UNDERSTANDING THE SLOWDOWN IN CAPITAL FLOWS TO EMERGING MARKETS

Net capital flows to emerging market economies have slowed since 2010, affecting all regions. This chapter shows that both weaker inflows and stronger outflows have contributed to the slowdown and that much of the decline in inflows can be explained by the narrowing differential in growth prospects between emerging market and advanced economies. The chapter also highlights that the incidence of external debt crises in the ongoing episode has so far been much lower, although the slow-down in net capital inflows has been comparable in breadth and size to the major slowdowns of the 1980s and 1990s. Improved policy frameworks have contributed greatly to this difference. Crucially, more flexible exchange rate regimes have facilitated orderly currency depreciations that have mitigated the effects of the global capital flow cycle on many emerging market economies. Higher levels of foreign asset holdings by emerging market economies, in particular higher levels of foreign reserves, as well as lower shares of external liabilities denominated in foreign currency (that is, less of the so-called original sin) have also been instrumental.

After a peak in 2010, net nonreserve capital inflows into emerging market economies have slowed considerably over the course of the past several years (Figure 2.1).[1] The slowdown in capital flows has occurred against a backdrop of a protracted growth slowdown in emerging market economies and, more recently, the first steps toward a tightening of monetary policy in the United States.

A historical perspective offers cause for concern. Capital inflow slowdowns after sustained expansions have been associated with costly economic crises and linked to turning points in monetary policy in advanced economies (Calvo, Leiderman, and Reinhart 1996; Kaminsky and Reinhart 1999). Moreover, two factors—emerging market economies' increased inte-

The authors of this chapter are Rudolfs Bems (lead author), Luis Catão (lead author), Zsóka Kóczán, Weicheng Lian, and Marcos Poplawski-Ribeiro, with support from Hao Jiang, Yun Liu, and Hong Yang.

[1]Throughout the chapter *net capital inflows* denotes net capital inflows, excluding reserve assets.

gration into global financial markets and higher share in global output—imply that a capital flow downturn that disrupts these economies' investment and growth prospects can also have more powerful international spillovers than in the past.[2]

Against this backdrop, this chapter examines the following questions:

- What are the main characteristics of the recent slow-down in capital flows to emerging markets? Has it been broad based across regions and types of flows? How have exchange rates and the cost of capital evolved?

- How does the recent slowdown compare with past slowdowns in capital flows? Has the composition of flows changed?

- What is driving the recent slowdown? Can changes in emerging market growth prospects, monetary policy in advanced economies, global risk appetite, or decreasing commodity prices explain most or all of the decline?

- Have policy-controlled variables, such as exchange rate flexibility, the level of reserves, and the level of debt, played a significant role? In particular, is there evidence that exchange rate flexibility has provided some insulation from the global capital flow cycle?[3]

[2]In 1980 emerging market economies accounted for 21 percent of world GDP and 27 percent of world trade, both measured in current dollars. By 2014, these shares had risen to 36 percent and 44 percent, respectively.

[3]A well-known theory attributed to Mundell (1963) postulates the existence of a "trilemma" in monetary policy, according to which a country, once it decides to have an open capital account, can independently pursue countercyclical monetary policies only if its exchange rate is flexible. Rey (forthcoming) argues that the insulation power of flexible exchange rates turns out to be very limited in practice and that only capital controls can provide effective insulation from the global financial cycle. As such, policymakers in financially open economies effectively face a dilemma between higher capital controls (which, in principle, lower the benefits of international financial integration) and lower or no capital controls (which then make economies more vulnerable to the global capital flow cycle). Obstfeld (2015) provides evidence, however, that exchange rate flexibility is still instrumental in decoupling short-term interest rates in emerging markets from interest rate changes in global financial centers (notably the United States), thus helping provide some insulation from the global financial cycle.

Figure 2.1. Net Capital Inflows to Emerging Market Economies and Number of Debt Crises, 1980–2015:Q3
(Percent of GDP, unless noted otherwise)

Net capital inflows in emerging markets over the past four decades have exhibited cycles. A slowdown phase of one such cycle has been taking place since 2010. Past net capital inflow slowdowns have been associated with external debt crises.
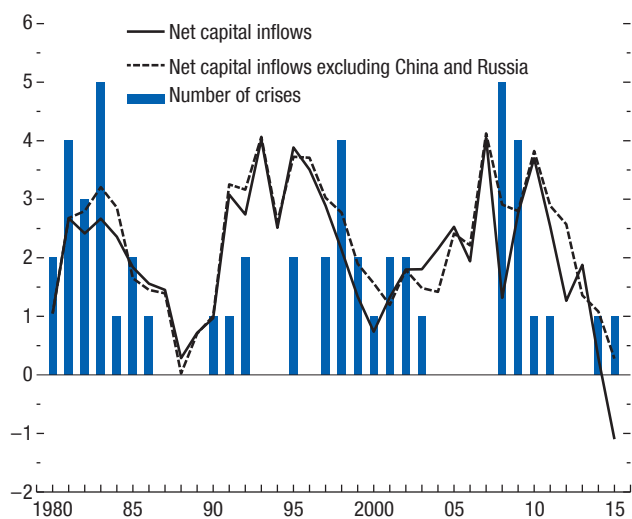
Sources: Catão and Milesi-Ferretti 2014; CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Calculations are based on a sample of 45 emerging market economies. The observation for 2015 refers to the first three quarters of 2015. Data on the number of crises refer to the external crisis variable in Catão and Milesi-Ferretti 2014, updated to the third quarter of 2015. See Annex 2.1 for the complete list of sample countries and external crisis episodes.

The analysis employs a variety of approaches, including accounting decompositions, event analyses, and panel regression methodologies. The models extend the set of possible explanatory variables and data coverage to capture regularities that may be more specific to the recent slowdown.

The chapter's main findings regarding the 2010–15 slowdown in net capital inflows are as follows:

- The slowdown affected three-quarters of the 45 sampled emerging market economies with available data. Both lower inflows and higher outflows contributed to the slowdown in net inflows. Countries that had relatively flexible exchange rate regimes in 2010 experienced large currency depreciations over the period.
- The current slowdown is similar in size and breadth to episodes in the 1980s and 1990s, but the contexts then and now are marked by several key differences:

  ○ Emerging market economies in the current episode have larger holdings of external liabilities and assets, including foreign reserve assets.
  ○ Capital outflows have become increasingly important for the dynamics of net capital inflows.
  ○ Exchange rates are now more flexible, and domestic prices seem better anchored, perhaps partly because of the widespread use of inflation-targeting regimes.

- Diminished prospects for growth in emerging markets relative to advanced economies can explain most of the slowdown in total capital flows to emerging markets since 2010, while national policies affect the cross-country distribution of those flows.
- In particular, flexible exchange rates appear to have helped some emerging markets mitigate the slowdown in capital flows so far by dampening the effects of global factors, as well as the effects of these economies' own slowing growth prospects.
- Swings in capital flows are also smaller in emerging markets with lower public debt, tighter capital controls, and higher foreign exchange reserves.

These findings have significant implications for both outlook and policy. On the positive side, they (1) corroborate that policy frameworks in emerging market economies have improved and (2) highlight these economies' reduced vulnerability due to a combination of much higher central bank reserves and lessened balance sheet exposure to currency risk (that is, less of the so-called original sin).

On the negative side, they point to two additional sources of risk. One is the narrowed growth differentials relative to advanced economies; the other is the dynamics of gross outflows. The narrowed growth differentials, which appear to be connected to much weaker gross capital inflows, may not be reversed anytime soon. Their persistence reinforces the need for prudent fiscal policies (as a diminished supply of external funds raises the cost of borrowing and servicing public debt), currency flexibility, and active reserve management policy as appropriate.

The second risk is more speculative and novel: in recent years, more sizable gross outflows contributed to the slowdown in net inflows, rather than mitigating it. This is because, in contrast to previous episodes, which featured a tight positive comovement between gross capital inflows and gross capital outflows (Broner and others 2013), such comovement has been much looser this time, including some negative comovement

between gross inflows and gross outflows in some countries and during some quarters. Whether this is a long-lasting feature of the dynamics of gross capital flows remains to be seen, but the analysis draws attention to the possibility.

The chapter begins by analyzing capital flow developments, including on the price side, in the context of developments since 2000. Next, it compares the recent slowdown with two similar episodes, one in the early 1980s and the second in the late 1990s, highlighting differences in the structure of external portfolios and exchange rate behavior. It then uses econometric tools to analyze the drivers of the recent slowdown. The chapter's conclusion summarizes the main findings.

