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# Are Capital Flows Fickle? Increasingly? And Does the Answer Still Depend on Type?

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## Abstract

According to conventional wisdom, capital flows are fickle. Focusing on emerging markets, we ask whether this conventional wisdom still holds in our contemporary world. Our results show that, despite recent structural and regulatory changes, much of it survives. Foreign direct investment (FDI) inflows are more stable than non-FDI inflows. Within non-FDI inflows, portfolio debt and bank-intermediated flows remain the most volatile. Whereas FDI inflows are driven mainly by pull factors, portfolio debt and equity are driven mainly by push factors; bank-intermediated flows are driven a combination of push and pull factors. Capital outflows from emerging markets behave differently, however: FDI outflows from emerging markets have grown and become significantly more volatile. There is similarly an increase in the volatility of bank-intermediated capital outflows from emerging markets. Our findings underscore that outflows from emerging markets, both FDI and bank-related flows, have come to play a growing role and warrant greater attention from analysts and policymakers.

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## 1. Introduction

According to conventional wisdom, capital flows are fickle (see, e.g., Bluedorn et al. 2013; Sussangkarn 2017). They are fickle more or less independent of time and place. Having reached this conclusion, analysts then go on and rank different capital flows according to their volatility. Here the consensus is that foreign direct investment (FDI)-related flows are least volatile and bank-intermediated flows are most volatile. Other portfolio capital flows rank somewhere in between; within this intermediate category debt flows are generally considered to be more volatile than equity-based flows.

This conventional wisdom is a distillation of the experience of earlier decades (see Becker and Noone [2008] for a survey of the literature in which this experience is reviewed). Yet the structure and regulation of international financial markets continue to change, especially recently. Chinese outward FDI has risen dramatically relative to other sources of FDI, for example, raising the question of whether FDI is equally stable regardless of source. South–South FDI flows have risen more generally, again raising the question of whether they behave in the same relatively stable manner as other FDI flows. Bank-intermediated flows have fallen, as large global banks have deleveraged and curtailed their cross-border operations in response to tighter regulatory oversight, although there is also the question of whether banks in emerging markets have stepped into this market space. Asian bond markets have grown relative to bond markets in other regions, pointing to the question of whether flows into and out of the bond markets of different regions are equally stable. Corporate bond markets have grown relative to sovereign bond markets. International investors have become active in equity markets worldwide.

All this raises the question of whether the conventional wisdom still holds in our contemporary world. Some authors suggest that it may not. Blanchard and Acalin (2016), for example, argue that FDI is now as volatile as portfolio capital flows.

In this paper we revisit these questions, focusing on emerging markets. We ask: How do the magnitude and volatility of various capital flows compare? How have they evolved over time? What are the observable empirical correlates of different flows?

We analyze trends in capital flows since the 1990s, including in the post–Global Financial Crisis era. Whereas a majority of previous studies have utilized annual data largely for reasons of availability and convenience, we work here with quarterly data. This allows us to analyze capital flows at business cycle frequencies and around country-specific sudden stops and global stops – events that are hard to pinpoint using annual data.

In terms of inflows into emerging markets, our results suggest that the patterns identified in earlier work persist despite recent structural and regulatory changes, and that much of the conventional wisdom survives. FDI inflows remain more stable than non-FDI inflows: FDI inflows have lower volatility; are more persistent; and decline by smaller amounts in both country-specific sudden stop and global stop episodes. Within non-FDI inflows, portfolio debt and bank-intermediated flows remain the most volatile. Bank-intermediated flows, which rose in the mid 2000s, are especially volatile. They decline most sharply during country-specific sudden stops and global stop episodes. These results may not be surprising, but their constancy is surprising. Empirical regularities in international finance that stand the test of time are the exception, not the rule.

But outflows from emerging markets behave differently. In contrast to the findings for inflows, we document important changes since the turn of the century and in the most recent decade, in particular, in the behavior of outflows. FDI outflows from emerging markets have grown and become significantly more volatile. Similarly, there is a significant increase in the volatility of “other” (mainly bank-intermediated) capital outflows from emerging markets since the turn of the century. Those other outflows are twice as volatile again as FDI outflows, as measured by the coefficient of variation of gross flows scaled by GDP, in the most recent period, 2011–15. In terms of shocks to the capital account of the balance of payments, our findings underscore that outflows from emerging markets, both FDI and bank-related flows, have come to play a growing role and deserve greater attention from analysts and policymakers.

## 2. Magnitude, persistence, and volatility of capital flows

We use quarterly data from the IMF’s Balance of Payments Statistics between 1990:Q1 and 2015:Q4 for 34 emerging countries.<sup>1</sup> The data are patchy for the earlier years; coverage improves over time, yielding an unbalanced panel. The capital flow data are in U.S. dollars. We scale them by annual trend GDP for purposes of analysis.

We analyze inflows and outflows separately. Data are available separately for FDI and non-FDI flows. The latter are further decomposed into portfolio flows (and into portfolio equity and portfolio debt), versus what are labeled “other” flows. The “other” category includes flows through the banking sector (loans, deposits, and banking capital), loans raised by the private sector, trade credits, official government flows, and other smaller residual components. We exclude flows to the general government and monetary authorities, retaining only private flows. The largest share of (private) other flows is made up of flows through the banking sector. Hence some researchers simply refer to them as “bank flows.”<sup>2</sup>

Figures 1 to 4 and Table 1 show that the average FDI and non-FDI inflows are roughly equal in magnitude. Median average annual flows are 2.6 percent and 2.4 percent of GDP annually.<sup>3</sup> Within non-FDI flows, other (bank) flows are the largest, followed by portfolio debt. Portfolio equity flows remain relatively small, averaging 0.2 percent of GDP over the entire period and just 0.16 percent a year in the last five years. Outflows are smaller than inflows on average (these being emerging markets). Figure 2, as we read it, confirms that the relative magnitude of other flows has declined and that portfolio debt has increased since the 2008–09 global financial crisis.

