4. Drivers of Capital Flows and the Role of the Investor Base in Latin America

Following a decade of strong capital inflows, Latin America is now experiencing weaker economic growth and financial inflows accompanying the end of the commodity super-cycle. Global factors, notably global commodity prices, are strongly associated with cyclical movements of capital inflows in emerging markets. This holds particularly true for Latin America. At the same time, country-specific structural factors, such as good governance and strong institutional and regulatory frameworks, play a key role in attracting inflows over longer time horizons. With regard to vulnerabilities, capital flows in countries with deeper financial markets and stable, large domestic investor bases exhibit lower sensitivity to external shocks, whereas a larger presence of foreign investors and more open capital accounts increase this sensitivity. Other policy dimensions, such as exchange rate flexibility, can also mitigate the vulnerabilities of capital flows to the region.

Starting in the early 2000s, Latin America experienced a decade of robust growth, partly boosted by relatively high global commodity prices, that was only briefly interrupted by the global financial crisis. This boom in economic activity, combined with increased financial integration with the rest of the world, was accompanied by an increase in capital flows to the region. Capital inflows provided ample funding and lowered borrowing costs, contributing to the financing of investment activities in these economies (Magud and Sosa 2015). However, despite its benefits, this increase in Latin American countries' exposure to foreign financing conditions and global market developments has also brought challenges.

With the ongoing growth rebalancing in China and the end of the commodity super-cycle, several Latin American economies are facing lower external demand (Chapter 3). Concurrently, capital flows to the region have already started to diminish noticeably, although they have been relatively resilient compared with other emerging market regions.

In the context of weaker growth prospects at home and faltering external demand, higher global policy uncertainty, and faster-than-expected monetary normalization in the United States (Chapter 1), it is crucial to understand the dynamics of capital flows to the region, and to emerging markets at large. In particular, what are the main drivers of capital flows in emerging market economies? Are these flows mainly driven by global ("push") factors or rather by country-specific ("pull") factors? Are these factors mostly cyclical or structural in nature? Is Latin America any different from other emerging market regions? Given the broadly documented vulnerabilities of emerging markets to external shocks, do the composition of the investor base and the characteristics of domestic financial markets act as mitigating (or amplifying) factors to the sensitivity of capital flows to these shocks? This chapter takes stock of the situation and addresses these important questions, including their policy implications.

Setting the Stage

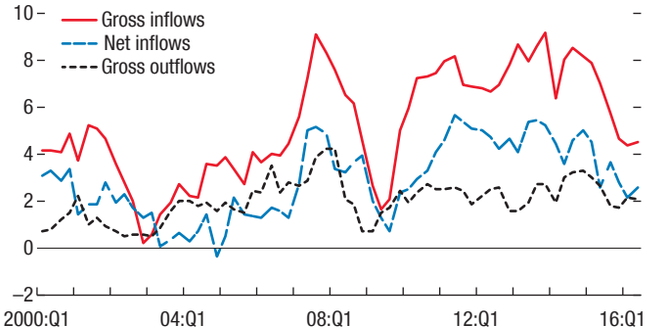
Since the turn of the century, capital flows in emerging markets have experienced significant fluctuations. In some of the largest economies of Latin America—Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay (the LA7)—gross capital inflows increased, on average, from about zero in the early 2000s to a remarkable 9 percent of GDP at the onset of the global financial crisis (Figure 4.1, panel 1).[1] Following

Prepared by Carlos Caceres, Carlos Gonçalves, and Galen Sher, with excellent research assistance from Genevieve Lindow. See Caceres and others (forthcoming a, b) for more technical details. Carolina Osorio Buitrón provided data on monetary shocks in the United States.

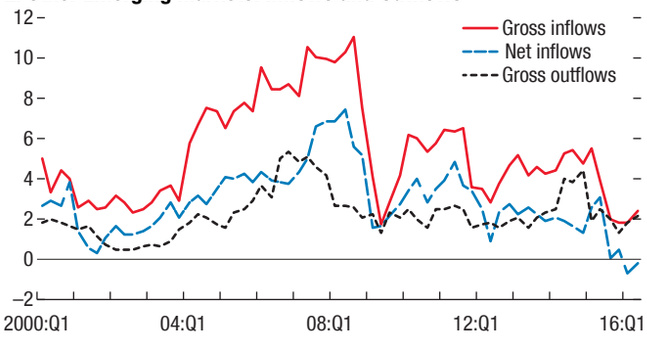
[1]Gross capital inflows are defined as the net purchases of domestic assets by nonresidents, whereas gross capital outflows relate to the net purchases of foreign assets by domestic agents. Gross total flows include foreign direct investment, portfolio, other investment, and

Figure 4.1. Capital Flows in Emerging Markets
(Percent of trend GDP; median)

1. LA7: Inflows and Outflows



2. Other Emerging Markets: Inflows and Outflows



Sources: Haver Analytics; IMF, Balance of Payments Statistics Yearbook database; IMF, World Economic Outlook database; and IMF staff calculations.
Note: LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; Other emerging markets = Albania, Bangladesh, Bulgaria, China, Croatia, Egypt, Ghana, Hungary, India, Indonesia, Kazakhstan, Kenya, Malaysia, Morocco, Nigeria, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Tunisia, Turkey, Vietnam.

a sharp yet brief decline during the crisis, gross inflows to the region remained robust (near their precrisis levels) until late 2014. That period marked the end of the commodity super-cycle, and at the same time gross inflows to the region started to soften.

In other emerging market regions, capital inflows grew in similar fashion up to the global financial crisis (Figure 4.1, panel 2). However, the recovery in gross inflows after the crisis was more moderate than that observed in Latin America. More recently, inflows to Latin America have proved to be more resilient than those to other regions, even after the end of the commodity super-cycle.[2]

Two important features have characterized capital flows in emerging markets over this period. First, gross inflows and gross outflows exhibit a strong positive correlation over time. That is, gross outflows tend to increase when gross inflows increase, and to fall when gross inflows fall. In other words, changes in gross inflows and outflows tend to be in the same direction; therefore, these flows tend to offset each other somewhat. Second, the overall magnitudes of gross inflows are generally significantly larger than the magnitude of gross outflows, despite a moderate increase in gross outflows in recent years. Hence, gross outflows play only a limited offsetting role against gross inflows, and in accounting terms, net inflows tend to be driven by gross inflows. Given the predominant role of gross inflows over gross outflows, some of the analysis in this chapter focuses on gross inflows.

These observations are true across all emerging market regions and can be documented not only since the turn of the century but also during the 1990s and earlier periods (Table 4.1).[3]

Common Cyclical Behavior of Capital Flows

Another interesting feature of capital inflows is that, even though they vary substantially over time, this time variation is broadly similar from one country to the next. In this sense, these cycles in capital flows are synchronized across countries. This holds particularly true for the LA5 countries—Brazil, Chile, Colombia, Mexico, and Peru (Figure 4.2). The common cyclical variation in capital inflows is probably due to common cyclical variation in each country's underlying macroeconomic and financial conditions

derivative flows. Net capital inflows are defined as the difference between gross capital inflows and outflows.

[2]Despite this recent resilience, Latin American countries have received lower capital inflows, on average, than other emerging markets since 2000. Gross and net inflows to the region averaged 5 percent and 2½ percent of GDP, respectively, over that period, compared with 7 percent and 3½ percent of GDP in other emerging markets.

[3]See Broner and others (2013) for more details.

Table 4.1. Cross-Correlations of Capital Flows in Selected Emerging Market Economies
(Percent of trend GDP)

	Net Inflows								
	1990–2016			1990–2002			2003–16		
	LA5	LA7	OEM	LA5	LA7	OEM	LA5	LA7	OEM
Gross inflows	0.59	0.71	0.77	0.70	0.80	0.91	0.51	0.66	0.75
Gross outflows	−0.31	−0.19	−0.03	−0.10	0.09	−0.20	−0.47	−0.37	−0.04
Subcomponents:									
FDI net inflows	0.28	0.40	0.68	0.37	0.33	0.36	0.20	0.47	0.75
Portfolio net inflows	0.61	0.60	0.31	0.40	0.42	0.39	0.74	0.71	0.29
Other net inflows	0.55	0.61	0.74	0.65	0.70	0.81	0.46	0.54	0.73
	Gross Inflows								
	1990–2016			1990–2002			2003–16		
	LA5	LA7	OEM	LA5	LA7	OEM	LA5	LA7	OEM
Gross outflows	0.59	0.56	0.61	0.64	0.67	0.23	0.51	0.46	0.64
Subcomponents:									
FDI gross inflows	0.67	0.55	0.84	0.73	0.52	0.48	0.60	0.56	0.87
Portfolio gross inflows	0.51	0.55	0.36	0.37	0.45	0.52	0.65	0.66	0.33
Other gross inflows	0.62	0.72	0.80	0.66	0.77	0.76	0.58	0.66	0.81
	Gross Outflows								
	1990–2016			1990–2002			2003–16		
	LA5	LA7	OEM	LA5	LA7	OEM	LA5	LA7	OEM
Subcomponents:									
FDI gross outflows	0.56	0.42	0.72	0.76	0.62	0.38	0.45	0.33	0.73
Portfolio gross outflows	0.82	0.71	0.47	0.82	0.66	0.39	0.83	0.73	0.47
Other gross outflows	0.70	0.77	0.73	0.82	0.82	0.87	0.62	0.75	0.71

Source: IMF staff calculations.
Note: FDI = foreign direct investment; LA5 = Brazil, Chile, Colombia, Mexico, Peru; LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; OEM (other emerging markets) = Albania, Bangladesh, Bulgaria, China, Egypt, Ghana, Croatia, Hungary, India, Indonesia, Kazakhstan, Kenya, Morocco, Malaysia, Nigeria, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Tunisia, Turkey, Vietnam.

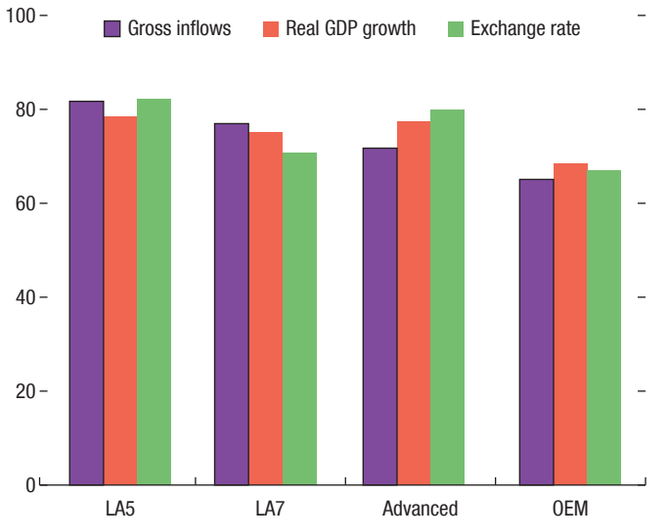
(Chapter 3 of the October 2015 *Regional Economic Outlook: Western Hemisphere*).

Focusing on the individual LA7 countries, it is interesting to note that capital inflows in Brazil and Mexico, the two largest economies in the region, tend to follow each other (and the LA7 median) quite closely (Figure 4.3, panel 1). Countries such as Chile, Colombia, and Peru also tend broadly to exhibit the same cyclical behavior (Figure 4.3, panel 2). Nevertheless, Chile's capital inflows relative to the size of its economy have been larger, on average, than those in the other countries in the region. Finally, capital inflows in Argentina and Uruguay are characterized by a higher degree of volatility relative to that of the other five LA7 countries (Figure 4.3, panel 3). In particular, both countries experienced a significant fall in capital inflows in the early 2000s (during the Argentine crisis). However, capital flows to Uruguay rebounded strongly following that crisis, whereas flows to Argentina remained subdued for most of the subsequent decade.

Structural Differences in Capital Flows

In addition to their variation over time, capital inflows vary substantially from one country to the next. In particular, the average level of capital inflows (relative to the size of the economy) attracted by the different emerging markets varies substantially from country to country (Figure 4.4). For instance, since 2000, gross inflows in countries such as Albania, Bulgaria, Kazakhstan, and Vietnam averaged more than 12 percent of GDP, while that number was less than 2 percent in countries such as Argentina, Egypt, and Indonesia. For the LA7 countries, Chile received the most gross capital inflows, averaging 7½ percent of GDP since 2000, whereas Argentina's

Figure 4.2. Synchronicity of Capital Inflows, Domestic Growth, and Exchange Rates across Countries
(First principal component; percent share explained)



Sources: IMF, Balance of Payment Statistics Yearbook database; IMF, World Economic Outlook database; and IMF staff calculations.
Note: For the exchange rate, all euro area countries are treated as a single entity. LA5 = Brazil, Chile, Colombia, Mexico, Peru; LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; Advanced = Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States; OEM (other emerging markets) = Albania, Bangladesh, Bulgaria, China, Croatia, Egypt, Ghana, Hungary, India, Indonesia, Kazakhstan, Kenya, Malaysia, Morocco, Nigeria, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Tunisia, Turkey, Vietnam.

gross capital inflows averaged ¾ percent of GDP over that period.