Anatomy of the Slowdown in Net Capital Inflows

This section presents detailed statistics on the evolution of net capital inflows and their components for emerging market economies. The presentation focuses on capital flow dynamics in the aftermath of the global financial crisis and puts the findings in the context of the net capital inflow cycles prior to the crisis.[4] The section also looks at the cost of financing, as captured by exchange rates and sovereign yields, which evolve in tandem with capital flows.

Preliminaries

Detailed data sources, as well as the emerging market economy sample and variable definitions as used in this chapter, are presented in Annex 2.1. The country sample consists of 45 emerging market economies. To utilize the most recent balance of payments capital flow data, while at the same time avoiding the large seasonal fluctuations in the quarterly data, this section's findings are based on annual data, combined with data for the first three quarters of 2015.

Definitions of key variables used in this chapter are as follows: *capital inflows* are defined as net acquisition of domestic assets by nonresidents; *capital outflows* are defined as net acquisition of foreign assets by residents, excluding reserve assets; and *net capital inflows* are defined as the difference between capital inflows and

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[4]Comparable statistics for the evolution of capital flows in low-income developing countries are discussed in Box 2.1. Results for low-income developing countries reveal notably different capital flow dynamics, with increasing net capital inflows until 2013 and a sharp reversal thereafter.

outflows. Net capital inflows and changes in reserve assets together constitute the *financial account balance*, as defined in the IMF's *Balance of Payments Manual*.

Capital Flows

Net capital inflows to emerging market economies have shown a sizable decline since 2010 (Figure 2.2). A decline of comparable magnitude is present in all quartiles of the 45-country sample, as well as for the weighted mean of capital inflows.[5] The behavior of the weighted mean is similar regardless of whether it includes China and Russia, but with those two countries included, the measure declines more sharply in 2014–15.[6]

The overall size of the 2010–15 slowdown, measured as the change in net capital inflows between 2010 and the year ending in the third quarter of 2015 (that is, from the fourth quarter of 2014 through the third quarter of 2015), was $1.123 trillion for the full sample of 45 emerging market economies and $448 billion when China and Russia are excluded. Expressed relative to economic activity, the aggregate decline in net capital inflows was 4.9 percent of the sample's GDP—reflecting that the weighted mean of net capital inflows swung from an inflow of 3.7 percent of GDP in 2010 to an outflow of 1.2 percent during the most recent four quarters (the fourth quarter of 2014 through the third quarter of 2015). The slowdown occurred in three-quarters of the 45 emerging market economies.[7] Net inflows in the third quarter of 2015 were particularly weak, and preliminary data suggest that the weakness continued in the fourth quarter.

To document the role of key capital flow components in the 2010–15 slowdown, the analysis next decomposes net capital inflows by direction of flow, type of flow, and recipient region. Starting with the direction of flow, the results show that, over the entire 2010–15 period, the slowdown is explained

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[5]The *weighted mean of capital flows* is defined throughout the chapter as the GDP-weighted mean of the capital-flow-to-GDP ratio, which is equivalent to the sum of capital inflows divided by the sum of GDP for the countries in the sample.
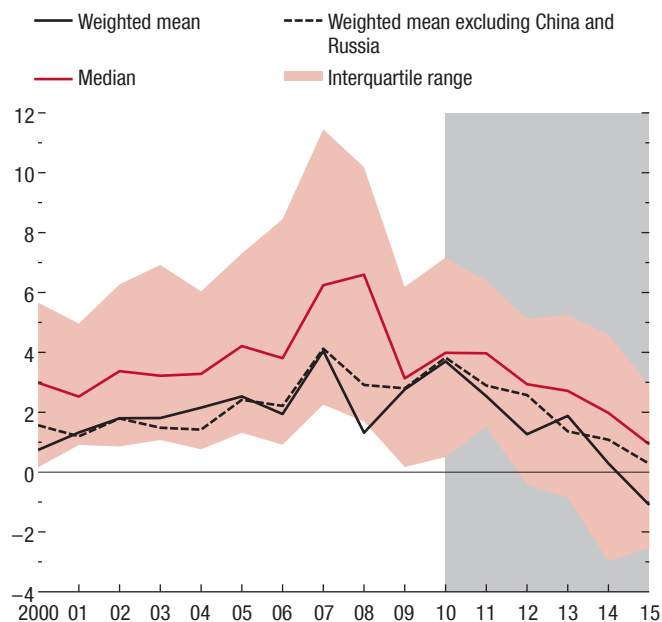
[6]China is singled out because of its large size relative to other sample countries, Russia because of the sanctions imposed since 2014.

[7]The chapter's sample of 45 countries leaves out several large fuel exporters, such as Algeria, Angola, Kuwait, Nigeria, and Qatar, whose capital flow data do not cover the entire 2000–15 period, but are available more recently. In contrast to most of the countries in the main sample, these fuel exporters exhibited net capital outflows during 2011–15, although, with lower oil prices and trade balances, such net outflows diminished over time.

Figure 2.2. Net Capital Inflows to Emerging Market Economies, 2000–15:Q3
(Percent of GDP)

Net capital inflows to emerging market economies have shown a persistent and sizable decline since 2010.
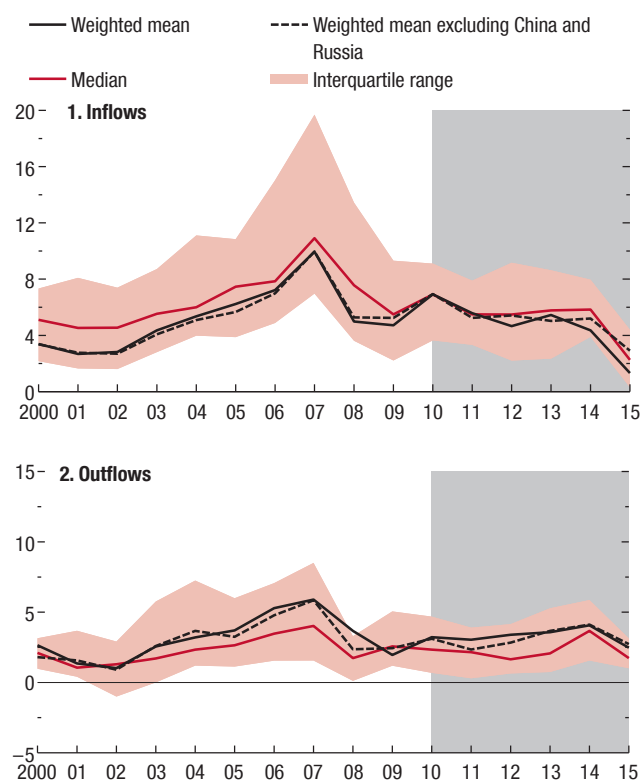

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Balanced sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample countries. The observation for 2015 refers to the first three quarters.

Figure 2.3. Capital Inflows and Outflows for Emerging Market Economies, 2000–15:Q3
(Percent of GDP)

A fall in gross capital inflows explains the net capital inflow slowdown over the entire 2010–15 period. At the same time, a rise in gross capital outflows was the main contributor to the slowdown during 2012–14.

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Balanced sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample countries. The observation for 2015 refers to the first three quarters.

by a fall in inflows (Figure 2.3). At the same time, the decomposition reveals that, behind the sustained decline in net capital inflows, the contributions from inflows and from outflows vary sizably over time. A rise in outflows was the main driver of the slowdown during 2012–14, whereas a decline in inflows was the chief contributor in 2011 and even more so in the first three quarters of 2015. During the latter episode, capital outflows fell as well, mitigating the slowdown in net inflows. Hence, a focus on the flows in only one direction will bias the dating of the slowdown. For example, if only gross inflows are considered, an uninterrupted slowdown starts in 2014 and accelerates in 2015.