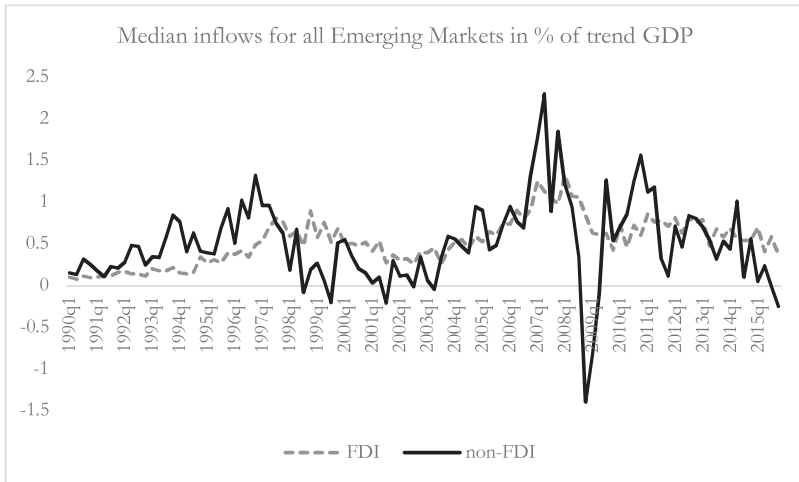
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1 The same set of countries included in Eichengreen and Gupta (2016).

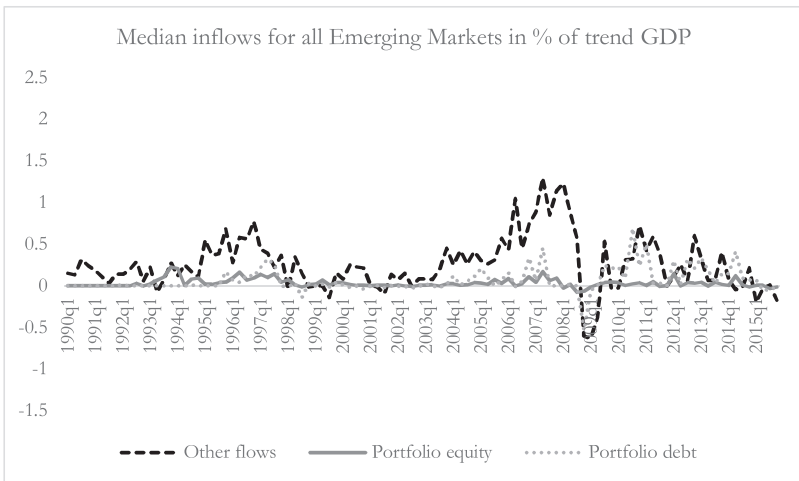
2 See, e.g., Bluedorn et al. (2013).

3 These are unweighted averages for the 34 sample countries.

**Figure 1. FDI and non-FDI capital inflows**

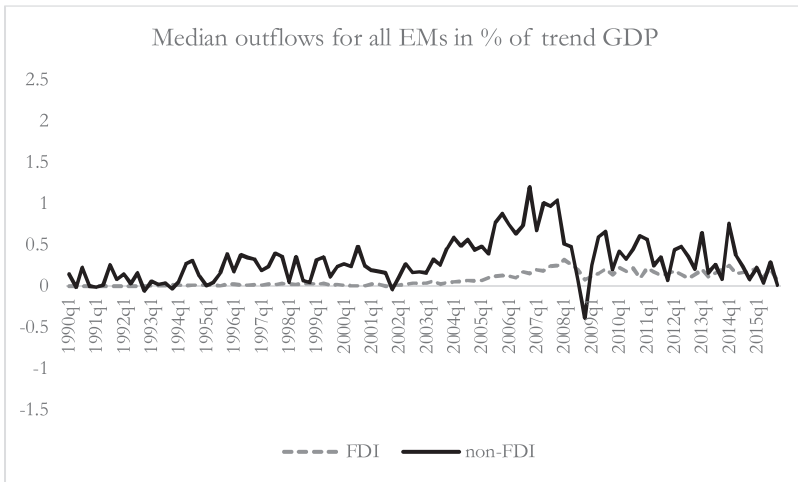


**Figure 2. Components of non-FDI capital inflows**

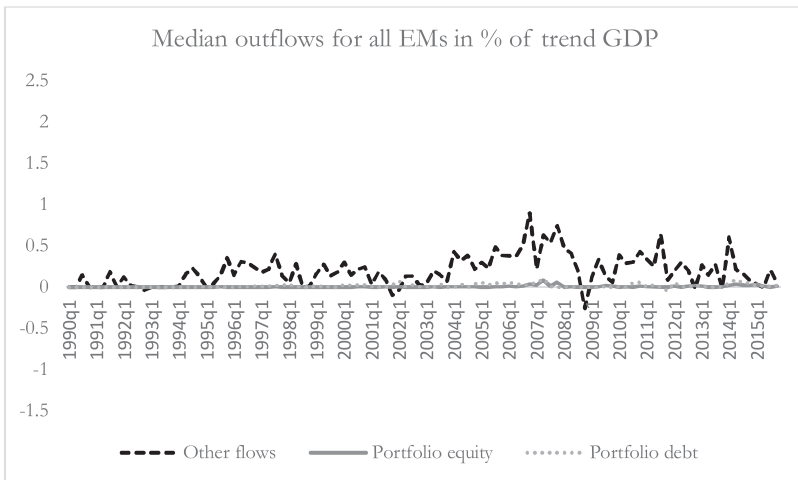


We measure volatility by the standard deviation and coefficient of variation. By these measures, non-FDI flows are relatively volatile. Portfolio debt flows and banking flows are among the most volatile. Non-FDI flows are more volatile than FDI flows and less persistent.

**Figure 3. FDI and non-FDI capital outflows**



**Figure 4. Components of non-FDI capital outflows**



In Table 2 we compare consecutive five-year periods. Portfolio debt inflows increased in 2006–10 and again in 2011–15. Less widely appreciated, FDI outflows from emerging markets rose strongly in 2006–10. Other flows also increased in 2006–10.

**Table 1. Magnitude, volatility, and persistence of capital inflows and outflows**

		Median quarterly average	Median standard deviation	Median coefficient of variation	Persistence
FDI	inflows	0.65	0.63	0.96	0.53
	outflows	0.14	0.28	1.64	0.26
non-FDI	inflows	0.61	1.31	2.12	0.40
	outflows	0.32	0.94	1.93	0.21
Portfolio equity	inflows	0.05	0.22	3.15	0.31
	outflows	0.02	0.08	3.01	0.3
Portfolio debt	inflows	0.24	0.60	3.17	0.14
	outflows	0.06	0.22	3.13	0.13
Other flows	inflows	0.32	1.08	2.90	0.43
	outflows	0.20	0.81	3.34	0.18

*Note:* Mean, standard deviation and coefficient of variation are the median across all countries in the sample. Coefficient of variation is the standard deviation divided by the mean. Persistence is the AR(1) coefficient of a fixed-effects panel regression for respective capital flows. Non-FDI flows are the sum of portfolio equity, portfolio debt, and private other flows. Data are quarterly from 1990:Q1 to 2015:Q4. All capital flows are expressed as percent of annual trend GDP.