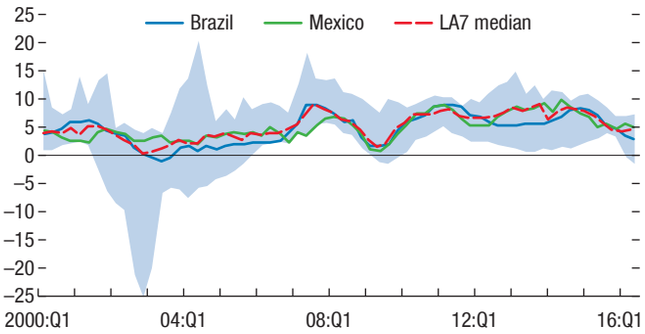
This significant heterogeneity across countries would suggest that there are important slow-moving or structural country-specific characteristics that make some countries more attractive to investors than others over periods longer than the usual business cycle.

Interestingly, the variation in capital inflows across emerging market economies is at least as large as the variation in these inflows across time (Table 4.2).[4] The relative importance of "between" country variation seems to be driven

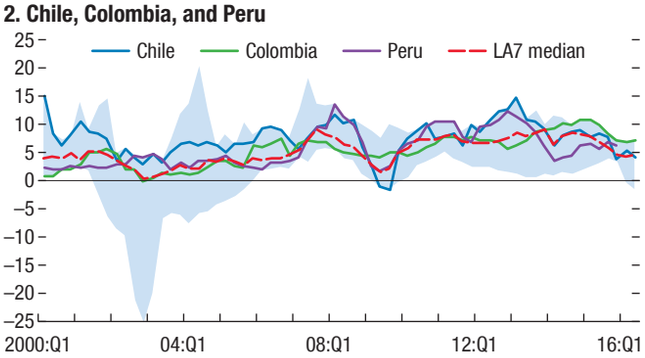
[4]For instance, 43 (47) percent of the variation in gross (net) inflows in emerging markets is attributable to variation "within" countries (across time), whereas 36 (41) percent is attributable to variation "between" countries (average over time).

Figure 4.3. LA7: Gross Inflows
(Percent of trend GDP)

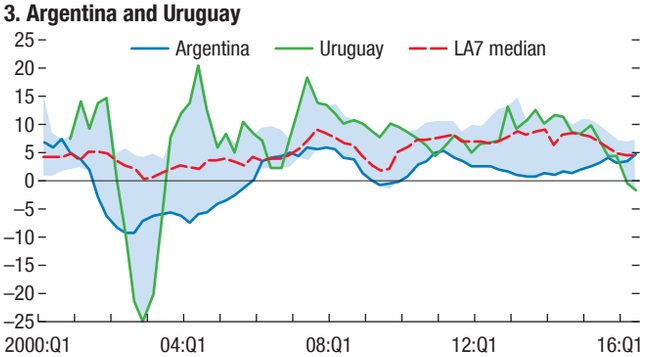
1. Brazil and Mexico



2. Chile, Colombia, and Peru



3. Argentina and Uruguay

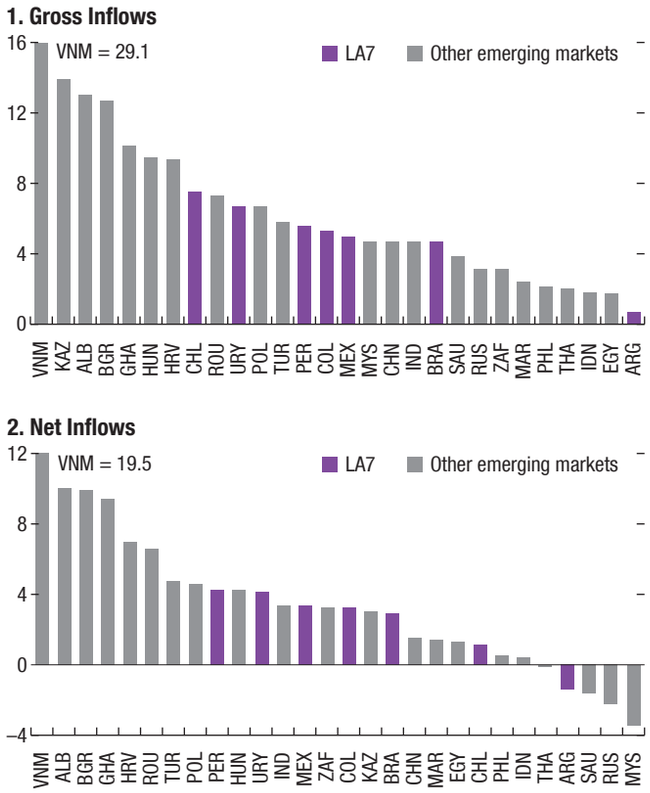


Sources: Haver Analytics; IMF, Balance of Payments Statistics Yearbook database; IMF, World Economic Outlook database; and IMF staff calculations.
Note: Shaded areas denote the minimum and maximum of the LA7 sample. LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

by and large by the other emerging market regions in the sample. This would suggest that cyclical variables might play a more important role in explaining capital flows in Latin America than in other emerging markets.[5]

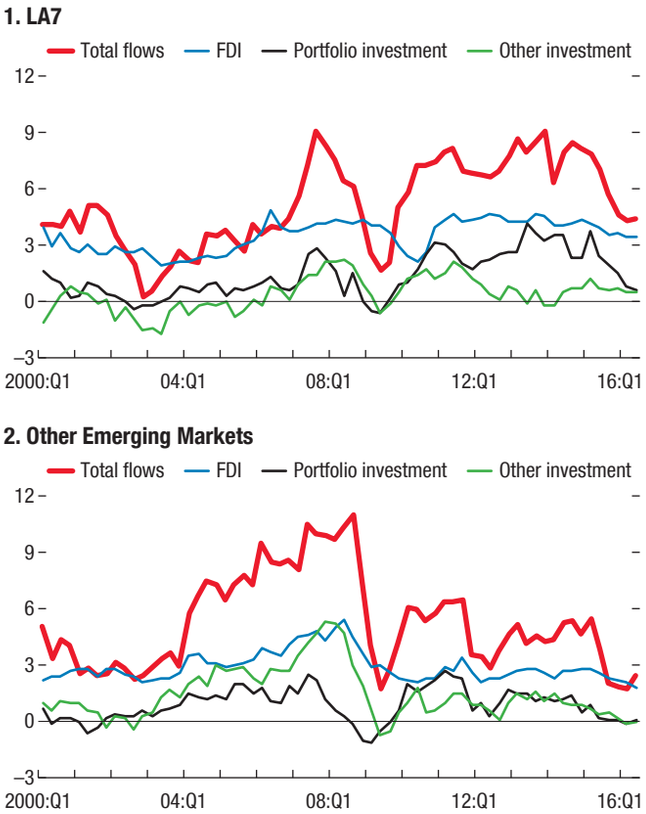
[5]For example, for emerging European and Asian economies, variation "within" ("between") countries accounts for 56 (7) percent

Figure 4.4. Average Inflows, 2000–16
(Percent of trend GDP)



Sources: Haver Analytics; IMF, Balance of Payments Statistics Yearbook database; IMF, World Economic Outlook database; and IMF staff calculations.
Note: For International Organization for Standardization (ISO) country codes used in data labels, see page 137.

Figure 4.5. Gross Inflows
(Percent of trend GDP; median)



Sources: Haver Analytics; IMF, Balance of Payments Statistics Yearbook database; IMF, World Economic Outlook database; and IMF staff calculations.
Note: FDI = foreign direct investment; LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; other emerging markets = Albania, Bangladesh, Bulgaria, China, Croatia, Egypt, Ghana, Hungary, India, Indonesia, Kazakhstan, Kenya, Malaysia, Morocco, Nigeria, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Tunisia, Turkey, Vietnam.

Subcomponents of Capital Flows

Gross and net capital flows can be decomposed into foreign direct investment (FDI), portfolio flows, and "other investment" flows.[6,7] The importance of gross inflows as compared with gross outflows, and the comovement between the different flow types, are also mirrored in these subcomponents of capital flows (Figure 4.5 and Table 4.1). Nevertheless, and despite their relatively strong cyclical comovement, these subcomponents also exhibit some singularities. First, FDI inflows in emerging markets are noticeably larger than portfolio and other investment inflows. For instance, in LA7 countries, FDI inflows have averaged 3¾ percent of GDP since 2000, while that number was 1¼ and ¼ percent of GDP for portfolio and other investment inflows, respectively.

Second, portfolio inflows are relatively more volatile than FDI inflows for emerging markets, in line with the fact that the share of the variation in portfolio inflows across time is noticeably larger than its share of variation across countries,

and 18 (82) percent, respectively, of total variation in capital inflows to these economies. Thus, the importance of cyclical factors for, say, Asian economies is likely to be substantially lower than for Latin America.

[6]For the countries in the sample, "other investment" flows include mainly bank loans and deposits.

[7]Strictly speaking, total flows also include financial derivatives, but for the countries in the sample, these tend to be minute compared with FDI, portfolio, and other investment flows.

Table 4.2. Data Variation across Countries and through Time
(Percent)

	LA5		LA7		OEM		EMs	
	"Within" variation	"Between" variation	"Within" variation	"Between" variation	"Within" variation	"Between" variation	"Within" variation	"Between" variation
Dependent Variables								
Net inflows	79	19	66	26	38	47	41	47
Gross inflows	86	14	67	22	33	43	36	43
FDI inflows	38	62	44	56	19	44	19	46
Portfolio inflows	93	6	77	22	56	18	61	18
Other investment inflows	89	8	57	3	48	25	48	24
Gross outflows	40	55	50	26	29	23	31	24
FDI outflows	26	60	20	62	11	12	11	14
Portfolio outflows	30	65	34	55	29	42	29	44
Other investment outflows	70	13	55	10	39	34	41	32
Cyclical Variables								
VIX (log)	100	0	100	0	100	0	100	0
G7 real GDP growth (year over year)	100	0	100	0	100	0	100	0
U.S. short-term interest rates	100	0	100	0	100	0	100	0
Global commodity price (log)	100	0	100	0	100	0	100	0
Real GDP growth differential	78	19	76	8	62	34	63	28
Short-term interest rate differential	29	71	41	19	23	55	28	40
Structural Variables								
Government effectiveness	3	97	3	97	7	93	6	94
Regulatory quality	5	95	6	94	7	93	6	94
Control of corruption	3	97	3	97	9	91	6	94
Rule of law	2	98	2	98	6	94	5	95
Voice and accountability	6	94	5	95	4	96	4	96
Political stability	8	92	7	93	11	89	10	90
Political risk	15	85	20	80	17	83	17	83
Polity synthetic index	15	78	9	86	3	96	3	96
Corporate tax rate	4	96	5	95	7	90	6	91
Credit rating	40	60	26	74	22	61	23	63

Source: IMF staff calculations.
Note: "Within" variation refers to the share of variation in the data through time; "between" variation refers to the share of variation in the data across countries. G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; LA5 = Brazil, Chile, Colombia, Mexico, Peru; LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; OEM (other emerging markets) = Albania, Bangladesh, Bulgaria, China, Croatia, Egypt, Ghana, Hungary, India, Indonesia, Kazakhstan, Kenya, Malaysia, Morocco, Nigeria, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Tunisia, Turkey, Vietnam; EMs = emerging markets; VIX = Chicago Board Options Exchange Volatility Index.