The 2010–15 slowdown reflects some combination of a decline in inflows and a rise in outflows for all four asset types shown in the balance of payments data: foreign direct investment (FDI), portfolio equity, portfolio debt, and "other investments" (including

bank flows), although the rise in outflows was reversed in 2015. The decline in inflows, which appears in both the weighted-mean and median measures (Figure 2.4, panels 1–4), is somewhat more pronounced for debt-generating inflows than for equity-like[8] inflows (including FDI).[9]

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[8]*Equity-like inflows* are defined as FDI and portfolio equity inflows.
[9]Several recent papers focus on the composition of gross capital flows. Cerutti, Claessens, and Puy (2015) find significant heterogeneity in gross inflows across asset types, with bank-related and portfolio flows comoving more strongly across countries than other types of flows. These authors also find that the role of global push factors varies by the type of flow. Blanchard and others (forthcoming) differ-

Figure 2.4 also highlights distinct time profiles for the four asset types. FDI and "other investment"—the two largest gross inflow components—exhibit marked declines relative to the peaks attained before the global financial crisis, with the decline for "other investment" being driven by the retrenchment of global banks following the crisis. In contrast, portfolio debt inflows increased considerably compared with the trough of the crisis, peaking in 2010–12 and declining thereafter.[10] Last, as revealed by the median in panel 2 of Figure 2.4, portfolio equity inflows remained negligible throughout the 2000–15 period for the majority of the sample. This comparison of inflows by type highlights an important point: that the surge in portfolio inflows after the global financial crisis was not matched by a surge in aggregate gross inflows, which remained below the peak reached in 2007 (Figure 2.3, panel 1).
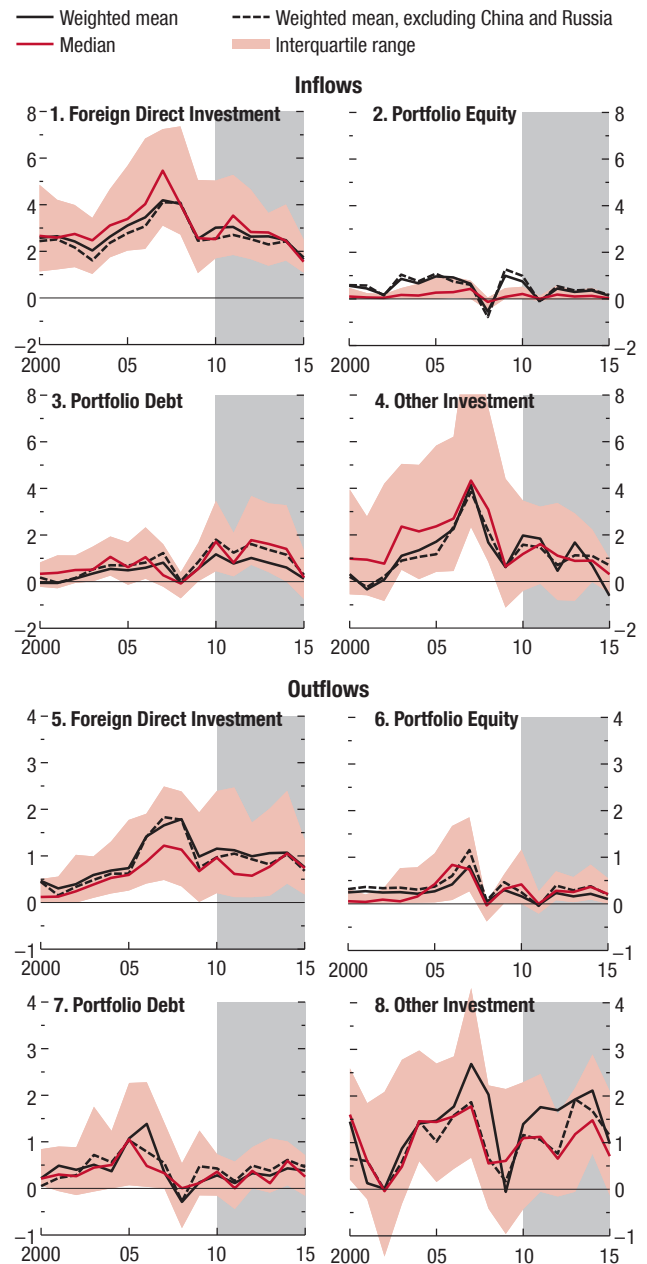
As in the case of inflows, all asset types contribute to the increase in capital outflows during 2010–14, but with more pronounced contributions for debt-generating flows than for equity-like flows (Figure 2.4, panels 5–8). During 2015, outflows for all asset types contracted. Similar to inflows, FDI and "other investment" were the largest components of outflows. The surge in portfolio debt inflows following the global financial crisis was not coupled with a similar pickup in portfolio debt outflows (panels 3 and 7).

The slowdown in net capital inflows has been broad based across regions (Figure 2.5). Further results (not shown here to save space) also reveal that both commodity exporters and non–commodity exporters exhibited a similar slowdown.

Yet there have been significant interregional differences in the slowdown. It has been more pronounced and persistent in eastern Europe, while in Latin America and "other emerging markets" it was concentrated in 2014–15 (Figure 2.5, panels 1, 3, and 4). These differences reflect both the composition of capital flows (notably the sharper decline in bank-based flows in eastern Europe following large inflows before the global financial crisis) and, as documented later in the chapter, greater exchange rate flexibility in Latin America, which appears to have mitigated the slowdown. One can also note sizable differences in the average

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entiate between bond and nonbond capital inflows and find the two types of flows to have a different impact on the economy.

[10]The surge and heightened volatility in emerging markets' portfolio inflows during 2009–13 and their possible implications have been studied in detail by Sahay and others (2014) as well as in Chapter 3 of the October 2015 *Global Financial Stability Report*.

Figure 2.4. Capital Inflows and Outflows for Emerging Market Economies by Asset Type, 2000–15:Q3
(Percent of GDP)

There was a broad-based decrease in gross capital inflows across asset types during the 2010–15 slowdown. At the same time, gross outflows across all asset types increased, except for the sharp reversal in 2015. Changes in gross capital inflows and outflows were more pronounced for debt-generating flows than for equity-like flows.
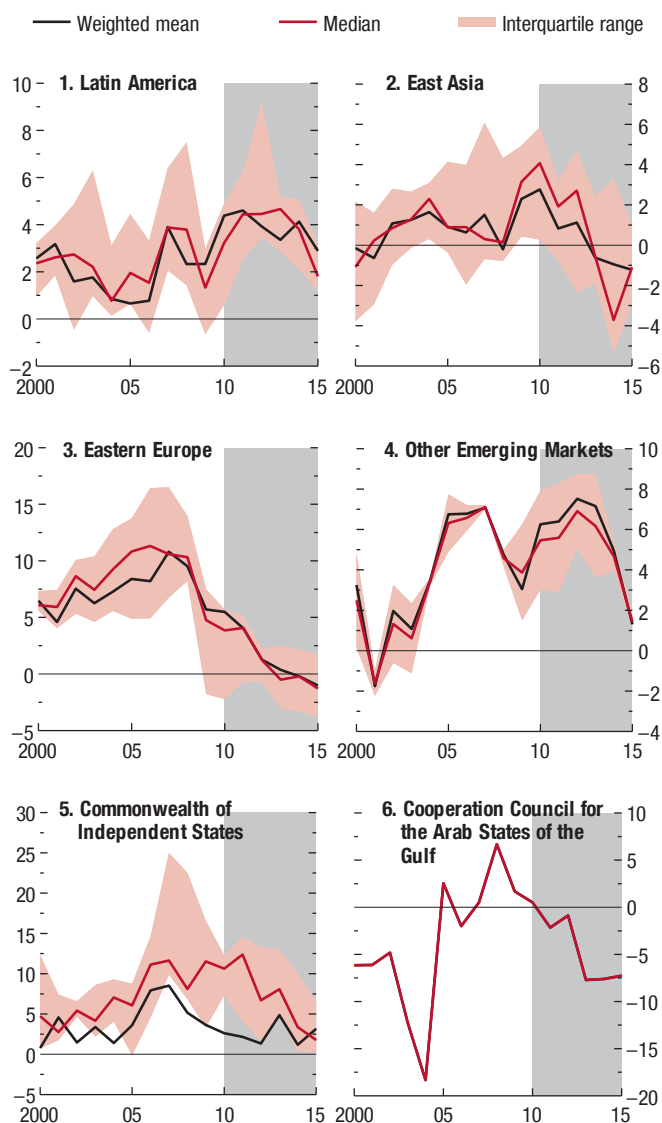

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Balanced sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample countries. The observation for 2015 refers to the first three quarters.

Figure 2.5. Net Capital Inflows by Region, 2000–15:Q3
(Percent of GDP)

The 2010–15 slowdown in net capital inflows was broad based across regions.

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Balanced sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample countries. The observation for 2015 refers to the first three quarters.

level of net capital inflows by region. In net terms, capital has been flowing out of east Asia,[11] member states of the Cooperation Council for the Arab States

[11]Throughout the chapter, *east Asia* is used to denote a region that includes both east and south Asian economies. See Annex 2.1 for details.

of the Gulf,[12] and eastern Europe (Figure 2.5, panels 2, 3, and 6). Meanwhile, Latin America, the Commonwealth of Independent States, and "other emerging markets" have continued to receive inflows (Figure 2.5, panels 1, 4, and 5).