**Table 2. Trends in the magnitude and volatility of capital inflows and outflows**

			1991–1995	1996–2000	2001–2005	2006–2010	2011–2015
FDI	inflows	Mean (quarterly average)	0.23	0.76	0.55	0.92	0.69
		Standard deviation	0.15	0.50	0.38	0.59	0.41
		Coeff. of variation	0.61	0.71	0.70	0.57	0.56
FDI	outflows	Mean (quarterly average)	0.01	0.04	0.07	0.29	0.20
		Standard deviation	0.02	0.07	0.14	0.30	0.26
		Coeff. of variation	0.93	1.25	1.49	1.11	1.17
Portfolio equity	inflows	Mean (quarterly average)	0.06	0.05	0.03	0.05	0.04
		Standard deviation	0.10	0.12	0.09	0.21	0.14
		Coeff. of variation	1.35	1.56	2.21	1.99	2.79
Portfolio equity	outflows	Mean (quarterly average)	0.00	0.00	0.01	0.04	0.01
		Standard deviation	0.00	0.02	0.04	0.12	0.03
		Coeff. of variation	1.91	2.44	2.19	1.80	1.68
Portfolio debt	inflows	Mean (quarterly average)	0.03	0.11	0.10	0.20	0.38
		Standard deviation	0.23	0.39	0.40	0.63	0.63
		Coeff. of variation	1.52	1.72	1.58	2.64	1.97
Portfolio debt	outflows	Mean (quarterly average)	0.01	0.03	0.04	0.05	0.02
		Standard deviation	0.07	0.09	0.14	0.24	0.17
		Coeff. of variation	1.95	2.08	1.85	2.38	1.44
Other flows	inflows	Mean (quarterly average)	0.22	0.32	0.20	0.56	0.17
		Standard deviation	0.97	0.79	0.59	1.09	0.67
		Coeff. of variation	1.26	1.41	0.92	1.65	1.30
Other flows	outflows	Mean (quarterly average)	0.10	0.24	0.17	0.31	0.19
		Standard deviation	0.65	0.66	0.63	1.08	0.66
		Coeff. of variation	1.64	1.56	2.11	2.42	2.29

*Note:* Mean, standard deviation and coefficient of variation are the median across all countries in the sample during respective time period. Coefficient of variation is standard deviation divided by mean. Data are quarterly from 1990:Q1 to 2015:Q4. All capital flows are expressed as percent of annual trend GDP.

We are interested in whether the volatility of flows, as measured by the coefficient of variation (adjusting the standard deviation by their mean in the same period) has risen significantly. In Tables 3 and 4 we therefore regress the coefficients of variation for a pooled sample of five-year periods on dummy variables for those five-year periods. We include a constant term, exclude the first five-year period and add country fixed effects.

**Table 3. Coefficient of variation of capital inflows**

	FDI	Portfolio equity	Portfolio debt	Other flows
1996–2000	0.119 [0.83]	−0.186 [0.31]	0.704 [0.93]	0.126 [0.14]
2001–05	0.101 [0.52]	0.862 [1.30]	−0.908 [0.80]	−0.520 [0.61]
2006–10	−0.012 [0.10]	0.591 [0.82]	1.336 <sup>***</sup> [1.76]	0.255 [0.31]
2011–15	0.068 [0.46]	0.428 [0.54]	1.096 [1.29]	−0.155 [0.14]
Country fixed effects	Yes	Yes	Yes	Yes
Observations	165	140	142	147
R <sup>2</sup>	0.008	0.019	0.077	0.012
No. of countries	34	33	34	34

*Note:* The dependent variable is the coefficient of variation of capital flows of type  $i$  in country  $c$  in period  $p$ . The coefficients of variation are regressed on time dummies indicating the different periods, where the first period (1991–95) is excluded. The interpretation of the coefficient is thus in relation to this first period. We exclude observations where the coefficient of variation exceeds a value of +10 or is below −10. Robust  $t$ -statistics are displayed in brackets. <sup>\*\*\*</sup>, <sup>\*\*</sup>, <sup>\*</sup> indicate significance at the 1 percent, 5 percent, and 10 percent level. Additionally, tests are conducted for whether the coefficients are significantly different from the previous period; <sup>^</sup>, <sup>^^</sup>, <sup>^^^</sup> indicate significant differences at the 1 percent, 5 percent, and 10 percent level.

**Table 4. Coefficient of variation of capital outflows**

	FDI	Portfolio equity	Portfolio debt	Other flows
1996–2000	0.285 [0.46]	0.475 [0.42]	−0.666 [0.84]	0.699 [1.23]
2001–05	0.931 <sup>**</sup> [2.43]	0.358 [0.50]	−1.219 [1.31]	1.427 <sup>*</sup> [1.97]
2006–10	0.542 <sup>*</sup> [1.86]	−0.164 [0.20]	−0.667 [0.53]	1.589 <sup>**</sup> [2.29]
2011–15	1.49 <sup>***^^</sup> [2.96]	−0.136 [0.14]	−1.054 [0.85]	0.598 [0.77]
Country fixed effects	Yes	Yes	Yes	Yes
Observations	157	132	132	133
No. of countries	34	32	32	34
R <sup>2</sup>	0.072	0.010	0.011	0.089

*Note:* See notes to Table 3.

The results indicate few changes on the inflow side. Portfolio debt inflows are significantly higher in 2006–10 than in 1990–95, but there are no other changes. This is evidence of stability in the volatility of inflows over time.

In contrast, there are significant increases in the volatility of FDI outflows from emerging markets in 2001–10 and again in 2011–15. In addition, we see significant increases in the volatility of “other” (bank-related) outflows after the turn of the century. We obtain the same results at even higher levels of precision (significance) when we regress the coefficients of variation on time trends ( $t = 1$  in 1990–95,  $t = 2$  in 1996–2000, etc.).

This is a striking answer to our question about trends in volatility. Capital inflows into emerging markets are volatile but not increasingly so. What is new is the growing volatility of outflows from emerging markets, bank-related outflows after the turn of the century, and FDI outflows after 2005 and especially after 2010. That FDI outflows are a growing source of capital account volatility in emerging markets is not adequately appreciated in the literature, in our view.