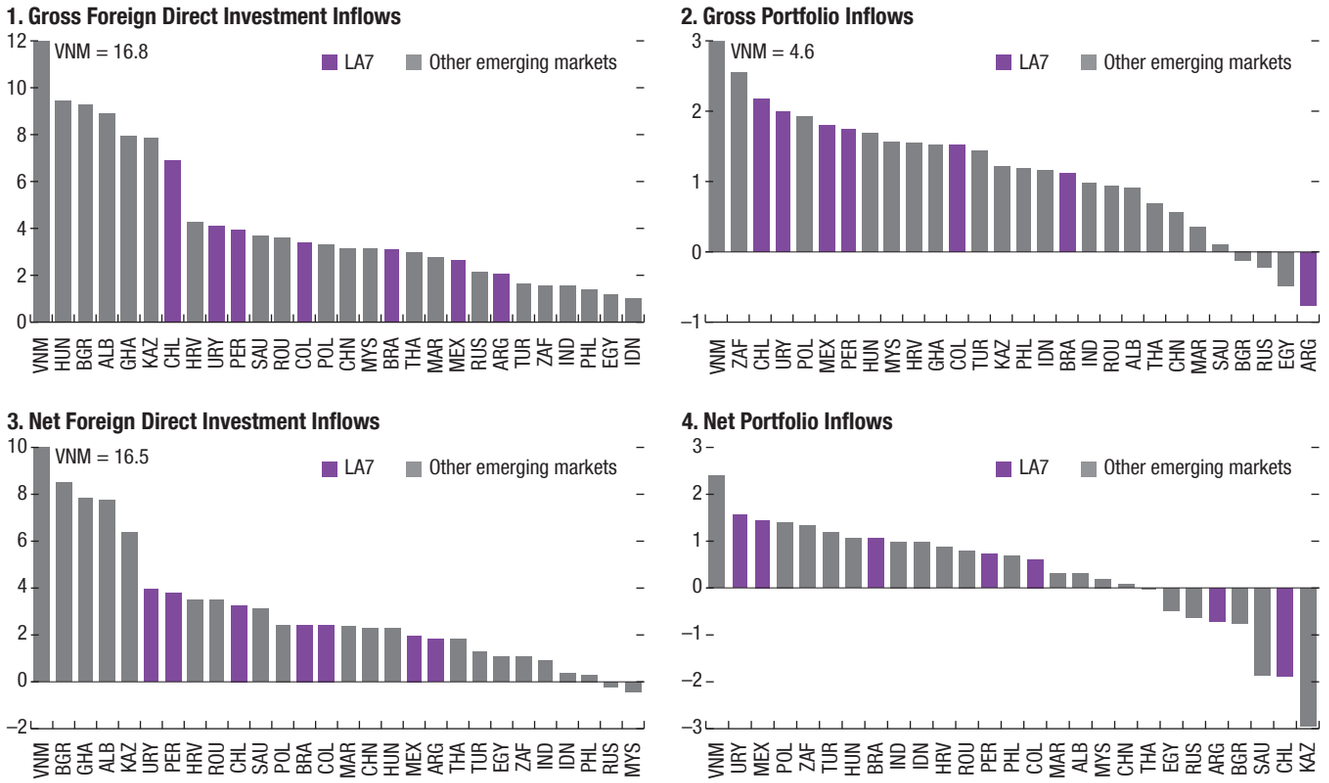
whereas it is the other way around for FDI inflows (Table 4.2).[8] Again, this holds particularly true for Latin American countries, where the "within" country variation in portfolio inflows accounts for most of the total variation in these flows.

Finally, as was the case with total capital flows, the average levels of FDI, portfolio, and other investment flows vary significantly from country to country (Figure 4.6). For instance, gross FDI inflows in such countries as Bulgaria, Hungary, and Vietnam averaged more than 9 percent of GDP since 2000, whereas that figure was less than 1½ percent of GDP for Egypt and Indonesia (Figure 4.6, panel 1). For LA7 countries, Chile and Uruguay have been the largest recipients of both gross FDI and portfolio inflows over that period, while Argentina recorded the lowest amount for both types of flows (Figure 4.6, panels 1 and 2).

In summary, capital flows exhibit strong cyclical and structural variation. To explore the global and country-specific factors that might be driving capital flows, the next section relates capital flows to these factors. It pays special attention to comparing the Latin American experience with that of other emerging markets.

[8]For emerging markets, 61 percent of the variation in portfolio inflows is attributable to variation "within" countries (across time), whereas 18 percent is attributable to variation "between" countries (average over time). In the case of FDI inflows to these countries, those numbers are 19 percent and 46 percent, respectively.

Figure 4.6. LA7 and Other Emerging Markets: Average Inflows, 2000–16
(Percent of trend GDP)



Sources: Haver Analytics; IMF, Balance of Payments Statistics Yearbook database; IMF, World Economic Outlook database; and IMF staff calculations.
Note: For International Organization for Standardization (ISO) country codes used in data labels, see page 137. LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

Drivers of Capital Flows

Following a vast literature on the determinants of capital flows, we separate the main drivers along global push factors and country-specific pull factors. Building on the main findings from other studies (in particular, Chapter 2 of the April 2016 *World Economic Outlook* and the studies reviewed in Koepke 2015), the core model specification includes the following global variables: a measure of global risk aversion proxied by the Chicago Board Options Exchange Volatility Index (VIX), a measure of global output growth, U.S. interest rates,[9] and an index of global commodity prices.

The country-specific explanatory variables are separated into those that may explain cyclical variation in capital flows and those that may explain structural variation in these flows. While all the country-specific variables vary across countries and over time, those characterized as "cyclical" factors tend to exhibit a much higher variation "within" countries (across time) relative to their variation "between" countries (average over time), and vice versa for the "structural" factors (Table 4.2).

The regression model includes the differential between domestic growth and global growth, the differential between domestic interest rates and the corresponding U.S. interest rates to describe the *cyclical* behavior of capital flows, and measures of governance, regulatory quality, business

[9]The main estimation results are broadly the same when short-term (three-month) or long-term (10-year) U.S. interest rates, and their difference ("yield curve slope"), are included in the regression.

climate, and political risk to explain the country-specific *structural* variation in capital flows.

The model is estimated using standard panel data techniques. Algebraically, the model for the cyclical variation in capital flows is

$$Y_{i,t} = a + \beta_1 G_t + \beta_2 C_{i,t} + \mu_i + \varepsilon_{i,t},$$

where $Y_{i,t}$ denotes the capital flow measure of interest as a percentage of trend GDP of country i at time t; G_t and $C_{i,t}$ are vectors containing the global and country-specific cyclical factors, respectively;[10] a, β_1, β_2 and contain the parameters to be estimated; μ_i denotes the unobserved country-specific fixed effects;[11] and $\varepsilon_{i,t}$ is the error term. The model is estimated using quarterly data, over the period from 2000:Q1 to 2016:Q2.

The model of the structural variation in capital flows is

$$\mu_i = \gamma + \rho Z_{i,t} + u_{i,t},$$

where μ_i is the fixed effects term from the cyclical model, γ and ρ are parameters to be estimated, and $Z_{i,t}$ refers to a country-specific structural factor. Given the high degree of multi-collinearity in the structural factors, these are included in the regression one at a time.[12]

Table 4.3 presents the fixed effect estimation results for gross inflows and outflows, as well as net inflows, for Latin American countries (both LA5 and LA7) and for other emerging market economies. Annex Table 4.1 presents the corresponding estimation results for gross inflows, including the country-specific structural factors.

In broad terms, the results obtained for net and gross inflows are largely similar. This outcome concurs with the finding that gross inflows are the main source of change in net inflows. By contrast, the regressions related to gross outflows differ substantially from those for gross or net inflows. The global and country-specific factors in the regression tend to explain less of the variation in gross outflows,[13] which is a common finding in the literature.

Focusing on capital inflows, higher global commodity prices appear to be strongly associated with higher inflows to all emerging markets (Annex Table 4.1).[14] Indeed, the cyclicality of capital flows tends to follow the global commodity price cycle quite closely (Figure 4.7).[15] An increase in global growth also appears to lead to higher capital inflows, although the relationship is only statistically significant for Latin American economies.

In this model specification, the VIX and U.S. interest rates do not appear to be strongly associated with capital flows. This does not necessarily mean that changes in the VIX or U.S. interest rates have no effect on capital inflows, but rather that most of their co-variation with capital inflows is already accounted for by commodity prices.[16] More generally, global commodity prices might embody changes in other global factors, which themselves have an impact on capital inflows to emerging market economies. For instance, commodity prices might react faster to changes in global economic developments and reflect those changes more rapidly than, say, global GDP measures.

[10]To mitigate endogeneity issues, all country-specific variables are included with a lag in the regressions.

[11]Fixed effects are used in the model for the cyclical variation, rather than the country-specific structural variables, to minimize any potential bias in the βs due to omitted (unobserved) variation across countries.

[12]Similar estimates for ρ are obtained using a one-stage pooled (ordinary least squares) regression—including these country-specific structural measures instead of the fixed effects.

[13]The R-squared statistic in the gross outflow regressions is less than half that of the corresponding R-squared statistic in the gross inflow regressions.

[14]This result is robust to the use of alternative global commodity price indices, or if we use the individual series of global oil, copper, or iron ore prices. It is also robust when the residual from regressing commodity prices on different global factors (including global growth and growth in China) is used instead of the global commodity price index itself.

[15]Similar observations are derived if the index of global commodity prices is replaced by the commodity terms-of-trade measure of Gruss (2014), which uses country-specific weights.

[16]Indeed, when the VIX is included individually as the only explanatory variable in the regression model, it is found to be statistically significant and to have the expected sign (Annex Table 4.2). However, the inclusion of the index of global commodity prices as an additional explanatory variable renders its estimated coefficients no longer statistically significant.

Table 4.3. Estimation Results: Core Specification Model, Fixed Effects, 2000–16

	Net Inflows			Gross Inflows			Gross Outflows		
Variables	LA5 (1)	LA7 (2)	OEM (3)	LA5 (4)	LA7 (5)	OEM (6)	LA5 (7)	LA7 (8)	OEM (9)
Global Factors									
VIX (log)	1.557	1.480*	0.644	1.230	0.987	0.795	−0.327	−0.493	0.155
	(0.972)	(0.704)	(0.886)	(0.862)	(1.077)	(1.359)	(0.309)	(0.692)	(1.027)
G7 real GDP growth (year over year)	0.308*	0.131	0.346*	0.509**	0.368*	−0.067	0.201	0.237	−0.417
	(0.139)	(0.225)	(0.182)	(0.171)	(0.166)	(0.442)	(0.188)	(0.161)	(0.357)
U.S. short-term interest rates	−0.302*	0.199	0.319	−0.083	0.214	1.129	0.219	0.015	0.815*
	(0.133)	(0.363)	(0.293)	(0.127)	(0.314)	(0.645)	(0.174)	(0.256)	(0.435)
Global commodity price (log)	2.174**	3.757**	2.735***	4.182***	4.458**	4.918***	2.008**	0.701	2.214*
	(0.755)	(1.403)	(0.545)	(0.387)	(1.354)	(1.261)	(0.660)	(1.631)	(1.225)
Country-Specific Factors									
Real GDP growth differential (lagged)	0.096	−0.033	0.527***	0.055	0.073	0.560***	−0.041	0.107	0.034
	(0.161)	(0.107)	(0.101)	(0.116)	(0.096)	(0.118)	(0.064)	(0.139)	(0.075)
Short-term interest rate differential	0.062	−0.061	0.013	−0.070	−0.080	0.026	−0.132	−0.019	0.014
(lagged)	(0.211)	(0.053)	(0.071)	(0.129)	(0.079)	(0.071)	(0.086)	(0.029)	(0.019)
Constant	−12.476	−19.507**	−15.155***	−18.141**	−19.244	−24.244**	−5.665	0.262	−9.254
	(5.942)	(7.881)	(4.322)	(4.352)	(10.425)	(9.338)	(4.316)	(9.752)	(8.409)
Observations	322	440	872	322	440	872	322	440	861
R-squared	0.252	0.264	0.209	0.480	0.385	0.141	0.269	0.097	0.060
Number of countries	5	7	15	5	7	15	5	7	15

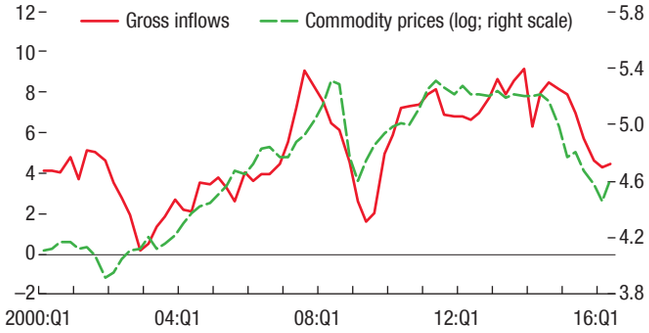
Source: IMF staff calculations.

Note: Robust standard errors in parentheses. G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; LA5 = Brazil, Chile, Colombia, Mexico, Peru; LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; OEM (other emerging markets) = China, Croatia, Egypt, Hungary, India, Indonesia, Morocco, Malaysia, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey; VIX = Chicago Board Options Exchange Volatility Index.