The discussion of capital flows so far has excluded the change in foreign reserve assets, which in this chapter is treated as a separate component of the financial account. The behavior of foreign reserve assets in emerging markets shows a striking similarity to the 2010–15 slowdown in net capital inflows (Figure 2.6). After peaking in 2007, the pace of accumulation of foreign reserve assets gradually slowed, and in the first three quarters of 2015, reserves in the median emerging market economy were reduced by 0.03 percent of GDP.[13] To the extent that the 2010–15 slowdown in net capital inflows was matched by a deceleration in the pace at which reserve assets were built up, the adjustment to the slowdown took place within the balance of payments financial account and, hence, did not require an accompanying adjustment in the current account. This observation is explored in more detail in a later section.

How robust is the preceding interpretation of recent capital flow developments in emerging markets? Several tests suggest the findings are not sensitive to a range of potential measurement issues. First, results pertaining to the 2010–15 slowdown remain broadly unchanged if constant exchange rates are used. In some emerging markets, exchange rates have depreciated sizably against the dollar. The depreciation has driven down the value of emerging market economies' GDPs measured in dollar terms and could, therefore, have increased the measured capital-flow-to-GDP ratio. The calculations show that using current exchange rates generates an upward bias in the ratio of capital flows to GDP but has a limited quantitative impact on this chapter's capital flow statistics.

Second, the documented findings are robust to using alternative samples. The results in Figures 2.2–2.6 remain broadly similar if the full sample (which includes 45 countries) is replaced with a subset consisting of the 20 largest emerging market economies. The findings in Figure 2.4 are not sensitive to the balanced-sample

[12]Among the member states of the Cooperation Council for the Arab States of the Gulf, full 2000–15 sample coverage is available only for Saudi Arabia.

[13]The pattern of a decline in net reserve asset accumulation is considerably more pronounced when Russia and, especially, China are included in the sample; both countries witnessed a reduction in their reserves in the first half of 2015.

Figure 2.6. Net Reserve Assets of Emerging Market Economies, 2000–15:Q3
(Percent of GDP)

The pace of reserve accumulation decreased in tandem with the slowdown in net capital inflows.
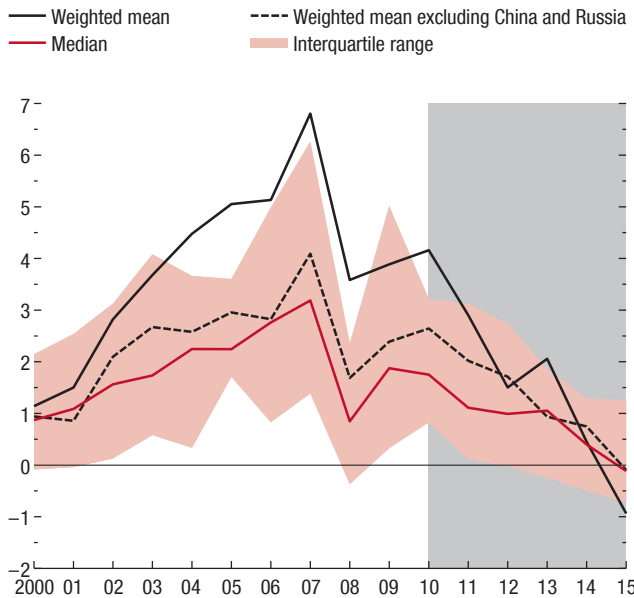
Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Balanced sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample countries. The observation for 2015 refers to the first three quarters.

Figure 2.7. Exchange Rates of Emerging Market Economies, 2010–15:Q3
(Percent change)

Exchange rates of emerging market economies depreciated against the dollar in recent years. The depreciation was particularly pronounced in 2015.

Sources: IMF, Information Notice System; IMF, International Financial Statistics database; and IMF staff calculations.
Note: Balanced sample of 40 emerging market economies. See Annex 2.1 for the complete list of sample countries. Economic and Monetary Union members—Estonia, Latvia, Lithuania, the Slovak Republic, and Slovenia—are excluded from the sample.
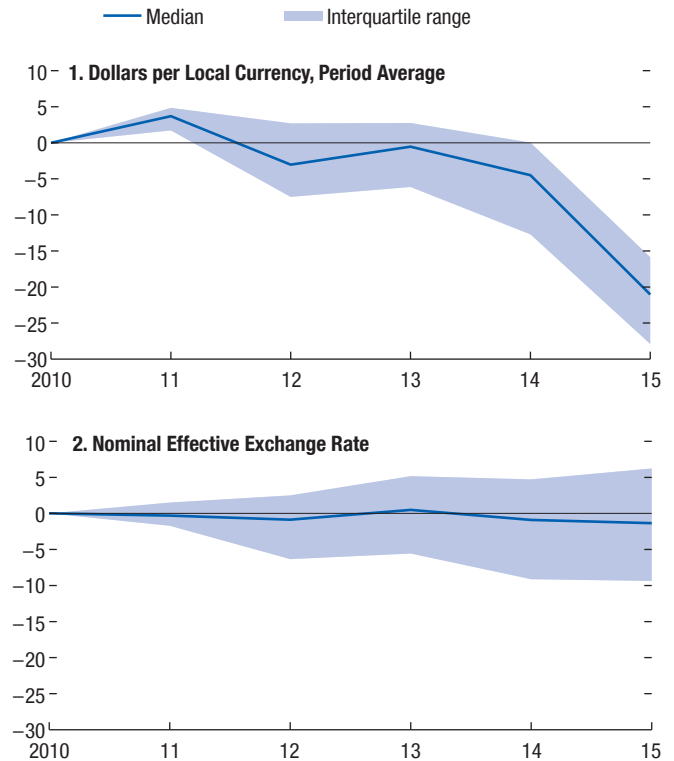
assumption and remain broadly unchanged if unbalanced data are used instead. Also, the results are robust to the exclusion of China and Russia from the full sample. The latter finding can be seen in Figures 2.2–2.5 by comparing the weighted mean for the full sample of 45 countries with the weighted mean that excludes China and Russia. While China is a dominant emerging market in terms of the size of both its GDP and its capital flows, its capital flows as a share of its GDP are broadly in line with those of other emerging markets. However, China's international reserves are well above the average for other emerging markets, both in level terms and in terms of the average pace of accumulation over 2000–15 as well.

Exchange Rates and the Cost of Capital

The exchange rates of emerging market economies, taken as a group, depreciated notably, particularly with

respect to the dollar, during the 2010–15 slowdown, with the bulk of the adjustment taking place in 2014–15 (Figure 2.7, panel 1). The currency depreciations were considerably less pronounced in effective terms (Figure 2.7, panel 2), as most currencies depreciated against the dollar over the same period.[14]

However, there was considerable cross-country heterogeneity in exchange rate behavior over the period (Figure 2.8). The exchange rates of several large emerging market economies, including Brazil, South Africa, and Turkey, depreciated by about 40 percent in nomi-

[14]For a discussion of the dollar cycle see the IMF's *2015 Spillover Report* (IMF 2015b).

Figure 2.8. Net Capital Inflow Slowdown and Exchange Rate Changes, 2010–15:Q3

Currency depreciation and the decline in net capital inflows exhibit no systematic association. Yet among the largest emerging markets, such as Brazil, China, and India, the association appears to be negative.

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; IMF, Information Notice System; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Changes in nominal effective exchange rate and in net capital inflows are defined as the difference between 2010 and the first three quarters of 2015. Economic and Monetary Union members—Estonia, Latvia, Lithuania, the Slovak Republic, and Slovenia—are excluded from the sample. Argentina, Belarus, 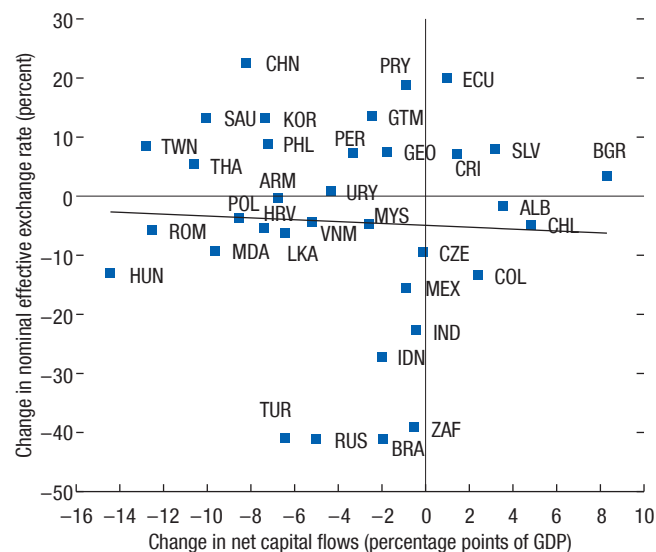Kazakhstan, and Ukraine are excluded as outliers. Data labels in the figure use International Organization for Standardization (ISO) country codes.

nal effective terms during 2010–15. At the same time, nominal effective exchange rates appreciated in more than two-fifths of the emerging market economies in the sample, including in China, Korea, the Philippines, and Thailand.