Which countries are mainly responsible for this increase in the level and volatility of FDI outflows from emerging markets? Some readers will suspect that China is driving the results. But recall that all such flows in our analysis are scaled by country-specific trend GDP. The countries with the highest share of outward FDI in GDP in the most recent five-year period are Chile, Malaysia, Hungary, and Russia – not China. In 2015 the countries with the largest such ratio were Chile, Israel, Malaysia, and Thailand. China figures, on the other hand, when one focuses instead on the growth of the FDI-to-GDP ratio. The countries with the largest annual increase in FDI outflows relative to GDP in 2011–15, in declining order, were Hungary, South Africa, Chile, and China. The countries with the largest annual increase in 2014–15 so measured, again in descending order, are Hungary, Chile, Israel, Poland, and China.<sup>4</sup>

Readers may also worry that the increase in the volatility of capital outflows from emerging markets (both FDI and bank-related outflows) is driven by a few outliers, where the average outflow is small so that a limited increase in the variance can produce a large increase in the coefficient of variation. We therefore made the same statistical comparisons dropping the top and bottom 2 percent of the observations. Reassuringly, the broad patterns remained the same.

### 3. Capital flows in sudden stops and capital flight episodes

Following Eichengreen and Gupta (2016), we classify an episode as a *sudden stop* when total capital inflows (FDI, portfolio equity and debt, and other inflows by nonresidents) decline below the average in the previous 20 quarters by at least one standard deviation, when the decline lasts for more than one quarter, and when flows are two standard deviations below their prior average in at least one quarter.<sup>5</sup> The sudden-stop episode then ends when flows recover to at least the prior mean minus one standard deviation. Analogously, we define an episode of *capital flight* as a sharp increase in gross outflows by residents. Specifically, a period qualifies when total capital outflows (FDI, portfolio equity and debt, and

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4 Note in addition that China is not included in most of our analysis because data on the composition of capital flows are incomplete.

5 One difference is that here we define sudden stops in terms of the behavior of total capital flows – FDI and non-FDI alike – whereas in Eichengreen and Gupta (2016) we defined sudden stops in terms of the behavior of non-FDI flows only.



**Table 5. Capital inflows in sudden stops**

	FDI	Portfolio equity	Portfolio debt	Other flows
<i>Stop<sub>ct</sub></i>	-0.346** [2.37]	-0.735*** [3.33]	-1.064*** [7.22]	-1.540*** [9.40]
Country fixed effects	Yes	Yes	Yes	Yes
Country-specific trends	Yes	Yes	Yes	Yes
Observations	2,401	2,373	2,401	2,401
No. of countries	34	33	34	34
R <sup>2</sup>	0.098	0.053	0.077	0.128

*Note:* The dependent variables are capital flows of the respective type as a percentage of trend GDP. They are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. The sample spans from 1990:Q1 to 2015:Q5. Robust *t*-statistics are reported in brackets. \*\*\*, \*\*, \* indicate significance at the 1 percent, 5 percent, and 10 percent level.

other outflows by residents) exceed the average in the previous 20 quarters by at least one standard deviation, when the increase lasts for more than one quarter, and when outflows are two standard deviations above their prior average in at least in one quarter. Capital flight episodes then end when capital outflows decline below the prior mean plus one standard deviation.

We summarize the behavior of capital flows around country-specific stops and flights by estimating the panel regression,

$$Y_{ict} = \beta SS_{ct} + \theta_c + t_{ct} + \varepsilon_{ict}, \tag{1}$$

where *i* refers to specific capital flows, *c* to the country and *t* to quarter-year: We regress capital flows of type *i*, denoted *Y<sub>ict</sub>*, on a dummy variable for the country-specific sudden stop (or flight) *SS<sub>ct</sub>*, country-fixed effects *θ<sub>c</sub>*, and country-specific time trends *t<sub>ct</sub>*. For ease of comparison, we normalize *Y<sub>ict</sub>* by subtracting from each observation its country-specific mean and dividing it by the country-specific standard deviation.

We see in Table 5 that portfolio equity, portfolio debt and other inflows all turn negative during sudden stops. The decline in inflows is sharpest for other flows and smallest for FDI. In addition, portfolio equity and debt outflows and especially other outflows drop significantly below their average in sudden stops (Table 6). This suggests that resident flows are stabilizing. Looking at the scale of outflows in Figures 5 and 6, however, it is evident that the decline in outflows during sudden stops is smaller than the decline in inflows. So even if the decline in outflows by residents partially offsets the decline in inflows by non-residents, this stabilizing impact is only partial, and net inflows still decline.

Finally, during periods of capital flight all categories of capital outflow increase (Table 7). The increase is again largest for other flows, followed by debt outflows. It is smallest for FDI.

**Table 6. Capital outflows in sudden stops**

	FDI	Portfolio equity	Portfolio debt	Other flows
<i>Stop<sub>ct</sub></i>	-0.165 [1.07]	-0.328*** [2.90]	-0.334* [1.81]	-0.353** [2.70]
Country fixed effects	Yes	Yes	Yes	Yes
Country-specific trends	Yes	Yes	Yes	Yes
Observations	2,397	2,120	2,280	2,398
No. of countries	34	32	32	34
<i>R</i> <sup>2</sup>	0.143	0.062	0.032	0.045

Note: See notes to Table 5.

The panels of Figure 5 document these points further. They show that although FDI inflows decline, that decline is small relative to other types of flows, and FDI inflows remain positive during sudden stops. In contrast, average portfolio equity and debt inflows turn negative in sudden stop periods (Table 8). Although the drop at  $t = 0$  is sharp, inflows recover and are back to pre-crisis levels within four quarters of the start of the episode. Other flows also turn negative at  $t = 0$ , and in addition recover very slowly, much more slowly than in the case of portfolio equity and debt flows. Other flows still remain negative four quarters after the beginning of the sudden stop episode.