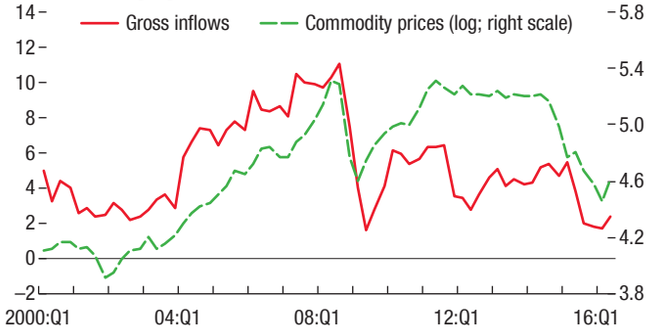
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Figure 4.7. Gross Inflows and Commodity Prices
(Percent of trend GDP; median)

1. LA7: Gross Inflows and Commodity Prices



2. Other Emerging Markets: Gross Inflows and Commodity Prices



Sources: Haver Analytics; IMF, Balance of Payments Statistics Yearbook database; IMF, Commodity Price System database; IMF, World Economic Outlook database; and IMF staff calculations.
Note: LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; Other emerging markets = Albania, Bangladesh, Bulgaria, China, Croatia, Egypt, Ghana, Hungary, India, Indonesia, Kazakhstan, Kenya, Malaysia, Morocco, Nigeria, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Tunisia, Turkey, Vietnam.

In other words, global commodity prices might be the best proxy for the widely documented "global financial cycle" or global demand factors,[17] which together influence the cyclical behavior of capital flows in emerging markets (Box 4.1).[18] Indeed, the analysis finds evidence that, despite the high cross-correlation among global variables, global commodity prices exhibit the highest correlation with the principal component of capital inflows and of asset prices in emerging markets (Table 4.4). However, this appears to be a particular feature of the last commodity supercycle that started in the early 2000s.[19] In the 1990s, for instance, the VIX was a better proxy for the "global financial cycle" related to capital flows in emerging markets.

Coming back to the latest period (2000 onward) when commodity prices were strongly related to the global financial cycle, investment decisions in Latin America appear to be influenced by commodity prices in both commodity and noncommodity producing sectors (Box 4.2). In this context, commodity prices might be a harbinger of an improved outlook in commodity-related sectors, but also a sign of improved macroeconomic and financial conditions more generally.

Regarding the cyclical component of capital inflows, the differential between domestic interest rates and global interest rates does not appear to have a strong effect on capital inflows. However, the differential of domestic growth relative to global growth appears to be strongly and positively associated with capital inflows but only for other emerging market economies, not Latin America.[20,21] Splitting the sample among commodity and noncommodity exporters, the group of commodity exporters exhibits similar results to those of Latin America

[17]Rey (2015) documents the existence of a "global financial cycle" in capital flows, asset prices, and in credit growth. Moreover, this global financial cycle is not necessarily aligned with country-specific macroeconomic conditions.

[18]Chapters 1 and 2 of the April 2017 *World Economic Outlook* document the important role of growth in China—and concomitant commodity price fluctuations—as a key driver of economic performance in emerging markets, especially in commodity exporters.

[19]Indeed, the role of commodity prices in explaining capital flows since the early 2000s likely derives from their role as a high-frequency indicator of global demand (see Box 4.1 and Ghosh and others 2014).

[20]Overall, the main results were found to be robust to using slight variations of the core specification model. In particular, similar results were obtained when using different maturities of domestic and global interest rates; replacing actual domestic and global growth with their "expected" counterparts; and including all variables contemporaneously or with lags. See Caceres and others (forthcoming b) for more details.

[21]When the domestic growth differential is included individually, its estimated coefficient is found to be significant—with the expected sign—for all emerging markets (Annex Table 4.2). However, the introduction of commodity prices in the regression renders that coefficient to be no longer statistically significant for Latin American countries.

Table 4.4. Cross-Correlations of Selected Global Factors, 2000–16

	Principal Component of Capital Inflows in EMs	Principal Component of Stock Prices in EMs (log)	Global Commodity Prices (log)	U.S. Nominal Effective Exchange Rate (log)	S&P 500 Stock Price Index (log)	VIX (log)	U.S. Long-Term Interest Rates	G7 Real GDP Growth	U.S. Short-Term Interest Rates
Principal component of capital inflows in EMs	1								
Principal component of stock prices in EMs (log)	0.86***	1							
Global commodity prices (log)	0.82***	0.93***	1						
U.S. nominal effective exchange rate (log)	−0.75***	−0.86***	−0.93***	1					
S&P 500 stock price index (log)	0.58***	0.52***	0.34***	−0.1	1				
VIX (log)	−0.38***	−0.33***	−0.24*	0.19	−0.56***	1			
U.S. long-term interest rates	−0.31**	−0.60***	−0.61***	0.49***	−0.43***	0.11	1		
G7 real GDP growth	0.30**	−0.09	−0.15	0.18	0.33***	−0.49***	0.29**	1	
U.S. short-term interest rates	0.05	−0.36***	−0.44***	0.41***	−0.1	−0.11	0.84***	0.40***	1

Source: IMF staff calculations.

Note: Robust standard errors in parentheses. EMs = emerging markets; G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; S&P = Standard and Poor's; VIX = Chicago Board Options Exchange Volatility Index.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

regarding the importance of the domestic growth differential.[22,23]

Country-specific structural factors seem to have a significant impact on the relative attractiveness of emerging markets to international investors. In particular, countries with more efficient governments, better regulatory quality, and tighter control of corruption tend to attract more capital inflows relative to the size of their economies. Similarly, countries with higher political stability, lower political risk,[24] and more entrenched democratic institutions as well as political accountability mechanisms also tend to attract higher levels of capital inflows.

The model estimates suggest that, controlling for other factors, an increase in the average level of LA7 countries in any one of the indicators measuring government effectiveness, regulatory quality, control of corruption, or rule of law from their current levels to the average among advanced economies would lead to a sustained increase in capital inflows of about 1½–1¾ percent of GDP. Even when looking at their impact *within* Latin American economies, improving the underlying factors captured by these indicators from their current levels in countries such as Brazil, Colombia, and Peru to the levels observed in Chile would raise their capital inflow levels by about 1½–2 percent of GDP. For Argentina, that figure could be up to 3 percent of GDP. This largely explains why the actual gross capital inflows to Chile since 2000 have been, on average, 2¾ percent of GDP higher than in the other LA7 countries.

In addition, lower domestic corporate tax rates seem to be an effective mechanism for attracting higher levels of capital inflows. Countries with higher credit ratings also appear to attract more capital inflows.[25] Although not strictly a policy variable, credit ratings to some extent reflect

[22]See Caceres and others (forthcoming b) for details.

[23]This is not surprising given the large presence of commodity exporters in the LA7, whereas the group of "other emerging markets" contains by and large noncommodity exporters.

[24]The political risk measure, from the International Country Risk Guide database, is an index in which higher values denote lower political risk.

[25]Indeed, a number of institutional investors use internal rules governing the eligibility of potential investment assets based on third-party credit ratings.

policy choices and the credibility of policy frameworks.

Finally, additional conclusions can be drawn by taking a closer look at the regression results for some of the main subcomponents of capital flows—FDI and portfolio flows (Annex Table 4.3). First, global factors and, more generally, cyclical factors appear to be strongly associated with portfolio inflows. This is not really the case for FDI inflows, where the only exception is the positive association between commodity prices and FDI inflows in Latin American economies only. This is consistent with the fact that portfolio flows (and other investment flows) exhibit a larger "within" country variation relative to FDI flows (Table 4.2). Second, country-specific structural variables appear to be important factors in explaining slower-moving changes in capital inflows for all the main subcomponents (FDI, portfolio, and other investment) of capital flows. In other words, institutional factors play a key role in attracting all types of flows to emerging markets.

In summary, global factors appear to be an important driver of the *cyclical* component of capital inflows in emerging markets, whereas country-specific institutional factors are key drivers of the *structural* component of these flows.

Robustness Checks

The estimated partial correlation between a given explanatory variable and capital flows would crucially depend on which other variables are included in the estimation model. As in the empirical growth literature, however, the existing economic theory is not sufficiently explicit about what explanatory variables should be included in the capital flow regression. Thus, different empirical researchers tend to investigate different models, and their findings could be driven by these somewhat arbitrary choices.

To mitigate this potentially important model selection bias from our estimated coefficients, we design a simple procedure in the spirit of Sala-i-Martin (1997). Essentially, we consider N potential explanatory variables that are usually used in the literature, and then estimate $(2^N - 1)$ fixed-effects regressions using a given capital flow measure as a dependent variable on the $(2^N - 1)$ possible combinations of these explanatory variables.[26,27] For each variable, we summarize the estimated coefficients on a particular variable (and their significance levels) in a histogram. The variables whose coefficients are robustly more significant would tend to be concentrated to the right (left) of the "zero-coefficient" line when the variable has a true positive (negative) relation with capital flows. In contrast, variables that are not often significant across different models are likely to attract coefficients close to zero.

Figure 4.8 exhibits the resulting histogram from all the estimated coefficients across all models for the four global variables that feature in our core specification model: global commodity prices, the VIX, global GDP growth, and U.S. short-term interest rates.[28] For global commodity prices, most of the estimated coefficients are positive, confirming its strong association with capital inflows in both Latin America and other emerging market regions (Figure 4.8, panel 1). Indeed, for Latin American countries, all the estimated coefficients related to global commodity prices are found to be positive and significant across all model variants (Table 4.5).[29] That share is equal to two-thirds for other emerging market economies

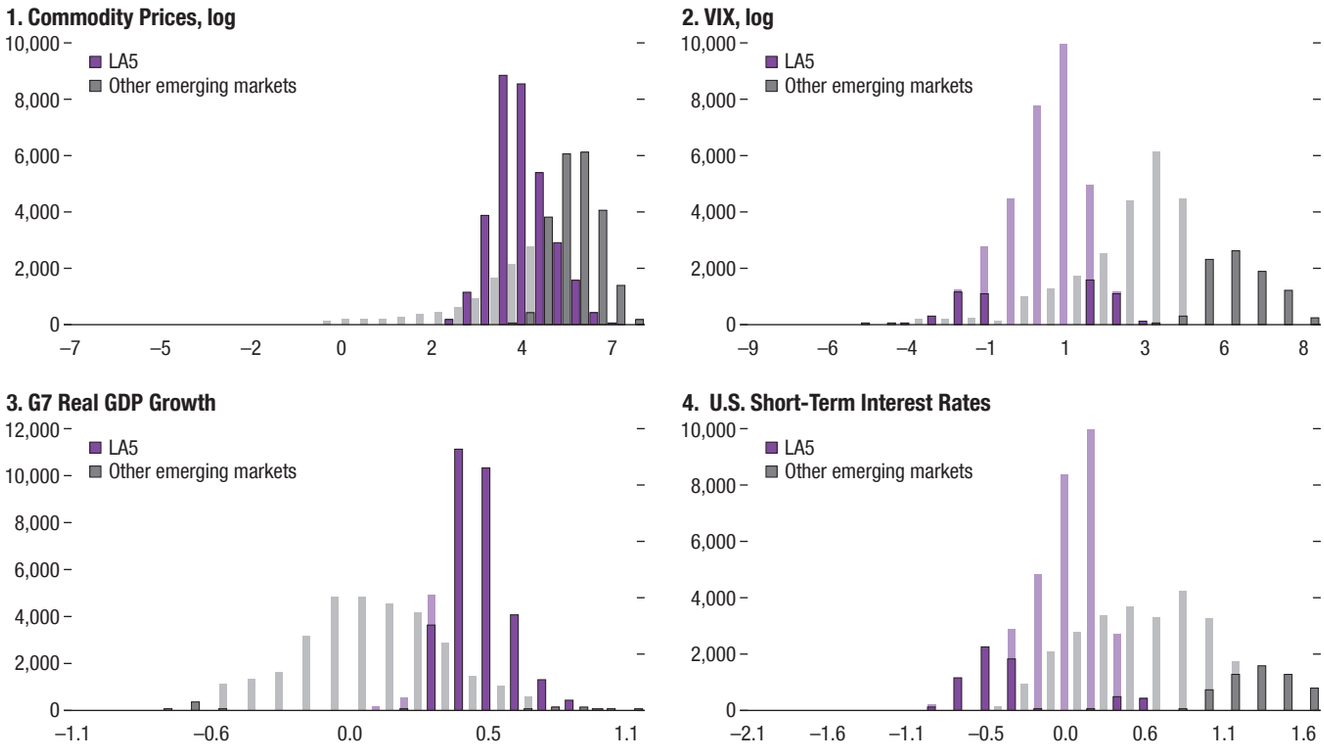
[26]In this case, we have compiled data on $N = 15$ potential variables, listed in Table 4.5, yielding more than 32,000 possible models.