For the cross section of the sample's emerging market economies there is no systematic correlation (–0.04) between the slowdown in net capital inflows and changes in nominal effective exchange rates. However, countries with the largest depreciations (20 percent or more) on average saw a smaller slowdown (2.3 percent of GDP) than did the rest of the sample (4.5 percent of GDP).[15] At the same time, several key emerging market economies with large nominal

[15]The group of countries with the largest depreciations includes Brazil, India, Indonesia, South Africa, and Turkey but excludes Russia, given that Russia's capital flows were affected by an idiosyncratic factor (international sanctions).

effective exchange rate appreciations had above-average slowdowns. China is the leading case among such economies, with the sample's largest exchange rate appreciation in nominal effective terms (22.5 percent) and an above-average fall in net capital inflows (8.2 percent of GDP). This evidence suggests that flexible exchange rates might have mitigated the slowdown in net capital inflows.

The overall cost of borrowing in emerging market economies is well below levels observed prior to the global financial crisis. The main contributor to the historically low level of borrowing costs is the declining trend in bond yields in advanced economies over the past two decades. For example, 10-year U.S. Treasury bond yields decreased from 640 basis points to 200 basis points between 2000 and 2015. Over the same period, emerging market sovereign spreads—as captured by the J.P. Morgan Emerging Market Bond Index—decreased for the median country by 170 basis points (Figure 2.9, panel 1).

However, sovereign spreads have increased in recent quarters. The fall in net capital flows during the 2010–15 slowdown was associated with rising sovereign spreads in emerging market economies (Figure 2.9, panel 2). At the same time, countries with larger depreciations in nominal effective exchange rates faced higher spreads (Figure 2.9, panel 3).

Historical Comparisons: What Is Different This Time?

To put the 2010–15 slowdown in historical perspective, this section compares it with two similar past episodes (in the early 1980s and late 1990s) and examines shifts in the structural characteristics and policies of emerging market economies in the intervening years.

The three major capital flow slowdown episodes, as measured from the peak to the bottom of the ratio of total net capital inflows to GDP, are 1981–88, 1995–2000, and 2010 through the third quarter of 2015 (Figure 2.10).[16] The first of these episodes covers the

[16]A strand of research starting in the 1990s focuses on unexpected and abrupt reversals in net capital flows—the so-called sudden stops (see Dornbusch and others 1994 and Calvo 1998). Subsequently assembled historical evidence shows that boom-bust cycles in cross-border capital flows are not new: capital flows displayed long-lasting swings of up to several percentage points of GDP in the first globalization period, which started in the late nineteenth century and ended with the Great Depression of the 1930s (see Catão 2007; Bordo and Haubrich 2010; Reinhart and Rogoff 2011; and Accominotti and Eichengreen, forthcoming).

Figure 2.9. Cost of Financing, Sovereign Spreads, and Capital Flows in Emerging Market Economies

The cost of financing, defined as the sum of the 10-year U.S. Treasury bond yield and EMBI spreads, remains well below historical peaks, but has increased in recent quarters. Recent increases in sovereign spreads are positively associated with (1) net capital inflow slowdowns and (2) exchange rate depreciations.

1. Cost of Financing and Sovereign Spreads (2000–15:Q3)

2. EMBI versus Capital Inflows (2010–15:Q3)
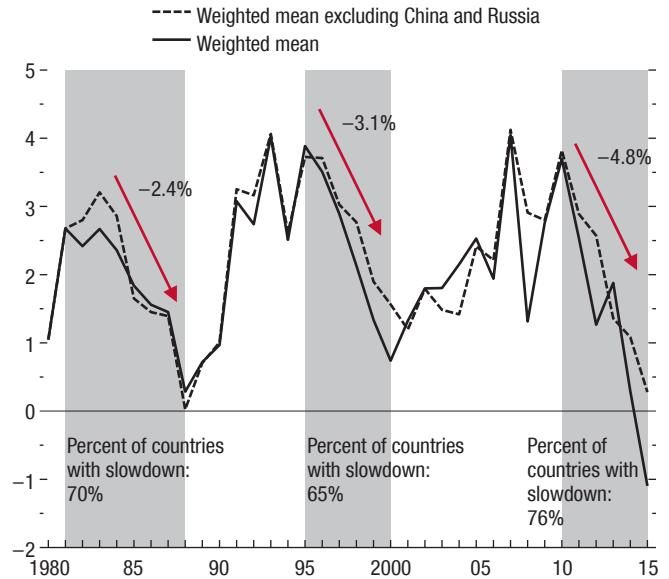
3. EMBI versus NEER (2010–15:Q3)
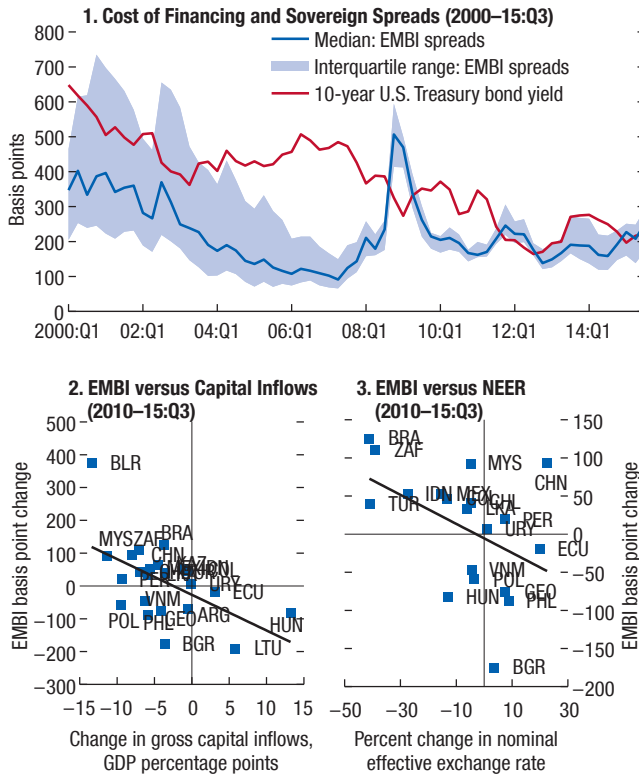
Sources: Bloomberg L.P.; CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: See Annex 2.1 for the complete list of sample countries included in each panel. EMBI = J.P. Morgan Emerging Market Bond Index; NEER = nominal effective exchange rate. Data labels in the figure use International Organization for Standardization (ISO) country codes.

Figure 2.10. Three Major Net Capital Inflow Slowdown Episodes
(Percent of GDP)

The recent net capital inflow slowdown episode was similar to previous episodes in terms of the magnitude and breadth of the slowdown.

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Calculations are based on a sample of 45 emerging market economies. The observation for 2015 refers to the first three quarters. See Annex 2.1 for the complete list of sample countries.

Changing Structure of External Portfolios

Capital flows to and from emerging market economies affect those economies' external portfolios, and the external portfolio structures, in turn, affect capital flows. After each of the previous two slowdowns, emerging market economies saw a surge in cross-border capital flows; as a result, over time they accumulated external assets and liabilities and became increasingly integrated into global financial markets. This has meant more asset trade with other countries, especially with advanced economies, but potentially also more cross-border spillovers.[18]

Between 1980 and 2014, external equity liabilities of emerging market economies surged, from below 10

developing country debt crisis of the 1980s, while the second one overlaps with the Asian crisis of 1997–98 and other major emerging market crises. All three episodes were preceded by a prolonged surge in capital inflows, and all three are similar both in the aggregate size of the slowdown (ranging from 2.4 percent to 4.8 percent) and in the fraction of the economies with declining ratios of net capital inflows to GDP (65 percent to 76 percent).[17]

[17]In terms of the aggregate size of the slowdown, the 2010–15 episode is more comparable with earlier episodes when China is excluded from the sample, decreasing the size of the slowdown from –4.8 percent to –3.3 percent of GDP.