These patterns are summarized in panel regressions:

$$Y_{ict} = \sum_{j=-4}^{j=4} \beta_j SS_{ct+j} + \theta_c + t_{ct} + \varepsilon_{ict}, \quad (2)$$

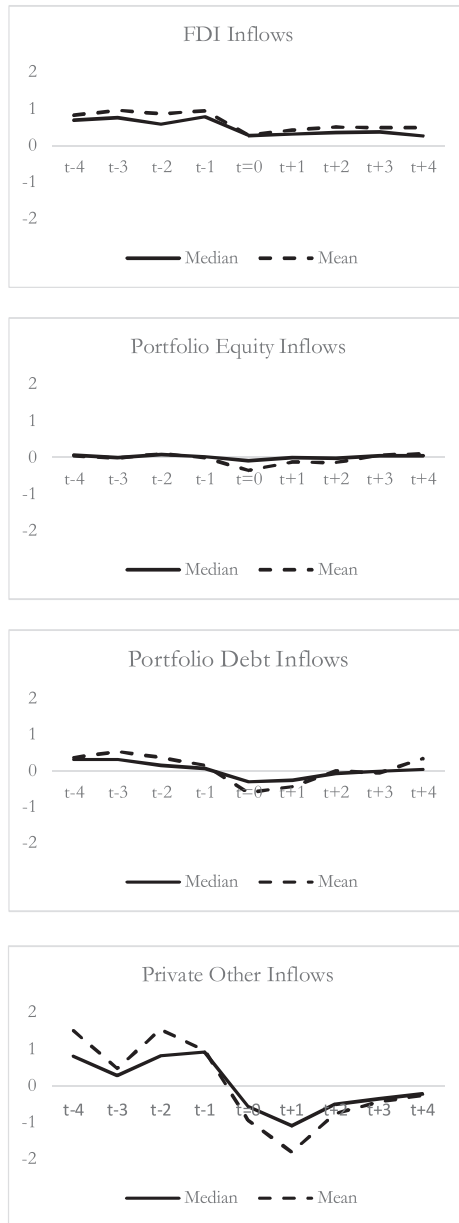
where we regress capital flows (normalized by country-specific mean and standard deviation) of type  $i$ , for country  $c$  in time period  $t$ ,  $Y_{ict}$ , on dummy variables for different quarters before, during and after country-specific sudden stops, on country-fixed effects  $\theta_c$ , and on country-specific time trends  $t_{ct}$ .

The estimated coefficients indicate that all types of inflows drop significantly at the start of a sudden stop period. The coefficient is largest for other inflows and portfolio debt inflows. The impact lasts longer for portfolio debt flows and other flows, with the coefficient remaining significantly negative for three and four quarters, respectively, after the start of the sudden stop episode. These results, and the sharp drop in other flows in particular, are consistent with what Levchenko and Mauro (2007) found in their earlier study.

#### 4. Capital flows during global stops

We define a global stop as a period when three conditions are met: median capital inflows decline by at least one standard deviation below their mean in the preceding 20 quarters; the drop lasts for at least two quarters; and the drop exceeds the mean by two standard

**Figure 5. Capital inflows around country-specific sudden stops**



**Note:** This figure shows behavior of respective types of capital inflows, as percent of trend GDP, around stop periods.  $t = 0$  is the first quarter of a stop period. For each period ( $t - 4$  to  $t + 4$ ) first the mean is calculated for different sudden stops for a given country. Solid line is the median of the country means, and broken line is the mean of the country means.

**Table 7. Capital outflows in capital flight episodes**

	FDI	Portfolio equity	Portfolio debt	Other flows
<i>Flight<sub>ct</sub></i>	0.488*** [3.48]	0.627*** [4.36]	0.528*** [5.70]	1.043*** [9.83]
Country fixed effects	Yes	Yes	Yes	Yes
Country-specific trends	Yes	Yes	Yes	Yes
Observations	2,040	1,920	2,036	2,040
No. of countries	33	31	32	33
R <sup>2</sup>	0.150	0.085	0.050	0.104

Note: See notes to Table 5.

**Table 8. Capital inflows during sudden stops**

	FDI	Portfolio equity	Portfolio debt	Other flows
Stop -4	0.226 [1.22]	0.190 [0.60]	0.396* [1.99]	0.426** [2.62]
Stop -3	0.465* [1.86]	-0.396* [-1.90]	0.444* [1.90]	0.243 [1.40]
Stop -2	0.331 [1.59]	0.131 [0.67]	0.081 [0.42]	0.358 [1.68]
Stop -1	0.332 [1.46]	-0.437* [-1.73]	0.021 [0.10]	0.264 [1.08]
Stop	-0.381* [-2.01]	-1.336*** [-3.93]	-1.089*** [-4.98]	-1.102*** [-3.98]
Stop +1	-0.255 [-1.49]	-0.741** [-2.64]	-1.065*** [-5.06]	-2.029*** [-6.77]
Stop +2	-0.039 [-0.13]	-0.581*** [-2.82]	-0.404* [-2.03]	-1.179*** [-5.70]
Stop +3	-0.140 [-1.04]	-0.198 [-1.57]	-0.464*** [-3.38]	-1.410*** [-5.28]
Stop +4	-0.176 [-0.92]	0.070 [0.61]	-0.074 [-0.38]	-0.860*** [-3.31]
Country fixed effects	Yes	Yes	Yes	Yes
Country-specific trend	Yes	Yes	Yes	Yes
Observations	2,401	2,373	2,401	2,401
No. of countries	34	33	34	34
R <sup>2</sup>	0.103	0.068	0.073	0.152

Note: The dependent variables are capital inflows of the respective type as percent of trend GDP. Variables are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. Capital flows are regressed on country-specific sudden stops and dummies indicating 1 to 4 quarters before, the quarter when the sudden stop starts, and 1 to 4 quarters after the start of a sudden stop period. The sample spans from 1990:Q1 to 2015:Q4. Robust t-statistics are reported in brackets. \*\*\*, \*\*, \* indicate significance at the 1 percent, 5 percent, and 10 percent level.

deviation in at least one quarter.<sup>6</sup> The global stop ends when capital inflows are no longer at least one standard deviation below their earlier mean. This approach identifies 1998:Q3–1998:Q4 and 2008:Q4–2009:Q1 as global stop periods.

6 Median capital inflows are calculated as the sum of FDI, portfolio equity, portfolio debt, and other flows as a percentage of trend GDP.

**Table 9. Capital inflows around global stops**

	FDI	Portfolio equity	Portfolio debt	Other flows
<i>Global Stop<sub>t</sub></i>	0.262** [2.35]	-0.536*** [-4.59]	-0.712*** [-7.65]	-0.761*** [-5.59]
Country fixed effects	Yes	Yes	Yes	Yes
Country-specific trends	Yes	Yes	Yes	Yes
Observations	3,237	2,962	3,084	3,213
No. of countries	34	33	34	34
R <sup>2</sup>	0.11	0.05	0.07	0.07

*Note:* The dependent variables are capital flows of the respective type as a percentage of trend GDP. They are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. The sample spans from 1990:Q1 to 2015:Q4. Robust *t*-statistics are reported in brackets. \*\*\*, \*\*, \* indicate significance at the 1 percent, 5 percent, and 10 percent level.