[27]This particular estimation setup is adequate for testing the robustness of cyclical factors (with relatively high "within" variation), but not that of structural factors (with relatively high "between" variation) whose effect would be mostly captured by the fixed effects term.

[28]See Caceres and others (forthcoming b) for the histograms on all other variables.

[29]Arguably, the "expected sign" convention used in Table 4.5 can be challenging in the case of global and domestic interest rates and their differentials. Indeed, an increase in interest rates in the capital flow destination country (the emerging market in question or the United States) would imply potentially higher yields (that is, return on investment). However, higher interest rates or spreads in emerging markets could also be an indication of higher risks associated with these countries (negative for capital flows to emerging markets), whereas an increase in U.S. interest rates might be a sign of stronger global growth (positive for capital flows to emerging markets).

Figure 4.8. Distribution of Estimated Coefficients across Models
(Frequency)



Source: IMF staff calculations.
Note: The height of the bars denotes the total numbers of coefficients in each interval. Of these, dark solid bars denote the numbers of coefficients that are statistically significant at the 1 percent confidence level. G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; LA5 = Brazil, Chile, Colombia, Mexico, Peru; Other emerging markets = Albania, Bangladesh, Bulgaria, Croatia, China, Egypt, Ghana, Hungary, India, Indonesia, Kazakhstan, Kenya, Malaysia, Morocco, Nigeria, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Tunisia, Turkey, Vietnam; VIX = Chicago Board Options Exchange Volatility Index.

(also the highest among all potential explanatory variables).

However, the VIX can be found to have a negative association with capital flows in some models, but a positive relation in others, and these relationships are most often not statistically significant (Figure 4.8, panel 2; and Table 4.5). Interestingly, and in line with earlier results, most of the estimated coefficients for global output growth appear to be positive and significant for Latin American countries, but mainly not significant for other regions (Figure 4.8, panel 3). This analysis thus confirms the robustness of the fixed-effects estimation results over the period 2000–16.

Is Latin America Any Different?

Overall, a key difference across regions is that, once commodity prices have been taken into account, capital inflows to Latin America do not appear to be strongly linked to domestic growth, while they remain highly linked for other emerging market economies. More generally, global factors appear to play a predominant role in driving the *cyclical* behavior of capital flows to Latin American countries relative to other emerging market economies.[30,31]

[30]This is in line with the relatively high proportion of "within" variation in capital flows to Latin American countries relative to other emerging market economies (Table 4.2).

[31]See Chapter 1 of the April 2017 *World Economic Outlook.*

Table 4.5. Share of Statistically Significant Coefficients across Models, 2000–16

	LA5		OEM	
Variable	Expected Sign	Opposite Sign	Expected Sign	Opposite Sign
Global commodity prices	100	0	67	0
G7 real GDP growth	95	0	1	1
Real GDP growth differential	79	0	2	0
U.S. monetary shock	64	0	0	27
U.S. long-term interest rates	60	0	0	24
Short-term interest rate differential	49	0	7	0
Expected real GDP growth differential	37	0	16	0
S&P 500 stock price returns	25	2	32	0
Expected G7 real GDP growth	18	5	0	8
U.S. short-term interest rates	16	3	0	20
VIX	8	8	0	26
MSCI stock price returns	0	69	0	37
Long-term interest rate differential	0	12	34	0
EMBIG spreads	0	64	0	50
Sovereign CDS spreads	0	43	0	94

Source: IMF staff calculations.

Note: As a convention, expected sign is positive for global commodity prices, G7 real GDP growth, expected G7 real GDP growth, U.S. short-term interest rates, U.S. long-term interest rates, real GDP growth differential, expected real GDP growth differential, short-term interest rate differential, long-term interest rate differential, J.P. Morgan Emerging Market Bond Index Global (EMBIG) spreads, sovereign credit default swap (CDS) spreads, and Morgan Stanley Capital International (MSCI) stock price returns. Expected sign is negative in the case of the Chicago Board Options Exchange Volatility Index (VIX), U.S. monetary shock, and Standard and Poor's (S&P) 500 stock price returns. G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; LA5 = Brazil, Chile, Colombia, Mexico, Peru; OEM = other emerging markets.

To illustrate this point, we look at what our core estimation implies for the historical contribution of the different global and country-specific factors to changes in capital inflows during two periods of interest:[32] (1) the global financial crisis and (2) the most recent period characterized by the end of the commodity super-cycle. During the first period, most of the fall in capital inflows to Latin America was driven by global factors, mainly global output growth and commodity prices, whereas for other emerging markets, the domestic growth differential accounted for more than a quarter of the explained variation in capital inflows (Figure 4.9, panel 1).

In the most recent period, the sharp decline in commodity prices was by and large the largest contributor to the reduction in capital inflows to all emerging markets. However, for the group of other emerging market economies, the domestic growth differential accounted for 19 percent of the variation in inflows, but that source explained just 9 percent of Latin America's slightly more moderate decline in capital inflows (Figure 4.9, panel 2).

[32]Structural factors do not feature in the decomposition of the changes in capital flows, given that the former are assumed to remain constant over time within the fixed effect regressions.

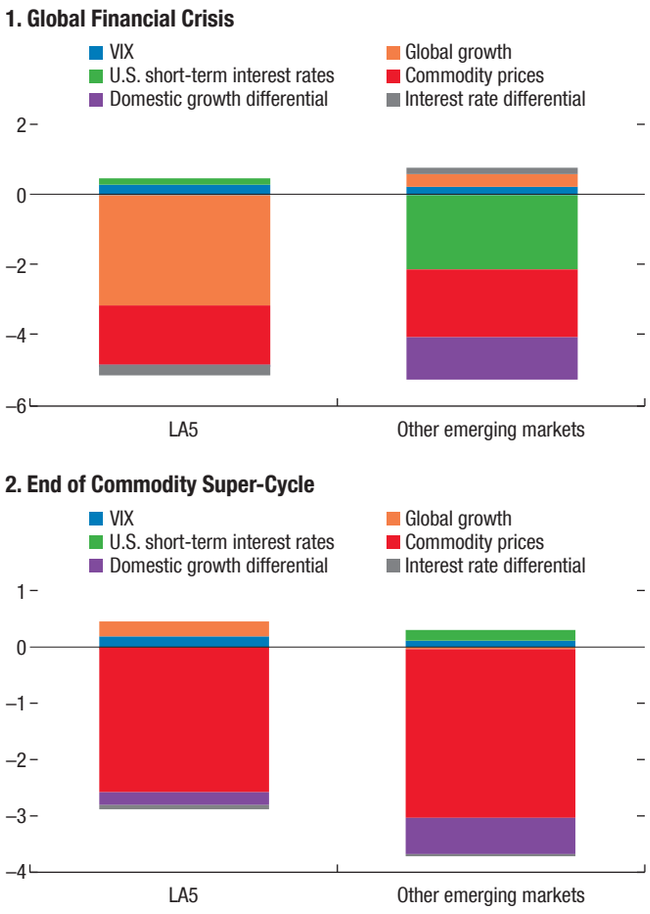
Going forward, because external demand and commodity prices are expected to remain low for the foreseeable future, downward pressure on capital inflows to Latin America and other emerging markets is likely to remain over the coming years compared with the period following the global financial crisis. Nevertheless, inflows to Latin America are expected to remain relatively more resilient than in other emerging market economies whose weaker domestic growth prospects are also weighing down on capital inflows to those regions.

Finally, country-specific *structural* factors have strong effects on capital flows both in Latin America and in other emerging market regions. Indeed, all the institutional and political factors included in the regressions are statistically significant for both sets of countries.

Role of the Investor Base and Market Characteristics

Given the important role of global factors in explaining the cyclical behavior of capital flows in emerging markets, and particularly in Latin America, this section explores whether a number of country-specific factors have an impact on the

Figure 4.9. Contribution of Global and Country-Specific Factors to Changes in Gross Inflows
(Percent of trend GDP)



Source: IMF staff calculations.
Note: "Global financial crisis" denotes the period from 2008:Q1 to 2009:Q2; "End of commodity super-cycle" denotes the period from 2013:Q1 to 2016:Q2. LA5 = Brazil, Chile, Colombia, Mexico, Peru; other emerging markets = Albania, Bulgaria, China, Croatia, Egypt, Ghana, Hungary, India, Indonesia, Kazakhstan, Malaysia, Morocco, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Turkey, Vietnam; VIX = Chicago Board Options Exchange Volatility Index.

sensitivity of capital flows to external variables. In particular, it analyzes to what extent the composition of the investor base and domestic market characteristics tend to dampen (or amplify) the response of capital flows to external shocks. In this context, one would expect that having a more stable investor base would enable countries to better absorb potential shocks to capital flows.

For this purpose, an interacted panel vector autoregression (IPVAR) estimation approach is used to assess how the dynamic responses of capital flows to external shocks are affected by policy choices and characteristics of the investor base and the domestic financial system.[33] This method is used to analyze the response of capital inflows to shocks, including the VIX, global commodity prices, global GDP growth, and a monetary shock that increases U.S. interest rates.[34]

Estimating the model without any interaction terms provides a useful benchmark (Figure 4.10, panel 1). As expected, shocks to the VIX or U.S. monetary policy rates lead to declines in capital inflows to emerging markets. Conversely, positive shocks to global commodity prices and global growth provide a boost to capital inflows to these countries.[35]

These impulse responses also provide an indication of the risks, both upside and downside, to capital flows from future external developments. In particular, a sustained 20 percent increase in commodity prices[36] would be accompanied by an average increase in capital inflows of almost 2 percent of GDP to Latin America and other emerging market economies. An increase in the VIX of some 10 points, similar to that observed during the period of heightened market turbulence at the beginning of the euro area crisis, would lead to a fall in capital inflows of the same magnitude. Similarly, a deceleration in the global economy by 1 percentage point or an unanticipated monetary policy tightening in the

[33]The model setup follows Towbin and Weber (2013). See Annex 4.1, and Caceres and others (forthcoming a), for more details.

[34]We use the "identified" U.S. monetary shock series estimated by Osorio Buitron and Vesperoni (2015), which extends the methodology first proposed by Matheson and Stavrev (2014).

[35]In a dynamic vector autoregression setting, variables are allowed to interact freely with one another through their lead-lag relations and (aside from identification issues) do not necessarily need to "compete" with each other regarding their effect on capital flows. In a static regression, such as in the fixed-effect panel setting used earlier, explanatory variables compete with each other regarding their contemporaneous informational content vis-à-vis capital flows. It is thus possible that an explanatory variable might present a nonsignificant partial-correlation estimate in a static regression (that is, one that would crucially depend on the other variables included in the model) and still induce a statistically significant impulse response function in a dynamic setting.

[36]This would be in line with, say, an increase in oil prices from current levels ($50 a barrel) to $60 a barrel.

United States of about 50 basis points would lead to a fall in capital inflows in emerging markets of close to 1 percent of GDP.

Now, by introducing an interaction term that indicates whether countries have above- or below-average levels of foreign participation in their domestic debt markets, these effects are allowed to vary across the two groups. Accordingly, capital flows in countries with higher foreign participation are found to be more sensitive to external factors (Figure 4.10, panel 2). Introducing an alternative interaction term based on the size of the stock market relative to the economy leads to the conclusion that deeper domestic financial markets and more liquid markets lower the sensitivity of capital flows to external shocks (Figure 4.10, panel 3).[37] Similarly, a larger share of pension funds—which tend to allocate a large proportion of their assets to long-term stable investments—in domestic financial intermediation also decreases the sensitivity of capital inflows to global factors (Figure 4.10, panel 4).

The above findings, taken in combination, raise an interesting question: if deeper markets tend to better shield capital inflows in emerging markets from external shocks, while higher foreign participation tends to have the opposite effect, should countries then open their domestic financial markets to nonresidents to increase market depth, or should they close their internal markets to foreigners at the expense of potentially lower market size and liquidity? The answer is not clear from the corresponding impulse responses because both groups of countries exhibit similar sensitivities to external shocks. However, what is certain is that, on average, countries during periods characterized by both deeper markets *and* higher foreign participation tend to exhibit better macroeconomic and financial fundamentals, including lower inflation rates and inflation volatility, higher domestic growth and lower growth volatility, lower sovereign spreads, more favorable credit ratings, and better governance indicators (Figure 4.11).