[18]The IMF's Coordinated Portfolio Investment Survey shows that advanced economies are the main source of, and destination for, the increased capital flows involving emerging market economies. Flows among emerging market economies have also increased, but from a low base.

Figure 2.11. External Balance Sheets of Emerging Market Economies, 1980–2014
(Percent of GDP)

Emerging market economies are increasingly integrated into global financial markets. The increase in the external liabilities of these economies has been mostly driven by equity liabilities, while on the external asset side, both equity and debt assets have contributed. Growth in reserve assets has broadly kept pace with nonreserve assets and has been particularly pronounced in east Asia.
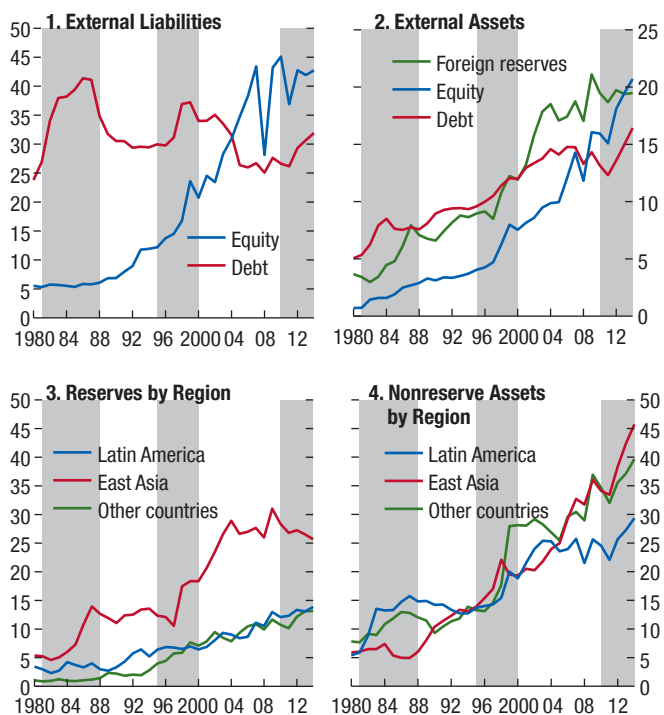
Sources: External Wealth of Nations Mark II database; and IMF staff calculations.
Note: Balanced sample of 22 countries from the full sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample countries. All variables are GDP weighted.

percent of GDP to more than 40 percent of GDP,[19] while external debt liabilities remained broadly trendless (Figure 2.11, panel 1).[20] On the external asset side, both equity and debt assets as a share of GDP rose over the period, from about 5 percent to almost 40 percent in 2014.[21]

In the three decades leading up to 2009, the increase in the ratio of foreign reserves to GDP largely kept pace with the rise in the rest of external portfolio assets (Figure 2.11, panel 2). The increase in foreign reserves was most pronounced in east Asia, especially after the Asian crisis of 1997–98 (Figure 2.11, panel 3), whereas the increase in the stock of nonreserve assets was more uniform across regions (Figure 2.11, panel 4).[22]

These structural changes in external portfolios have several immediate and important implications for the episodes of slowdowns in net capital inflows, which are discussed next.

Increasing Role of Capital Outflows

The flip side of the increasing external assets of emerging markets is that gross capital outflows have gradually increased in size and are playing an increasingly important role in net capital flow dynamics. One way to see this is by comparing the contributions of capital inflows and outflows to the three slowdown episodes shown in Figure 2.12. In the 1980s, the slowdown was driven entirely by a decline in capital inflows. The same explanation broadly holds for the 1995–2000 slowdown episode. In contrast, capital outflows are contributing sizably to the most recent emerging market capital flow cycle.[23]

The growing role for capital outflows can at least partly be linked to income growth and the accompanying increase in outward FDI from emerging markets, as well as to institutional shifts, such as the emergence of pension funds and sovereign wealth funds. These developments open a possibility for gross outflows to play a role in the dynamics of net capital flows for emerging market economies. Chapter 4 of the October 2013 *World Economic Outlook* argues that emerging markets can improve their capital flow management through development of their financial markets, which fosters private sector outflows that can help stabilize net capital flows. Indeed, the overall strong positive correlation between capital inflows and outflows in emerging markets over 2000–10, shown in Figure 2.12, supports the

[19]This finding is documented by Lane and Milesi-Ferretti (2007).
[20]Within debt liabilities, the share of portfolio debt in external debt liabilities rose from about 30 percent in 2008 to more than 40 percent in 2014. In the aggregate, the increase in portfolio debt is largely offset by a decline in banks' debt liabilities, reflecting the postcrisis deleveraging of global banks.
[21]Avdjiev, Chui, and Shin (2014) show that the split of assets into equity and debt is not clear-cut, as much of FDI is actually not equity, but intrafirm debt.

[22]For a comparative discussion on the links between capital flows and trends in reserve accumulation in emerging markets and advanced economies, see Choi, Sharma, and Strömqvist 2009.
[23]A significant part of the increased importance of gross capital outflows likely reflects improvements in the measurement of capital outflows over time. A number of studies (see, for example, Claessens and Naude 1993) argue that data for 1980–90 were marked by a severe underreporting of outflows, as capital flight was not captured in the balance of payments statistics.

Figure 2.12. Gross Capital Inflows and Outflows of Emerging Market Economies, 1980–2014
(Percent of GDP)

Gross capital inflows played a dominant role in net capital inflow slowdown episodes in the 1980s and 1990s. However, the role of gross capital outflows increased in the 2010–15 slowdown.
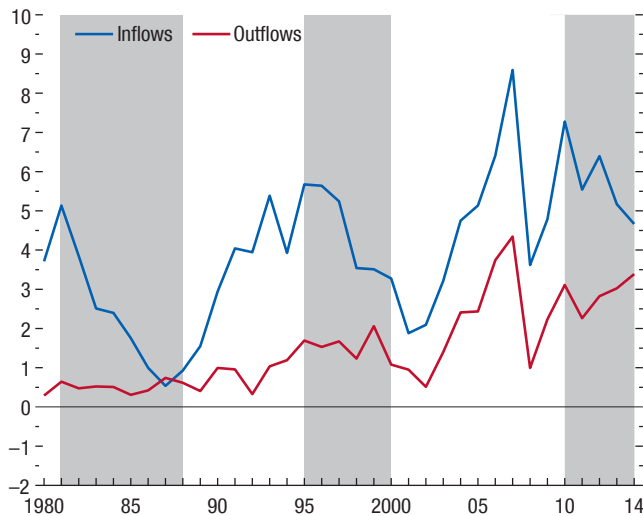
Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Balanced sample of 22 economies from the full sample of 45 emerging market economies. See Annex 2.1 for a complete list of the sample countries.

Figure 2.13. Net External Debt Liabilities of Emerging Market Economies, 1980–2014
(Percent of GDP)

Overall, emerging markets' currency mismatches, as proxied by net external debt liabilities, have declined considerably over the past three decades. An increase in both external nonreserve assets and reserve assets has contributed to the decline.

Sources: External Wealth of Nations Mark II database; and IMF staff calculations.
Note: Balanced sample of 22 economies from the full sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample countries. All variables are GDP weighted.
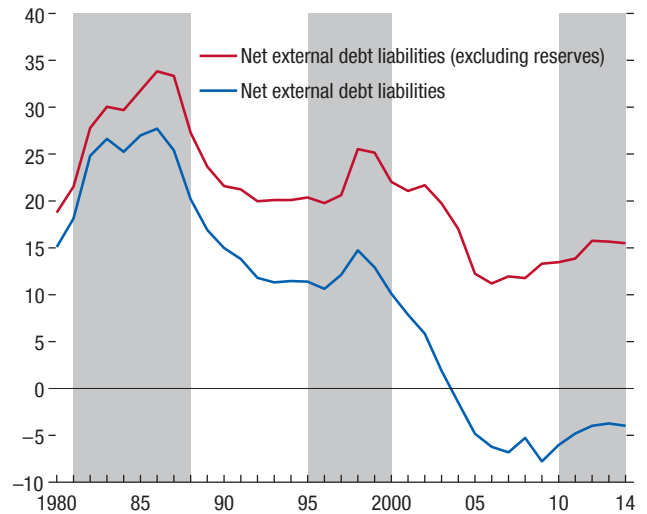
notion that outflows played the role of a buffer during that period. Yet over 2012–14, outflows exacerbated the decline in net inflows, suggesting that a potentially destabilizing role cannot be ruled out.

