBFI 2012 10%*VIX	0.0178 (0.0176)	0.0170 (0.0191)	-0.00214 (0.0271)	0.00626 (0.0253)	0.000305 (0.00588)	-0.000810 (0.00610)	-0.00147 (0.0184)	0.00112 (0.0178)
L.High NBFI 2012 10%*Growth	-15.32*** (5.396)	-15.16*** (5.821)	-2.539 (6.754)	1.014 (6.316)	-2.839* (1.645)	-1.351 (1.715)	-2.038 (4.507)	-0.396 (4.338)
R-squared	0.252	0.403	0.147	0.365	0.205	0.289	0.415	0.510
L.High NBFI 2012 20%	-0.296 (0.185)			-0.189 (0.188)	0.0550 (0.0678)	0.121* (0.0661)	-0.299** (0.132)	-0.333** (0.131)
L.High NBFI 2012 20%*VIX	0.0180* (0.0104)	0.0158 (0.0103)	0.0110 (0.00946)	0.0103 (0.00888)	-0.00361 (0.00332)	-0.00458 (0.00334)	0.00788 (0.00777)	0.00826 (0.00751)
L.High NBFI 2012 20%*Growth	-0.952 (2.600)	-3.022 (2.754)	1.620 (2.186)	0.793 (1.914)	-0.814 (0.858)	-0.657 (0.828)	0.170 (1.331)	0.753 (1.326)
R-squared	0.209	0.337	0.150	0.372	0.197	0.288	0.409	0.504
L.High NBFI 2012 30%	-0.231 (0.147)		-0.135 (0.128)		0.0212 (0.0596)	0.0905 (0.0583)	-0.438*** (0.108)	-0.463*** (0.109)
L.High NBFI 2012 30%*VIX	0.0112 (0.00804)	0.00807 (0.00827)	0.00568 (0.00710)	0.00520 (0.00657)	-0.00242 (0.00269)	-0.00407 (0.00286)	0.00189 (0.00621)	0.00184 (0.00622)
L.High NBFI 2012 30%*Growth	0.267 (1.699)	-0.656 (1.634)	0.137 (1.318)	-1.221 (1.190)	-0.309 (0.593)	-0.162 (0.550)	0.786 (0.956)	1.142 (0.931)
Observations	480	396	280	206	440	356	380	306
R-squared	0.191	0.302	0.139	0.366	0.195	0.287	0.405	0.506
Number of countrycode	24	21	14	11	22	19	19	16
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
GFC Controls	YES	YES	YES	YES	YES	YES	YES	YES
Domestic Risk Controls	NO	YES	NO	YES	NO	YES	NO	YES