Furthermore, capital inflows in countries with fixed exchange rate regimes tend to exhibit greater sensitivity to external shocks—particularly to U.S. monetary shocks—than capital inflows in countries with more flexible exchange rate arrangements (Figure 4.10, panel 5).[38] Finally, in countries with higher degrees of capital account openness, capital inflows appear to be more vulnerable to external conditions (Figure 4.10, panel 6).[39]

Conclusions and Policy Implications

This chapter documents that the high degree of variation in capital flows across time is common across emerging market economies, particularly in Latin America. This synchronicity reflects the important role of global factors in driving the cyclical component of capital inflows in these economies.[40] Among these factors, commodity prices are empirically found to play a predominant role in explaining capital flows. Other global factors, such as global growth or global risk aversion, are also important, but a large part of their effect seems to be captured by commodity prices. Commodity prices therefore appear to be a better proxy for the "global financial cycle" in capital flows and asset prices in emerging markets since the early 2000s.[41]

[37]These results for capital flows complement the analysis on asset prices in Chapter 2 of the April 2014 *Global Financial Stability Report*, which finds that deeper domestic markets and lower foreign participation provide buffers against shocks to global risk aversion.

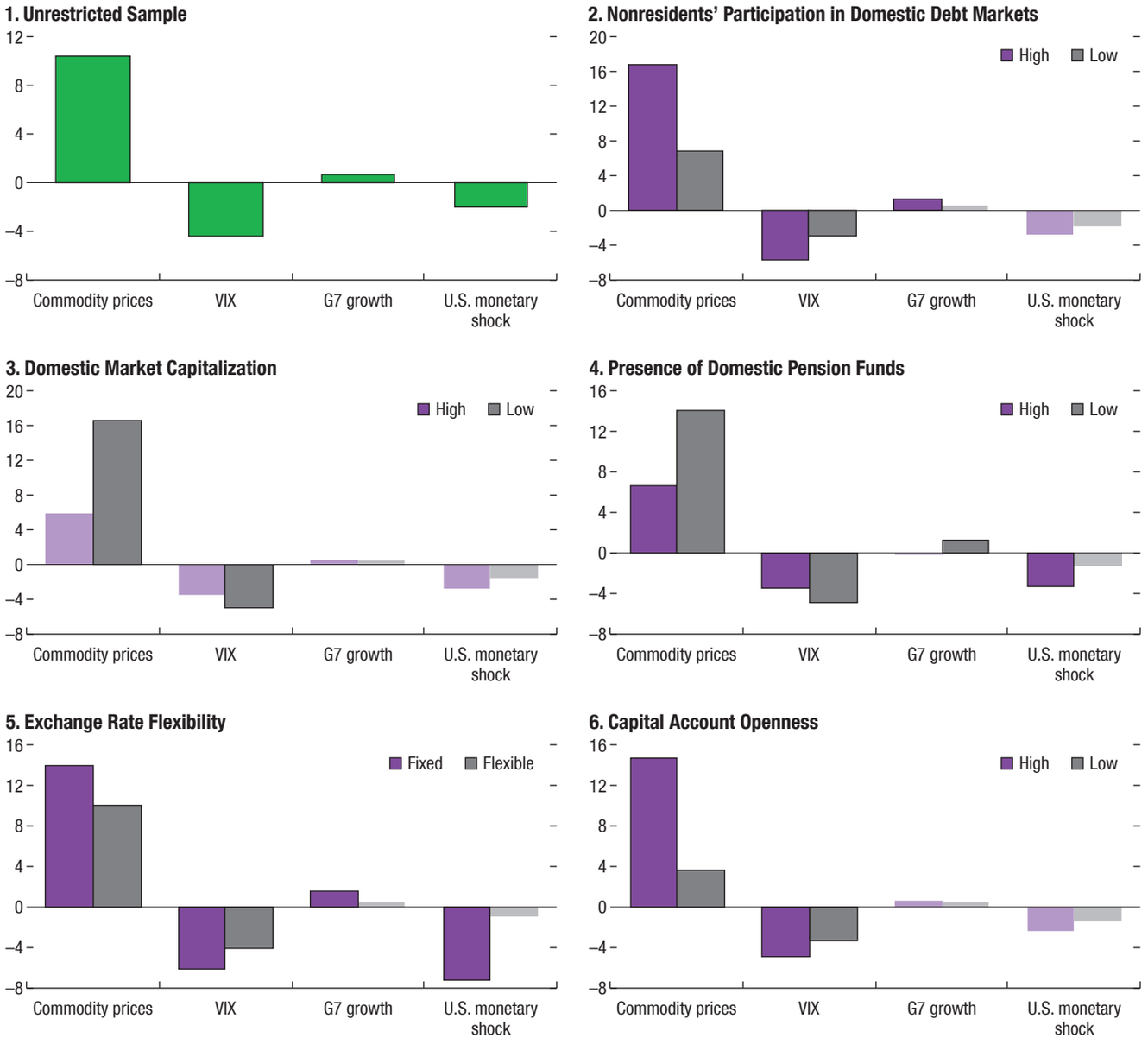
[38]This is in line with the findings in Chapter 2 of the April 2016 *World Economic Outlook*.

[39]These two results are broadly in line with the findings in Adler, Djigbenou, and Sosa (2016).

[40]This is in line with the existing results in the literature (Calvo, Leiderman, and Reinhart 1993; Reinhart and Reinhart 2008; Ghosh and others 2014; Obstfeld, Ostry, and Qureshi, forthcoming). Obstfeld. Ostry, and Qureshi (forthcoming) state that the rise and fall of capital flows over the sample period 1986–2013 (with similar results using the period 2000–13) appear to be tightly correlated with global factors.

[41]Indeed, Ghosh and others (2014) suggest that higher commodity prices correlate strongly with larger capital inflows inasmuch as they indicate a boom in demand for emerging market exports, and perhaps the recycling of income earned by commodity exporters.

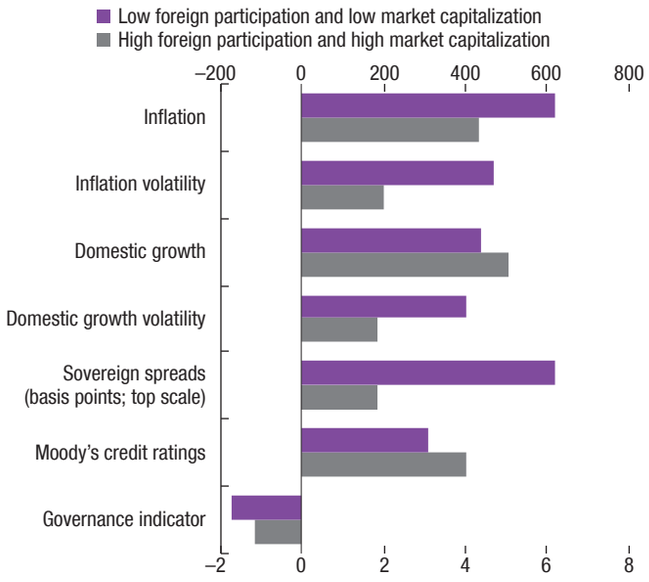
Figure 4.10. Impulse Response Functions of Gross Inflows to External Shocks
(Percent of trend GDP)



Source: IMF staff calculations.
Note: Bars represent the response of gross inflows four quarters after a positive one-unit shock to each of the four exogenous global variables. A unit shock for the VIX and global commodity prices corresponds to a unit change in the logarithm of these two variables; a unit shock for G7 growth and the "U.S. monetary shock" corresponds to a 1 percentage point change in these variables. Solid bars with black borders denote that the response is statistically significant at the 5 percent confidence level. G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; VIX = Chicago Board Options Exchange Volatility Index.

The positive relationship between commodity prices and capital inflows can pose challenges to the conduct of monetary policy in Latin American economies. An increase in commodity prices, for example, would tend to lead to higher growth and inflationary pressures, which would, all else being equal, call for tighter monetary policy (that is, higher interest rates). However, higher commodity prices would also accompany higher inflows and likely exchange rate appreciation,

Figure 4.11. Foreign Participation and Market Capitalization
(Percent; unless indicated otherwise)



Source: IMF staff calculations.
Note: "High-high" includes Bulgaria (2007:Q4–2008:Q3), Chile (2004:Q1–2009:Q1), Colombia (2014:Q3–2016:Q4), Indonesia (2007:Q4–2008:Q3 and 2010:Q4–2016:Q4), Mexico (2011:Q3–2016:Q4), Peru (2006:Q4–2016:Q4), Philippines (2006:Q4–2016:Q4), Poland (2010:Q4–2011:Q3 and 2013:Q4–2016:Q4), and Russia (2004:Q1–2006:Q4). "Low-low" includes Argentina (2004:Q1–2005:Q4 and 2008:Q4–2016:Q1), Brazil (2004:Q1–2004:Q3), China (2004:Q1–2007:Q3), Colombia (2005:Q2–2007:Q3), Mexico (2006:Q2–2007:Q3 and 2008:Q4–2010:Q4), Poland (2008:Q4–2009:Q4), Russia (2014:Q4–2016:Q4), and Turkey (most of the period 2004:Q1–2012:Q2).

which complicate the use of monetary policy tightening to forestall overheating in the economy. This highlights the need for an appropriate policy mix, which would call for the use of fiscal policy as well as exchange rate flexibility to complement monetary policy in response to a surge in capital inflows. In the current setting, policies will need to manage these forces working in the other direction. Effective macroprudential policies can also help monetary policy achieve its goal, and could be used to complement other (fiscal and structural) policies in order to contain potential adverse side effects for financial stability.

In Latin America, once commodity prices and other global factors are taken into account, domestic economic growth does not seem to significantly drive the cyclical behavior of capital flows, unlike in other emerging market regions.

Looking beyond the business cycle, however, country-specific structural factors explain a significant portion of the large cross-country heterogeneity observed in the average level of capital flows to emerging markets and the region. In particular, countries with better governance, more efficient public institutions, stronger regulatory and legal frameworks, and higher political stability and accountability, among other factors, tend to attract higher levels of capital inflows on average. In other words, capital flows are in large part driven by global cyclical "push" factors as well as country-specific structural "pull" factors.

With regard to vulnerabilities, given the importance of global factors in explaining the cyclical fluctuations in capital flows to emerging markets, the chapter also analyzes whether characteristics of the investor base and domestic financial markets can mitigate capital account risks stemming from external developments.

Overall, the results suggest that promoting deeper domestic financial markets, and stable domestic financial intermediation (such as pension funds and insurance companies), can reduce the vulnerabilities of capital flows to external shocks. In weighing their options, countries that open up their capital accounts to foreign participation to gain market depth appear to have better macroeconomic performance than relatively closed countries with shallower domestic financial markets. The pace of financial opening, however, would need be in line with financial stability considerations to avoid any rapid and excessive buildup of risk. Moreover, policy choices, such as allowing for more exchange rate flexibility, are also effective ways of reducing the sensitivity of capital flows to adverse external shocks.

Box 4.1. Commodity Prices and Underlying Global Forces

This box further explores the global forces at play behind the strong role for commodity prices in driving gross capital inflows. In particular, it considers the role of commodity prices both as a proxy for a global financial cycle and as a high-frequency indicator of aggregate global demand.

In the 2000s, commodity prices correlated more strongly with the principal component of gross capital inflows and stock prices in emerging markets than either the Chicago Board Options Exchange Volatility Index (VIX) or U.S. short-term interest rates (see Table 4.4 in the main text). This excess correlation suggests that commodity prices are a better proxy for the global financial cycle identified by Rey (2015) than global risk aversion or U.S. monetary policy. If commodity prices are serving as a proxy for such a global cycle, they could be driving gross capital inflows through portfolio inflows. This hypothesis would also explain why commodity prices seem to play a more important role than the VIX in explaining capital flows (see Annex Table 4.1).

However, this role for commodity prices is a relatively new phenomenon. In the 1990s, commodity prices were less correlated with these capital flows and stock prices than the VIX (Table 4.1.1). This may explain why global risk aversion, rather than commodity prices, is more commonly used in the literature to characterize the global financial cycle.

Table 4.1.1. Correlations between Selected Global Factors, 1990–2000

	Principal Component of Capital Flows in EMs	Principal Component of Stock Prices in EMs	Global Commodity Prices (log)	VIX (log)	U.S. Short-Term Interest Rates	U.S. Long-Term Interest Rates
Principal component of capital flows in EMs	1					
Principal component of stock prices in EMs	0.90***	1				
Global commodity prices (log)	0.67***	0.84***	1			
VIX (log)	−0.84***	−0.92***	−0.46***	1		
U.S. short-term interest rates	0.54**	0.74***	0.38**	0.29*	1	
U.S. long-term interest rates	0.64***	0.79***	0.65***	−0.51***	0.11	1

Source: IMF staff calculations.