Decline in Currency Mismatches

A large literature has documented the propensity of emerging markets to acquire foreign-currency debt liabilities and the attendant risks of doing so, stemming mainly from adverse balance sheet effects in case of a currency devaluation. Indeed, as discussed later, almost the entire stock of emerging market debt until the early 2000s was denominated in foreign currencies. By increasing their holdings of external assets by more than the increase in their external debt liabilities, emerging market economies as a whole have therefore considerably reduced the currency mismatch in their overall net external portfolios. When only external debt assets are considered, the overall improvement in the

net external position since the 1980s is about 20 percent of emerging market GDP. When foreign reserve assets are added, the decline in the net external position goes up to 30 percent of GDP (Figure 2.13).[24] The improvement is even more remarkable if external portfolio equity assets and the stock of FDI abroad are taken into account.

A second and more direct force reducing the currency mismatch has been the rise of debt liabilities denominated in domestic currency. The "original sin" of emerging market economies—the propensity to issue debt denominated in foreign currency (documented by Eichengreen and Hausmann 1998 and Eichengreen, Hausmann, and Panizza 2002)—has been substantially alleviated in both international and domestic markets.

The domestic-currency share of outstanding government debt rose substantially between 1995 and

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[24]These trends in emerging market currency exposures have been documented in more detail by Lane and Shambaugh (2010) and Benetrix, Shambaugh, and Lane (2015).

Figure 2.14. Outstanding Debt of Emerging Market Economies Denominated in Domestic Currency, 1995–2015
(Percent of total)

Since 1995 both the government and the private sector in emerging market economies have increasingly been able to issue domestic-currency-denominated debt, which has further contributed to the reduction in currency mismatches.
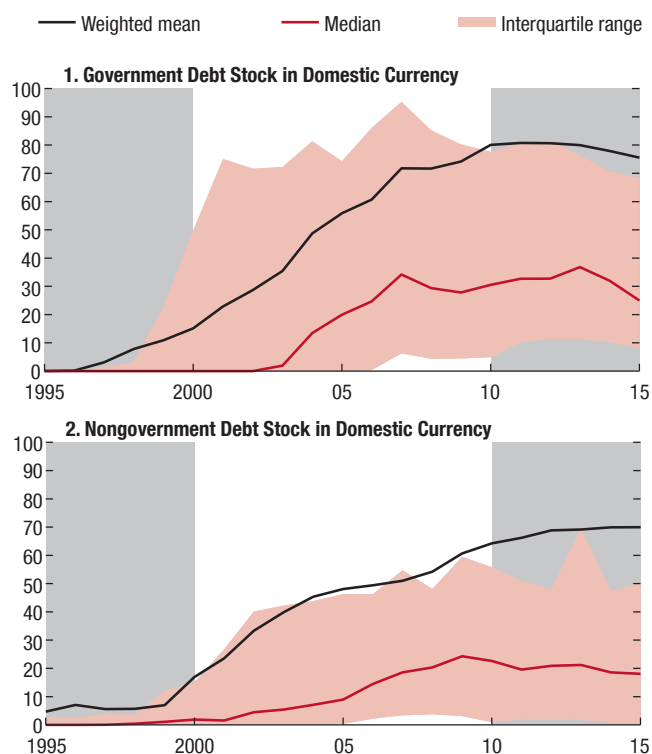
Sources: IMF, Vulnerability Exercise Securities Database; and IMF staff calculations.
Note: Calculations for government and private sectors are based on a balanced sample of 43 and 42 economies, respectively, within the 45 economies in the sample. See Annex 2.1 for the complete list of sample countries.

2010 (Figure 2.14, panel 1). Given the finding that the share of total government debt held by nonresidents was stable between 2004 and 2012 (Arslanalp and Tsuda 2014), the decline in original sin in public debt appears to have occurred both domestically and internationally. Original sin also declined in the nongovernment sector (Figure 2.14, panel 2). The much stronger increases for the weighted average share issued in domestic currency than for the median share suggest that original sin declined more in larger emerging market economies.

Despite the documented decline in currency mismatches, substantial vulnerabilities related to exchange rate movements remain. First, the net external debt position shown in Figure 2.13 abstracts from differences in maturity and liquidity of assets and liabilities

as well as from sectoral mismatches within economies. Second, as documented in Chapter 3 of the October 2015 *Global Financial Stability Report*, the stock of emerging market corporate debt has grown substantially over the past decade, even as the share of foreign-currency-denominated debt in total debt has declined. Finally, the majority of indicators of foreign-currency mismatches in Figures 2.13 and 2.14 peaked prior to 2010 and have remained stable or declined since.[25]

Shifts in Policy

Under the balance of payments identity, the sum of net nonreserve capital inflows and the current account balance equals the change in foreign reserves.[26] Hence, slowdowns in net nonreserve capital inflows are countered by some combination of a slower accumulation (or a faster decumulation) of foreign reserves and a higher current account balance. The three components of the identity are jointly determined. For example, during the years leading up to the global financial crisis, many commodity-exporting emerging market economies received strong capital inflows amid rising investment opportunities and accumulated reserves, with strong terms-of-trade gains offsetting the impact of rapid import growth on the current account. With the decline in commodity prices and more subdued growth prospects from 2011 onward, the process began to reverse. The following analysis uses the balance of payments identity as a guiding framework and discusses three relevant dimensions of the macro adjustment across episodes: exchange rates, foreign reserves, and the current account.

Foreign Reserves as a Buffer

Relative to previous slowdown episodes, in 2010–15 reserves played an important buffer role. To document this, based on the balance of payments identity, this subsection examines the extent to which the recent slowdown in emerging market net capital inflows has been countered by an increase in the current account balance—with potentially negative consequences for

[25]Only a part of the decline can be attributed to recent exchange rate depreciations in emerging markets.

[26]Two other items in the identity, typically small, are the capital account balance and errors and omissions. Here these terms are included in capital flows. Inclusion of errors and omissions in capital flows improves the measurement of changes in the current account and foreign reserves.

Table 2.1. Foreign Reserves and the Current Account in Balance of Payments Adjustments
(Dollars per dollar change in net capital inflows)

	Δ Net Nonreserve Inflows + Δ Current Account Balance + Δ Change in Reserves = 0		
Episode	Δ Net Nonreserve Inflows	Δ Current Account Balance	Δ Change in Reserves
1995–2000 Net Capital Inflow Slowdown	−1	**0.88**	0.12
2001–07 Net Capital Inflow Surge	1	0.11	**−1.11**
2010–15 Net Capital Inflow Slowdown	−1	0.07	**0.93**
Memorandum			
2013–15 Net Capital Inflow Slowdown	−1	0.18	**0.82**
2013–15 Net Capital Inflow Slowdown Excluding China	−1	0.30	**0.70**

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Δ denotes "change." A positive value of Δ change in reserves is defined as a decrease in the rate of increase of the stock of reserves. See Annex 2.1 for the complete list of sample countries. Net nonreserve inflows include errors and omissions and the capital account. The 2015 numbers refer to the first three quarters, annualized through a multiplier of 4/3.

domestic activity—or by a decrease in the pace of foreign reserve accumulation (or, alternatively, an increase in the pace of reserve decumulation, depending on whether at the start of the slowdown episode reserves were accumulated or decumulated).

Table 2.1 shows that for emerging markets as a whole, for each dollar decline in net capital inflows from 2010 through the third quarter of 2015, the current account balance increased by only 7 cents, while 93 cents came from the change in the pace of reserve accumulation. This change in pace reflects the fact that, while in 2010 the sample emerging markets as a group were accumulating foreign reserves, by 2015 the accumulation had stopped, and some countries are now decumulating foreign reserves (Figure 2.6). In contrast, during 1995–2000 the main counterpart to the capital inflow slowdown was an increase in current account balances amid a typically lower level of reserves.

As noted earlier, changes in net inflows and reserve accumulation during this period were substantial—close to 5 percent of countries' GDP. Most of the decline occurred from 2013 onward, a period during which China accounted for more than 80 percent of the change in net capital inflows and reserves. During this more recent period, the share of adjustment coming from the current account was higher in the overall sample, at 18 cents. The number is even higher once China is excluded, at 30 cents.