**Table 10. Capital outflows around global stops**

	FDI	Portfolio equity	Portfolio debt	Other flows
<i>Global Stop<sub>t</sub></i>	0.006 [0.06]	-0.028 [-0.24]	-0.342** [-2.61]	-0.473*** [-4.21]
Country fixed effects	Yes	Yes	Yes	Yes
Country-specific trends	Yes	Yes	Yes	Yes
Observations	3,201	2,709	2,871	3,209
No. of countries	34	32	32	34
R <sup>2</sup>	0.176	0.071	0.038	0.042

*Note:* The dependent variables are capital flows of the respective type as a percentage of trend GDP. They are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. The sample spans from 1990:Q1 to 2015:Q4. Robust *t*-statistics are reported in brackets. \*\*\*, \*\*, \* indicate significance at the 1 percent, 5 percent, and 10 percent level.

We again estimate a panel regression of the form

$$Y_{ict} = \beta GS_t + \theta_c + t_{ct} + \varepsilon_{ict}, \tag{3}$$

where *i* refers to specific capital flows, *c* to the country and *t* to quarter-year. We regress *Y<sub>ict</sub>*, capital flows of type *i* (normalized by subtracting from each observation its country-specific mean and dividing it by the country-specific standard deviation) on a dummy for the global stop, country-fixed effects  $\theta_c$ , and country-specific time trends *t<sub>ct</sub>*.

Results are in Tables 9 and 10. While portfolio equity, portfolio debt, and other inflows all decline in global stops, FDI inflows do not, suggesting that they are heavily influenced by other factors. Strikingly, FDI inflows behave “countercyclically,” rising significantly during global stops. On the other hand, resident outflows decline around global stops only in the case of portfolio debt and other flows (the change in outward FDI and portfolio equity outflows is essentially zero). To the extent that there is stabilizing behavior during episodes

of global stops, it comes through rising inward FDI by nonresidents and declining portfolio debt and other financial outflows by nonresidents and residents alike.

## 5. Correlates of capital inflows

To analyze the drivers of capital flows, we estimate regressions in the form of equation (4), where the dependent variable  $Y_{ict}$  is capital flows of type  $i$ , in country  $c$ , in quarter  $t$ . As before, flows are normalized by subtracting from each observation the country-specific mean and dividing by the country-specific standard deviation.

$$Y_{ict} = \beta_1 \text{Fed Fund Rate}_t + \beta_2 \ln(VIX_t) + \beta_3 Z_{ct-1} + \theta_c + \epsilon_{ct}. \quad (4)$$

Capital flows are regressed on global factors: the federal funds rate and the Chicago Board Options Exchange volatility index (VIX) (converted to log scale).<sup>7</sup> We also include a vector of country-specific variables,  $Z_{ct-1}$ . Domestic variables include quarterly real GDP growth, capital account openness (the Chinn-Ito index); financial sector depth (stock market capitalization or bank assets as percent of GDP); and proxies for the business environment (the ICRG rating of investment risk, which is an index ranging from 0 to 12; a score of 12 points equates to very low risk and a score of 0 points to very high risk).<sup>8</sup> We lag these by one quarter (or one year for the variables that are available at annual frequency).<sup>9</sup>

Regressions are estimated with country-fixed effects and robust standard errors. Because some of the structural variables are slow-moving, the fixed effects estimates may not be very precise, therefore we also run the same equations excluding the fixed effects. The results turn out to be very similar, hence we do not report them to save space.

The first four columns of Tables 11 through 14 suggest that FDI is driven mainly by pull factors, but that portfolio flows seem to be driven mainly by push factors, and so-called other flows are driven both by push and pull factors.

Most inflows are not strongly correlated with the federal funds rate, with the prominent exception of portfolio debt inflows (an increase in the U.S. policy rate predictably dampens debt flows). Higher global risk aversion as measured by VIX reduces portfolio capital inflows but not FDI inflows (the coefficient of VIX is negative and significant for all non-FDI

7 In variations of these regressions we include the 10-year U.S. bond yield as an indicator of the U.S. monetary policy. Results are similar to those obtained with the federal funds rate.

8 As an alternative to GDP growth, we included one-year ahead growth forecast from the World Economic Outlook database in the regressions. Its coefficient is insignificant in all regressions.

9 To limit multicollinearity, we estimate our regressions with a parsimonious set of control variables.

**Table 11. Correlates of FDI flows**

	FDI inflows				FDI outflows			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Federal funds rate	0.008 [0.39]	0.038** [2.12]	0.022 [0.97]	0.044 [1.50]	-0.090*** [4.35]	-0.061*** [3.02]	-0.080*** [3.38]	-0.063* [1.90]
Log(VIX)	0.020 [0.21]	-0.082 [0.88]	0.023 [0.25]	-0.023 [0.23]	-0.142 [1.63]	-0.215** [2.58]	-0.152* [1.78]	-0.155 [1.61]
GDP growth	0.035*** [3.72]	0.025*** [3.10]	0.034*** [3.67]	0.040*** [3.84]	0.019*** [2.83]	0.012** [2.19]	0.017** [2.41]	0.024*** [3.23]
Investment environment		0.168*** [6.09]				0.138*** [5.91]		
Chinn-Ito index of capital account openness			0.191*** [4.52]				0.115** [2.15]	
Bank assets, percent of GDP				0.023*** [5.02]				0.016*** [3.07]
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,256	2,234	2,148	2,001	2,256	2,234	2,148	2,001
R <sup>2</sup>	0.023	0.071	0.049	0.094	0.039	0.069	0.049	0.086
No. of countries	29	29	29	29	29	29	29	29

*Note:* The dependent variable is FDI inflows as percent of trend GDP, in columns (1)–(4) and FDI outflows as percent of trend GDP in columns (5)–(8). The dependent variables are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. The sample spans from 1990:Q1 to 2015:Q4. Robust t-statistics are reported in brackets. \*\*\*, \*\*, \* indicate significance at the 1 percent, 5 percent, and 10 percent level.