Note: Stock prices are measured in log U.S. dollars. Capital flows are gross capital inflows as a fraction of trend GDP. The sample of EMs for capital flows includes Argentina, Brazil, Bulgaria, Chile, Hungary, Indonesia, Mexico, Peru, Philippines, Romania, Russia, South Africa, Thailand, and Turkey. The sample of EMs for stock prices includes Argentina, Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Russia, South Africa, Thailand, and Turkey. EMs = emerging markets; VIX = Chicago Board Options Exchange Volatility Index.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

At the same time, it is possible to provide an indicative decomposition of commodity price movements into those that can be explained by demand and supply factors.[1] Using this decomposition, demand factors seem to have a clear role in explaining the significant relationship between capital inflows and commodity prices. In particular, the demand component of commodity prices is positive and statistically significantly associated with gross capital inflows (column (1) of Table 4.1.2).

In other words, increases in commodity prices attributable to increases in global aggregate demand tend to drive capital flows to emerging market economies. Interestingly, increases in commodity prices attributable

This box was prepared by Galen Sher.

[1]The Commodities Unit in the IMF Research Department provides such a decomposition internally. The demand component is based on a regression of commodity prices on an aggregate of equity market indices, purchasing managers' indices, and industrial production of many countries. The supply component is a residual.

Box 4.1 *(continued)*

Table 4.1.2. Decomposing Commodity Prices into Demand and Supply Components by Type of Gross Capital Inflow, 2000–16

	(1) Total	(2) FDI	(3) Portfolio	(4) Other
VIX (log)	−0.830	0.103	−1.295***	0.219
	(0.813)	(0.461)	(0.257)	(0.539)
G7 real GDP growth (year over year)	−0.776*	−0.600	0.122*	−0.374**
	(0.406)	(0.356)	(0.067)	(0.148)
U.S. short-term interest rates	0.341	0.278	−0.159*	0.102
	(0.383)	(0.194)	(0.088)	(0.159)
Real GDP growth differential (lagged)	0.435***	0.037	0.069	0.287***
	(0.107)	(0.067)	(0.040)	(0.084)
Short-term interest rate differential (lagged)	−0.048	−0.011	−0.009	−0.030
	(0.056)	(0.016)	(0.009)	(0.040)
Demand component of commodity price (log)	0.252***	0.088**	0.050**	0.119***
	(0.046)	(0.041)	(0.022)	(0.020)
Supply component of commodity price (log)	2.989	1.963	−0.462	1.508
	(2.343)	(1.497)	(1.039)	(0.958)
Observations	1,312	1,312	1,312	1,281
R-squared	0.135	0.048	0.168	0.169
Number of countries	22	22	22	22

Source: IMF staff calculations.

Note: These regressions are estimated by fixed effects. The dependent variable is gross capital inflows in column (1), gross FDI inflows in column (2), gross portfolio inflows in column (3), and gross other inflows in column (4). Robust standard errors appear in parentheses below each coefficient estimate. Countries include Argentina, Brazil, Chile, China, Colombia, Croatia, Egypt, Hungary, India, Indonesia, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey, and Uruguay. FDI = foreign direct investment; G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; VIX = Chicago Board Options Exchange Volatility Index.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

to negative commodity supply shocks have a larger estimated association with capital flows (than those attributable to demand), but this effect is uncertain and thus not statistically significant.

Upon disaggregating gross capital inflows into foreign direct investment, portfolio, and "other" flow components, the roles of global risk aversion and U.S. monetary policy become evident for portfolio flows specifically. The role for the demand component of commodity prices appears to be strongest for 'other' flows, which primarily reflect cross-border bank lending. It could be possible, therefore, that demand-related increases in commodity prices expand trade-related activities, and thus demand for external finance (for example, to finance investment, as seen in Box 4.2), at the same time that higher collateral values permit foreign banks to expand credit supply.

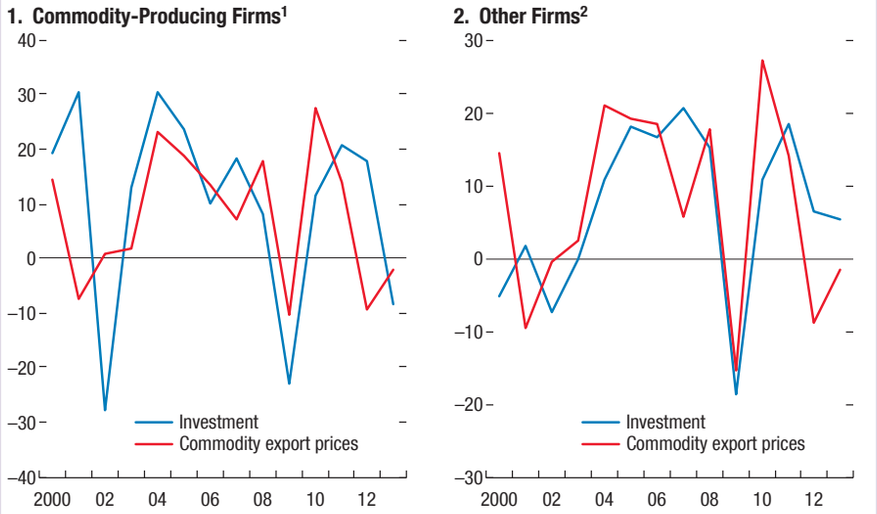
Therefore, there seems to be a cyclical pattern of capital flows to emerging market economies that is common between these economies. This cyclical pattern is highly correlated with global commodity prices, and evidence suggests two plausible, related interpretations of the importance of commodity prices. Commodity prices seem to behave in a way that reflects the global financial cycle, especially in the 2000s, and their role in explaining capital flows derives from their role as a high-frequency indicator of global aggregate demand.

Box 4.2. Commodity Prices and Investment in Commodity and Noncommodity Sectors

This box further explores possible underlying mechanisms through which commodity prices play an important role in determining capital flows to emerging market economies. In Latin America, the estimated effect of commodity prices appears so strong in the panel data analysis that it dominates other explanatory factors, including domestic growth. Turning to more disaggregated data, one can try to understand this finding better by examining whether sectors directly affected by changing commodity prices react similarly to or differently from other sectors. Specifically, it seems natural to ask whether the capital flows that accompany changes in commodity prices primarily affect capital accumulation in commodity-producing sectors. Or does capital accumulation respond similarly across other sectors to changes in commodity prices? This would help explain the role of *direct* effects (such as changes in firm profitability) versus more *indirect* or *spillover* effects (such as changes in market sentiment) that may accompany commodity price changes as they pertain to effects on capital flows.

Figure 4.2.1 provides clear evidence of comovement between firm-level investment growth and country-specific commodity export price changes for publicly listed firms in six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, and Peru).[1] Panel 1 of Figure 4.2.1 shows that investment growth tracks the growth rate in export-related commodity prices for the median agricultural and mining firm. Panel 2 of Figure 4.2.1 shows a similar, albeit slightly less volatile, pattern in the investment growth of all other firms. Broadly speaking, investment in the two groups of firms seems to respond similarly to changes in commodity prices.

Figure 4.2.1. Growth in Investment and Commodity Export Prices
(Percent change)



Sources: Thomson Reuters Worldscope; and IMF staff calculations.
[1]Countries include Argentina, Brazil, Chile, Colombia, Mexico, and Peru. Standard Industrial Classification codes include 01–09 (agriculture) and 10–14 (mining).
[2]Countries include Argentina, Brazil, Chile, Colombia, Mexico, and Peru. Standard Industral Classification codes include 15–99.

This box was prepared by Galen Sher.

[1]Analogous charts for non–Latin American emerging markets, and for all emerging markets, show a similar degree of comovement between investment and commodity prices.

Box 4.2 *(continued)*

Table 4.2.1. Results from Estimating the Free Parameters in the Investment Equation 4.2.1 by Fixed Effects on Firms Domiciled in the LA6 Countries

Variable	Parameter	(1)	(2)
$Q_{i,t}$	α	1.56***	1.55***
		(0.310)	(0.310)
$\frac{\pi_{i,t}}{K_{i,t-1}}$	β	0.58	0.58
		(0.675)	(0.675)
$\frac{D_{i,t}}{E_{i,t}}$	λ	−4.43***	−4.42***
		(0.706)	(0.705)
$\frac{IE_{i,t}}{D_{i,t-1}}$	ρ	3.88	3.98
		(4.724)	(4.723)
$\frac{\Delta D_{i,t}}{K_{i,t-1}}$	δ	0.16	0.15
		(0.142)	(0.141)
year t	θ	−0.17***	−0.16***
		(0.060)	(0.059)
$P^x_{i,t}$	κ	0.05***	0.04***
		(0.013)	(0.014)
$P^x_{i,t}X_i$	μ		0.04
			(0.040)
Number of observations		4,651	4,650
Number of firms		763	762

Source: IMF staff calculations.
Note: Standard errors that are robust to within-firm heteroscedasticity and serial correlation appear in parentheses below each coefficient estimate.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

To investigate the association between investment and commodity prices more systematically, we estimate the free parameters $\alpha, \beta, \lambda, \rho, \delta, \kappa, \mu$ and θ in the specification

$$100 \times \frac{I_{i,t}}{K_{i,t-1}} = \alpha Q_{i,t} + \beta \frac{\pi_{i,t}}{K_{i,t-1}} + \lambda \frac{D_{i,t}}{E_{i,t}} + \rho \frac{IE_{i,t}}{D_{i,t-1}} + \delta \frac{\Delta D_{i,t}}{K_{i,t-1}} + \kappa P^x_{i,t} + \mu P^x_{i,t} X_i + \theta t + c_i + u_{i,t} \quad (4.2.1)$$

for each firm-year observation (i,t). In this specification, I denotes investment in fixed capital; K denotes the capital stock, Q denotes the ratio of market capitalization to book value of equity (a proxy for Tobin's q), $\boldsymbol{\pi}$ denotes net profit, D denotes the book value of debt, E denotes the book value of equity, IE denotes interest expense, P^x denotes the commodity export price in the firm's domicile country, X is an indicator variable equal to one if the firm is in the agriculture or mining industries and zero otherwise, θt allows for the possibility of a linear time trend, and $c_i + u_{i,t}$ is an error term that reflects firm-specific and idiosyncratic components. The parameter κ measures the extent of comovement between investment and commodity prices, while the parameter μ measures the difference in this comovement between commodity-producing firms and other firms.

Table 4.2.1 shows estimates of the parameters in equation (4.2.1) for firms in LA6 countries. Column (1) shows a version with the restriction $\mu = 0$. The estimates here are very similar to those obtained in Chapter 4 of the April 2015 *Regional Economic Outlook: Western Hemisphere* and Magud and Sosa (2015). In particular, we see a strong role for Tobin's q in explaining investment.

Allowing for different investment responses in commodity and noncommodity sectors, column (2) of Table 4.2.1 shows the estimation results when we allow μ to be unrestricted. Similar to Figure 4.2.1, we see evidence for a positive association between commodity prices and investment ($\kappa > 0$). This positive association also holds for noncommodity-producing firms, suggesting important spillover effects between

Box 4.2 *(continued)*

sectors. In addition, column (2) shows that the coefficient μ on the interaction term between commodity export prices and the indicator variable of commodity production is not statistically significant. This indicates that higher commodity prices lead to higher investment by both commodity producers and other firms in a similar fashion.

Annex 4.1. Technical Details

Investor Base and Domestic Financial Market Measures

In an attempt to quantify the characteristics of the investor base as well as those of the domestic financial markets, we use the variables defined below:

Foreign participation in domestic debt markets is defined as the share of domestic debt instruments held by nonresidents out of total domestic debt instruments, as computed by Arslanalp and Tsuda (2014).

Domestic market capitalization is defined as the ratio of total domestic market capitalization to the country's nominal GDP. This measure was obtained from the World Bank's Global Financial Development Database (GFDD), computed following Cihak and others (2012).

The presence of domestic pension funds is defined as the ratio of total assets under management of domestic pension funds to the country's total financial sector assets. This measure was also derived using the GFDD.

An *exchange rate flexibility* index, produced by Aizenman, Chinn, and Ito (2010), was used. A high score relates to a fixed exchange rate regime, and a low score relates to a more flexible exchange rate arrangement.

A *capital account openness* indicator, also derived by Aizenman, Chinn, and Ito (2010), takes the value of one for countries deemed to be relatively open and zero for those that are relatively closed.