**Table 12. Correlates of portfolio equity flows**

	Portfolio equity inflows				Portfolio equity outflows			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Federal funds rate	0.018 [1.06]	0.014 [0.69]	0.007 [0.38]	0.015 [0.71]	-0.007 [0.38]	0.011 [0.58]	0.003 [0.15]	0.011 [0.41]
Log(VIX)	-0.561*** [8.17]	-0.562*** [8.10]	-0.582*** [7.82]	-0.614*** [8.13]	-0.341*** [2.87]	-0.412*** [3.43]	-0.324*** [2.83]	-0.301*** [2.55]
GDP growth	0.006 [1.23]	0.007 [1.20]	0.006 [1.16]	0.004 [0.73]	-0.010 [1.46]	-0.016** [2.29]	-0.013* [1.93]	-0.006 [0.66]
Investment environment		-0.017 [0.59]				0.102*** [4.16]		
Chinn-Ito index of capital account openness			-0.046 [1.45]				0.100** [2.45]	
Bank assets, percent of GDP				0.001 [0.16]				0.007* [1.76]
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,197	2,175	2,093	1,945	1,945	1,923	1,853	1,702
R <sup>2</sup>	0.039	0.040	0.042	0.044	0.012	0.030	0.020	0.019
No. of countries	29	29	29	29	27	27	27	27

*Note:* The dependent variable is portfolio equity inflows as percent of trend GDP in columns (1)–(4) and portfolio equity outflows as percent of trend GDP in columns (5)–(8). The dependent variables are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. The sample spans from 1990:Q1 to 2015:Q4. Robust t-statistics are reported in brackets. \*\*\*, \*\*, \* indicate significance at the 1 percent, 5 percent, and 10 percent level.

flows and largest for portfolio debt and portfolio equity flows). FDI seems to be affected more by domestic than external factors (for example, GDP growth appears to act as a pull factor for FDI). A better investment climate is associated with larger FDI inflows, as we have come to expect. In contrast, growth and the investment climate do not appear to act as pull factors for portfolio flows.

**Table 13. Correlates of portfolio debt flows**

	Portfolio debt inflows				Portfolio debt outflows			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Federal funds rate	-0.062*** [3.50]	-0.063*** [3.40]	-0.071*** [3.99]	-0.067*** [3.63]	0.001 [0.08]	0.009 [0.76]	0.006 [0.62]	-0.001 [0.09]
Log(VIX)	-0.590*** [9.54]	-0.584*** [8.54]	-0.641*** [10.13]	-0.664*** [8.90]	-0.453*** [3.65]	-0.483*** [3.83]	-0.446*** [3.65]	-0.441*** [3.54]
GDP growth	-0.002 [0.31]	-0.002 [0.24]	-0.005 [0.66]	-0.001 [0.09]	-0.006 [1.06]	-0.009 [1.56]	-0.006 [1.10]	-0.010 <sup>†</sup> [1.83]
Investment environment		-0.008 [0.27]				0.051** [2.43]		
Chinn-Ito index of capital account openness			0.019 [0.69]				0.040 [1.29]	
Bank assets, percent of GDP				0.002 [0.90]				0.000 [0.01]
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,173	2,151	2,069	1,921	2,055	2,033	1,957	1,807
R <sup>2</sup>	0.047	0.046	0.060	0.062	0.021	0.025	0.023	0.021
No. of countries	29	29	29	29	28	28	28	28

*Note:* The dependent variable is portfolio debt inflows as percent of trend GDP in columns (1)–(4) and portfolio debt outflows as percent of trend GDP in columns (5)–(8). The dependent variables are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. The sample spans from 1990:Q1 to 2015:Q4. Robust *t*-statistics are reported in brackets. \*\*\*, \*\*, \* indicate significance at the 1 percent, 5 percent, and 10 percent level.

**Table 14. Correlates of other flows**

	Other inflows				Other outflows			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Federal funds rate	0.037 <sup>†</sup> [2.01]	0.053** [2.68]	0.037 <sup>†</sup> [1.84]	0.031 [1.28]	0.023 [1.51]	0.033* [1.91]	0.026 [1.51]	0.034 <sup>†</sup> [1.87]
Log(VIX)	-0.415*** [4.02]	-0.455*** [4.46]	-0.428*** [4.18]	-0.506*** [4.86]	-0.306*** [3.00]	-0.328*** [3.06]	-0.334*** [3.34]	-0.362*** [3.15]
GDP growth	0.063*** [5.69]	0.058*** [5.89]	0.062*** [5.74]	0.063*** [4.97]	0.016** [2.67]	0.013** [2.09]	0.012** [2.37]	0.019*** [2.95]
Investment environment		0.078** [2.53]				0.048** [2.29]		
Chinn-Ito index of capital account openness			0.044 [1.05]				0.056 [1.60]	
Bank assets, percent of GDP				0.007* [1.73]				0.008** [2.61]
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Ye	Yes
Observations	2,232	2,210	2,128	1,980	2,229	2,207	2,125	1,977
R <sup>2</sup>	0.123	0.134	0.126	0.124	0.022	0.026	0.025	0.035
No. of countries	29	29	29	29	29	29	29	29

*Note:* The dependent variable is “other” inflows as percent of trend GDP in columns (1)–(4) and other outflows as percent of trend GDP in columns (5)–(8). The dependent variables are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. The sample spans from 1990:Q1 to 2015:Q4. Robust *t*-statistics are reported in brackets. \*\*\*, \*\*, \* indicate significance at the 1 percent, 5 percent, and 10 percent level.

As a measure of the co-movement of capital flows across emerging countries, we include median flows to all other emerging countries or to all other emerging markets within the region.<sup>10</sup> Global capital flows are highly significant for all types of flows, but the effect

<sup>10</sup> We calculate these global or regional median flows for total capital flows, as well for specific types of capital flows, and include them separately in the regressions. These results are available from the authors on request.



is strongest for the specific subcategory of capital flows under consideration. Again, this points to factors other than country-specific growth and the country-specific investment climate in driving capital flows. Global flows are also more influential than regional flows. Including global or regional median capital flows also reduces the impact of VIX, because all of these variables capture global risk appetite to some extent.

Finally, we ask whether the effects of these variables have changed in recent years, using 2003 as the year when the estimated relationship may have changed (consistent with Eichengreen and Gupta 2016). For this we construct a time dummy for the post-2003 period, and interact it with the variables included in the regressions. We do not find much evidence of a change in the coefficients after 2003. Dummies for different periods – before and after 2000, 2008, and 2010, respectively – similarly do not yield significant interactions with the explanatory variables.

## 6. The behavior of outflows

We analyzed the correlates of outflows analogously. Some of the patterns for outflows are broadly similar to those for inflows. Non-FDI outflows are higher during periods of lower risk aversion. In addition, global risk aversion as measured by the VIX is also a significant determinant of FDI outflows from emerging markets (in contrast to FDI inflows to emerging markets, where the VIX was not significant as noted above). Both FDI and non-FDI outflows are strongly correlated with median global and regional outflows.