Interacted Panel Vector Autoregression

An interacted panel vector autoregression (IPVAR) model is used to explore how the impulse response of capital inflows to external shocks depends on the characteristics of the investor base and of domestic financial markets. Algebraically, a panel VAR estimation model can be written as

$$\begin{bmatrix} \boldsymbol{y} \\ \boldsymbol{X} \end{bmatrix}_{i,t} = A_0 + \sum_{j=1}^{L} \boldsymbol{A}_j \begin{bmatrix} \boldsymbol{y} \\ \boldsymbol{X} \end{bmatrix}_{i,t-j} + \begin{bmatrix} \boldsymbol{\epsilon}^{\boldsymbol{y}} \\ \boldsymbol{\epsilon}^{\boldsymbol{X}} \end{bmatrix}_{i,t},$$

where vectors $\boldsymbol{y}$ and $\boldsymbol{X}$ contain the country-specific and global variables, respectively, for country i at time t; the $\boldsymbol{A}_j$'s are (restricted) matrices of coefficients to be estimated;[1] and $\boldsymbol{\epsilon}^{\boldsymbol{y}}$ and $\boldsymbol{\epsilon}^{\boldsymbol{X}}$ are vectors containing the error terms.

In this model setup, $\boldsymbol{y}$ includes the capital flow measure, in percent of trend GDP, and the differential between domestic growth and global growth. $\boldsymbol{X}$ includes the measure of global commodity prices, the VIX, G7 real GDP growth, and the identified monetary shock to U.S. interest rates from Osorio Buitron and Vesperoni (2015). The variables in $\boldsymbol{X}$ are exogenous in relation to the variables in $\boldsymbol{y}$ (that is, the restriction in $\boldsymbol{A}_j$ ensures the block exogeneity of the variables in $\boldsymbol{X}$). The shock identification relies on Cholesky decomposition.[2]

In a standard panel VAR setting, the coefficients in the $\boldsymbol{A}_j$'s matrices remain constant over time and across countries. By contrast, in the IPVAR setting, the coefficients in the $\boldsymbol{A}_j$'s are functions of country-specific characteristics (for example, the investor base and domestic market measures) that can also vary over time. More precisely, for each country i characterized by a vector of investor base measures $\boldsymbol{F}_{i,t}$ at time t, the coefficients inside the $\boldsymbol{A}_j$'s are defined by $a_{i,t} = c + \boldsymbol{\gamma}' \boldsymbol{F}_{i,t}$, where c and $\boldsymbol{\gamma}$ are parameters estimated by the IPVAR framework.

[1]The coefficients in the $\boldsymbol{A}_j$'s corresponding to the effect of lags of $\boldsymbol{y}$ on $\boldsymbol{X}$ are set to zero to reflect the exogeneity of the variables included in $\boldsymbol{X}$.

[2]Broadly similar results are obtained using alternative ordering of the exogenous variables.

Annex Table 4.1. Estimation Results: Core Specification Model for Gross Inflows, 2000–16

	Core Model			
	LA5	LA7	OEM	EMs
First Stage: Cyclical Variables				
Global Factors				
VIX (log)	1.230	0.987	0.795	0.692
	(0.862)	(1.077)	(1.359)	(0.946)
G7 real GDP growth (year over year)	0.509**	0.368*	−0.067	0.070
	(0.171)	(0.166)	(0.442)	(0.297)
U.S. short-term interest rates	−0.083	0.214	1.129	0.799*
	(0.127)	(0.314)	(0.645)	(0.446)
Global commodity price (log)	4.182***	4.458**	4.918***	4.434***
	(0.387)	(1.354)	(1.261)	(0.973)
Country-Specific Factors				
Real GDP growth differential (lagged)	0.055	0.073	0.560***	0.419***
	(0.116)	(0.096)	(0.118)	(0.116)
Short-term interest rate differential (lagged)	−0.070	−0.080	0.026	−0.018
	(0.129)	(0.079)	(0.071)	(0.058)
Constant	−18.141**	−19.244	−24.244**	−20.458***
	(4.352)	(10.425)	(9.338)	(7.024)
Second Stage: Structural Variables				
Country-Specific Factor				
Government effectiveness	1.253***	1.949***	3.192***	2.729***
	(0.037)	(0.111)	(0.215)	(0.145)
Regulatory quality	1.412***	2.024***	4.743***	3.493***
	(0.031)	(0.068)	(0.164)	(0.109)
Control of corruption	1.069***	1.596***	4.471***	2.593***
	(0.015)	(0.061)	(0.197)	(0.112)
Rule of law	1.005***	1.578***	4.159***	2.785***
	(0.017)	(0.068)	(0.185)	(0.113)
Law and order	0.554***	0.485***	1.728***	0.982***
	(0.018)	(0.062)	(0.111)	(0.068)
Voice and accountability	1.380***	1.763***	3.054***	2.615***
	(0.055)	(0.130)	(0.122)	(0.095)
Political stability	0.624***	0.650***	3.063***	2.209***
	(0.042)	(0.082)	(0.094)	(0.075)
Political risk	0.070***	0.094***	0.253***	0.210***
	(0.004)	(0.010)	(0.011)	(0.008)
Institutionalized democracy	0.011**	0.016*	0.137***	0.087***
	(0.005)	(0.009)	(0.016)	(0.011)
Polity synthetic index	0.483***	0.781***	0.332***	0.317***
	(0.032)	(0.056)	(0.019)	(0.016)
Corporate tax rate	−0.115***	−0.190***	−0.356***	−0.279***
	(0.004)	(0.009)	(0.013)	(0.009)
Credit rating	0.494***	0.752***	0.571***	0.628***
	(0.037)	(0.051)	(0.110)	(0.071)
Observations	322	440	872	1,312
R-squared (first stage)	0.480	0.385	0.141	0.151
R-squared interquartile range (second stage)	0.424–0.826	0.162–0.520	0.214–0.434	0.193–0.374
Number of countries	5	7	15	22

Source: IMF staff calculations.

Note: Robust standard errors in parentheses. The Polity synthetic index measures how democratic a country is. G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; LA5 = Brazil, Chile, Colombia, Mexico, Peru; LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; OEM (other emerging markets) = China, Croatia, Egypt, Hungary, India, Indonesia, Morocco, Malaysia, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey; EMs = emerging markets; VIX = Chicago Board Options Exchange Volatility Index.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Annex Table 4.2. Estimation Results: Alternative Specifications for Capital Inflows, Fixed Effects, 2000–16

	Core Model		VIX		VIX and Commodity Prices		Domestic Growth Differential		Domestic Growth Differential and Commodity Prices	
	LA5	OEM	LA5	OEM	LA5	OEM	LA5	OEM	LA5	OEM
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Global Factors										
VIX (log)	1.230	0.795	−1.461**	−1.025	−0.212	−0.374				
	(0.862)	(1.359)	(0.518)	(1.556)	(0.650)	(1.476)				
G7 real GDP growth (year	0.509**	20.067								
over year)	(0.171)	(0.442)								
U.S. short-term interest rates	−0.083	1.129								
	(0.127)	(0.645)								
Global commodity price (log)	4.182***	4.918***			4.024***	2.566**			3.989***	2.641***
	(0.387)	(1.261)			(0.567)	(0.919)			(0.410)	(0.832)
Country-Specific Factor										
Real GDP growth differential	0.055	0.560***					0.333**	0.633***	0.032	0.634***
(lagged)	(0.116)	(0.118)					(0.100)	(0.096)	(0.070)	(0.119)
Short-term interest rate	20.070	0.026								
differential (lagged)	(0.129)	(0.071)								
Constant	−18.141**	−24.244**	9.968***	7.938	−12.733**	−6.203	4.946***	3.110***	−13.261***	−9.469**
	(4.352)	(9.338)	(1.535)	(4.594)	(4.369)	(5.220)	(0.208)	(0.272)	(1.959)	(3.818)
Observations	322	872	328	872	328	872	328	872	328	872
R-squared	0.480	0.141	0.031	0.002	0.389	0.023	0.082	0.056	0.389	0.079
Number of countries	5	15	5	15	5	15	5	15	5	15

Source: IMF staff calculations.

Note: Robust standard errors in parentheses. G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; LA5 = Brazil, Chile, Colombia, Mexico, Peru; OEM (other emerging markets) = China, Croatia, Egypt, Hungary, India, Indonesia, Morocco, Malaysia, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey; VIX = Chicago Board Options Exchange Volatility Index.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Annex Table 4.3. Estimation Results for Foreign Direct Investment and Portfolio Inflows, 2000–16

	Gross FDI Inflows			Gross Portfolio Inflows		
	LA5	LA7	OEM	LA5	LA7	OEM
First Stage: Cyclical Variables						
Global Factors						
VIX (log)	0.102	0.325	1.006	−0.338	−0.300	−0.938***
	(0.560)	(0.399)	(0.980)	(0.401)	(0.525)	(0.227)
G7 real GDP growth (year over year)	0.001	−0.017	−0.444	0.282**	0.264***	0.343***
	(0.068)	(0.064)	(0.334)	(0.064)	(0.049)	(0.109)
U.S. short-term interest rates	0.022	0.134	0.647	−0.316**	−0.030	−0.001
	(0.073)	(0.101)	(0.397)	(0.109)	(0.210)	(0.093)
Global commodity price (log)	1.493*	1.508**	2.100	1.206*	2.140**	1.252***
	(0.594)	(0.527)	(1.196)	(0.446)	(0.711)	(0.390)
Country-Specific Factors						
Real GDP growth differential (lagged)	0.006	0.034	0.035	0.051	−0.054	0.087*
	(0.102)	(0.063)	(0.084)	(0.033)	(0.055)	(0.049)
Short-term interest rate differential (lagged)	0.075	0.006	−0.005	−0.023	−0.017*	0.017
	(0.078)	(0.020)	(0.014)	(0.083)	(0.009)	(0.021)
Constant	−3.792	−4.600	−10.369	−2.933	−7.968	−2.889
	(3.094)	(2.630)	(8.444)	(2.668)	(4.673)	(1.773)
Second Stage: Structural Variables						
Country-Specific Factor						
Government effectiveness	2.214***	2.351***	2.184***	0.400***	0.812***	1.304***
	(0.087)	(0.084)	(0.136)	(0.025)	(0.073)	(0.044)
Regulatory quality	2.670***	2.140***	2.940***	0.521***	1.119***	1.278***
	(0.064)	(0.052)	(0.109)	(0.021)	(0.041)	(0.040)
Control of corruption	1.965***	1.677***	2.609***	0.287***	0.639***	1.378***
	(0.043)	(0.050)	(0.132)	(0.020)	(0.047)	(0.044)
Rule of law	1.825***	1.794***	2.734***	0.267***	0.628***	1.145***
	(0.047)	(0.048)	(0.116)	(0.020)	(0.049)	(0.045)
Law and order	1.093***	0.990***	0.858***	0.210***	0.193***	−0.062*
	(0.032)	(0.044)	(0.075)	(0.010)	(0.037)	(0.032)
Voice and accountability	2.438***	1.925***	1.285***	0.315***	0.512***	0.947***
	(0.120)	(0.118)	(0.093)	(0.036)	(0.085)	(0.026)
Political stability	1.062***	0.718***	1.820***	0.126***	0.104**	0.638***
	(0.085)	(0.078)	(0.065)	(0.022)	(0.050)	(0.029)
Political risk	0.121***	0.117***	0.160***	0.024***	0.035***	0.055***
	(0.009)	(0.009)	(0.007)	(0.002)	(0.006)	(0.003)
Institutionalized democracy	0.015	0.014	0.048***	0.001	0.001	0.062***
	(0.009)	(0.009)	(0.011)	(0.002)	(0.005)	(0.004)
Polity synthetic index	0.956***	0.806***	0.088***	0.184***	0.320***	0.113***
	(0.060)	(0.053)	(0.014)	(0.014)	(0.035)	(0.004)
Corporate tax rate	−0.219***	−0.229***	−0.187***	−0.047***	−0.097***	−0.010**
	(0.007)	(0.006)	(0.009)	(0.002)	(0.006)	(0.005)
Credit rating	0.904***	0.788***	0.643***	0.223***	0.486***	0.233***
	(0.073)	(0.048)	(0.068)	(0.015)	(0.027)	(0.028)
Observations	322	440	872	322	440	872
R-squared (first stage)	0.176	0.174	0.071	0.388	0.307	0.192
R-squared interquartile range (second stage)	0.350–0.796	0.331–0.728	0.122–0.382	0.271–0.489	0.073–0.327	0.191–0.515
Number of countries	5	7	15	5	7	15

Source: IMF staff calculations.

Note: Robust standard errors in parentheses. The Polity synthetic index measures how democratic a country is. G7 = Canada, France, Germany, Italy, Japan, United Kingdom, United States; LA5 = Brazil, Chile, Colombia, Mexico, Peru; LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; OEM (other emerging markets) = China, Croatia, Egypt, Hungary, India, Indonesia, Morocco, Malaysia, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey; VIX = Chicago Board Options Exchange Volatility Index.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

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