One of our key findings is that capital outflows from emerging markets, FDI and bank-related outflows in particular, have grown not just larger but also more volatile. We can use these regression results to ask which of the significant determinants of these outflows have themselves grown more volatile over time. The one determinant of outflows that is robustly significant and also has become more variable over time is the VIX. The coefficient of variation of the VIX rises by more than half between 1990–2000 and 2001–10; although it comes down slightly in 2011–15, it is still significantly higher than in the earlier 1990–2000 period. There is also an increase in the volatility of GDP growth, which translates in to more volatile capital outflows, in the 2006–10 period relative to other years, although this change is not statistically significant relative to other periods.

These results thus point to variations in global risk aversion as a factor in the growing volatility of FDI and bank-related outflows from emerging markets, although they beg the question of why those variations in global risk appetite do not have a similar effect in raising the volatility of FDI inflows into those same markets. Econometrically, the answer is that the VIX has a smaller coefficient and is less significant for FDI inflows than FDI outflows. In addition, any impact of an increasingly variable VIX in amplifying the volatility of FDI inflows into emerging markets in the recent period is offset at least partially by a less

volatile investment climate in emerging markets.<sup>11</sup> Economically, we do not have a good answer for why FDI to emerging markets is less sensitive to global risk appetite than FDI from emerging markets.

## 7. Conclusions

According to conventional wisdom as distilled in the literature and from past experience, capital flows are volatile. They are volatile independent of time and place. But different capital flows exhibit different degrees of volatility: FDI-related flows are least volatile, and bank-intermediated flows are most volatile. Other portfolio capital flows rank in between, and within this intermediate category debt flows are generally considered to be more volatile than equity-based flows.

In this paper we revisit this conventional wisdom, focusing on emerging markets. We ask how much of the conventional view survives recent changes in market structure and regulation. We investigate how the magnitude and volatility of various kinds of capital flows compare and how they have evolved over time. We analyze the empirical correlates of different flows.

In terms of inflows into emerging markets, our results suggest that most of the patterns identified in earlier work persist despite structural and regulatory changes and that much of the conventional wisdom survives. FDI inflows into emerging markets remain more stable than non-FDI inflows: FDI inflows have lower volatility; are more persistent; and decline by smaller amounts in country-specific sudden stop and global stop episodes. Within non-FDI inflows, bank-intermediated flows, which rose in the mid 2000s, are most volatile, least persistent, and decline most sharply during country-specific sudden stop and global stop episodes.

But outflows from emerging markets, which are increasingly important, behave differently. In contrast to inflows, we document important changes since the turn of the century, and in the most recent decade in particular, in the behavior of outflows. FDI outflows from emerging markets have grown and become significantly more volatile. Similarly, there is a significant increase in the volatility of bank-intermediated capital outflows from emerging markets since the turn of the century. In terms of shocks to the capital account of the balance of payments, our findings underscore that outflows from emerging markets, both FDI and bank-related flows, have come to play a growing role and deserve greater attention from emerging-market analysts and policymakers.

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<sup>11</sup> Our measure of the investment climate improved sharply in some emerging markets in the 1990s while deteriorating in others, before settling down (generally at improved levels) after the turn of the century.

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## Appendix A: Data

**Table A.1 Variables used in the analysis**

Variable/set of variables	Source	Details
Capital flows (FDI, portfolio equity, portfolio debt, other flows)	Haver	Original source is IFS. Old series BPM5 and new series BPM6 are spliced in the first year when the new series is available for each country; quarterly frequency
Nominal GDP	World Development Indicators, World Bank	In US\$ (at market exchange rates); annual frequency
Trend GDP (USD)	Generated	Estimated using Hodrick-Prescott filter over annual GDP in US\$
Federal funds rate (FFR)	Haver	U.S. policy rate; quarterly frequency
VIX index	DataStream	CBOE volatility index; quarterly frequency
GDP growth	Haver	Real GDP in local currency seasonally adjusted, year-on-year growth in percent; quarterly frequency
Investment profile	International Country Risk Guide (ICRG), PRS Group	Index of a country's investment risk profile ranging from 0 to 12: a score of 12 points equates to very low risk and a score of 0 points to very high risk
Chinn-Ito index	Authors' Web site	Index of capital account liberalization ranging from –1.89 to 2.39. Higher values indicate higher capital account openness; annual frequency
Bank assets	Global Financial Development Database (GFDD), World Bank	Percent of GDP; annual frequency

**Table A.2 Countries and periods included in the sample**

	Start	End	No. of observations
Argentina	1990:Q1	2015:Q4	104
Armenia	1993:Q1	2015:Q4	92
Belarus	1996:Q1	2015:Q4	80
Brazil	1990:Q1	2014:Q4	104
Bulgaria	1991:Q1	2015:Q2	98
Chile	1991:Q1	2015:Q4	100
Colombia	1996:Q1	2014:Q4	80
Croatia	1993:Q1	2015:Q4	92
Czech Republic	1995:Q1	2015:Q4	84
Guatemala	1990:Q1	2015:Q4	104
Hungary	1990:Q1	2015:Q4	104
India	1990:Q1	2015:Q2	102
Indonesia	1990:Q1	2015:Q3	103
Israel	1990:Q1	2015:Q4	104
Jordan	1990:Q1	2015:Q4	104
Kazakhstan	1996:Q1	2015:Q1	77
Latvia	1993:Q1	2015:Q4	92
Lithuania	1995:Q1	2015:Q4	84
Malaysia	1999:Q1	2015:Q4	68
Mexico	1990:Q1	2014:Q4	104
Pakistan	1990:Q1	2015:Q4	104
Peru	1991:Q1	2015:Q4	100
Philippines	1990:Q1	2015:Q4	104
Poland	1990:Q1	2015:Q4	86
Republic of Korea	1990:Q1	2015:Q4	104
Romania	1991:Q1	2015:Q4	100
Russia	1994:Q1	2015:Q4	88
South Africa	1990:Q1	2014:Q4	104
Sri Lanka	1990:Q1	2014:Q4	104
Thailand	1990:Q1	2015:Q4	104
Turkey	1990:Q1	2015:Q4	104
Ukraine	1994:Q1	2015:Q4	88
Venezuela	1994:Q1	2014:Q4	88
Vietnam	1996:Q1	2015:Q3	79

*Note:* The table displays the maximum number of observations. Observations for specific flows in some countries are slightly lower than reported here.