Table 2.1 also shows that during the capital flow surge episode of 2001–07, reserves played the role of a buffer. In fact, as a group, sample emerging markets even had an increase in current account balances (in some instances reflecting improved terms of trade), and the increased pace of reserve accumulation more than offset the surge in net capital inflows. One implica-

tion of this increased pace of reserve accumulation is that only in 2015 did emerging markets start to run down the liquidity buffers they had accumulated during the capital inflow boom episode that preceded the global financial crisis. During the 2010–14 period of the current slowdown, reserves continued to be accumulated, albeit at a decreasing pace (Figure 2.15). Furthermore, while in the initial years of the 2010–15 slowdown, the current account balances of emerging markets decreased—so that the decrease in the pace of reserve accumulation more than compensated for the slowdown in net capital inflows—during 2014–15, the current account balances increased, thus countering part of the slowdown.

The fact that reserve accumulation slowed down in tandem with diminished capital inflows (or turned into reserve losses in some countries seeing outflows) also has a positive side: by facilitating the repayment of residents' foreign-currency liabilities, the sale of foreign assets could reduce balance sheet fragilities and curtail the risk of default in the event that a currency depreciation eventually occurs. With strengthened domestic balance sheets, a currency depreciation can play its traditional role in switching demand toward domestic production and thus smooth the adjustment of output. Indeed, currency depreciation in 2014–15 coincides with the increase in the current account balance over the same period (Figure 2.15).

Increased Exchange Rate Flexibility and More Orderly Currency Depreciations

Flexible exchange rates cushion economic shocks and thus reduce the required amount of adjustment in capital flows. The main reason is that an immediate currency depreciation following an adverse shock raises

Figure 2.15. Net Capital Outflows and the Current Account during the 2010–15 Slowdown
(Percent of GDP)

Despite the slowdown in net capital inflows, emerging markets continued to accumulate foreign reserves until 2015, albeit at a decreasing pace. Meanwhile, the current account balance, after a prolonged decline, increased in 2014–15, countering part of the net capital inflow slowdown.
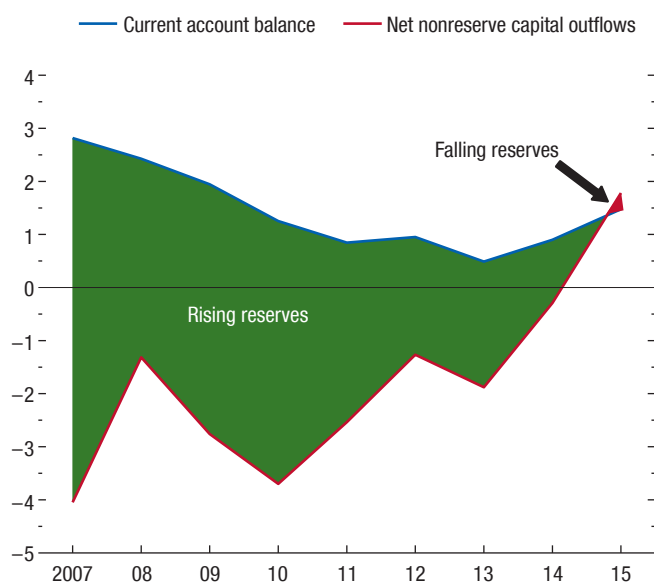
Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Balanced sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample economies. The observation for 2015 refers to the first three quarters. All variables are GDP weighted.

the cost of selling domestic assets and purchasing foreign currencies.[27] Put another way, immediate depreciations following negative shocks help hold capital in, while fears of future depreciations can drive capital out. Emerging market economies have been moving toward more flexible exchange rate regimes over the past two decades.[28]

Though exchange rates in many emerging market economies weakened in 2010–15, the depreciations

[27]Likewise, immediate appreciations in response to positive shocks deter capital inflows, as domestic assets become more expensive.
[28]Excluding countries that joined the euro area, 10 of the 45 economies in the sample saw an increase in their Reinhart-Rogoff flexibility indices from 1995 to 2010 (Argentina, Brazil, Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Moldova, Thailand). Furthermore, 7 economies that were classified as having freely falling exchange rate regimes in 1995 had flexible exchange rate regimes in 2010 (Armenia, Belarus, Mexico, Romania, Russia, Turkey, Uruguay). Over the same period the Reinhart-Rogoff flexibility index decreased for 4 of the sample's emerging markets (Albania, Costa Rica, Ecuador, Paraguay).

were less abrupt than they were in 1995–2000, and the overall size of the depreciation was smaller. Countries with relatively fixed exchange rate regimes[29] in 1995–2000 experienced sudden adjustments, in part reflecting pegs abandoned during currency crises. Several countries experienced an abrupt decline in their nominal effective exchange rates beginning in the third year of the episode, in 1998. For the 35 economies in the sample with relatively fixed exchange rate regimes in 1995, five fell into what Reinhart and Rogoff (2004) call "a freely falling exchange rate regime"[30] in one of the years between 1995 and 2000. In contrast, through the 2010–15 slowdown, countries with relatively fixed exchange rates maintained a stable nominal effective exchange rate (Figure 2.16, panel 1).

For countries with flexible exchange rate regimes,[31] the nominal effective exchange rate was stable in the first two years of the 1995–2000 episode and abruptly declined afterward, while in the 2010–15 episode, such countries saw a wide range of adjustments in their nominal effective exchange rates (Figure 2.16, panel 2). That pattern is consistent with the notion that exchange rate adjustments act as shock absorbers, and varying adjustments indicate that the shocks themselves were diverse (such as terms-of-trade declines in some countries and improvements in others).

The large currency depreciations in 2010–15 were more orderly than those in 1995–2000, in the sense that there were fewer large depreciations over a short period of time, and a much lower share of large depreciation episodes was associated with episodes of banking sector stress and external crises (Table 2.2, columns 4–6). The reduction in the incidence of crisis events is likely a consequence of a combination of factors. In addition to the less abrupt nature of exchange rate depreciations and more resilient balance sheets (with diminished currency mismatches), the external environment has been more favorable to emerging markets in the recent episode. First, the cost of financing in emerging markets during the current slowdown remains significantly lower than during 1995–2000 (Table 2.2, column 1). Although emerging market spreads have increased in recent quarters, they remain close to historical lows amid accommodative monetary conditions in advanced economies. Second, output growth rates in emerging markets during the current

[29]Categories 1 or 2 in the Reinhart-Rogoff coarse index.
[30]Category 5 in the Reinhart-Rogoff coarse index.
[31]Categories 3 or 4 in the Reinhart-Rogoff coarse index.

slowdown, relative to those in advanced economies, are significantly higher than in 1995–2000, owing to higher real growth in emerging markets as well as lower real growth in advanced economies (Table 2.2, columns 2 and 3). This favorable growth differential has helped emerging market economies continue to attract capital.

What Is Driving the Recent Slowdown in Capital Flows to Emerging Market Economies?

The drivers of the recent slowdown in net capital flows to emerging market economies are the subject of ongoing debate. While some analysts have argued that the slowdown is a consequence of diminished growth prospects in emerging market economies (including through lower commodity prices), others have high-lighted the role of prospective shifts in monetary policy in the United States following several years of near-zero interest rates and quantitative easing.

Against this backdrop, the goals of this section are twofold. The first goal is to link the recent slowdown in capital inflows to emerging market economies (and the pickup in capital outflows) to a set of potential contributing factors such as diminished growth and interest rate differentials, the exit from extraordinarily accommodative monetary policy in the United States, and changes in investors' risk appetite and commodity prices. Given evidence that gross inflows and gross outflows have in their own right—rather than just in terms of the net gap between them—a distinct impor-tance in determining systemic risk (Avdjiev, McCauley, and Shin 2015), the following econometric analysis provides separate regressions seeking to explain the individual behaviors of gross inflows and outflows. The section's second goal is to examine how the structural characteristics and policy frameworks of emerging market economies shape the dynamics of capital flows, such as whether flexible exchange rates have helped mitigate the slowdown in capital flows.

Methodology

Empirical Strategy

To achieve these goals, two complementary esti-mation strategies are used, each tailored to a specific purpose:[32]

[32]The macroeconomic variables used in the regressions, such as GDP and capital flows, influence each other in complex ways, mak-

Figure 2.16. Nominal Effective Exchange Rate Adjustment in 1995–2000 and 2010–15:Q3
(Percent change, years on x-axis)

Exchange rate adjustments during the 2010–15 slowdown were less abrupt than in 1995–2000. Countries with fixed exchange rate regimes managed to maintain their pegs, and countries with flexible exchange rate regimes avoided the broad-based abrupt declines observed during 1995–2000.
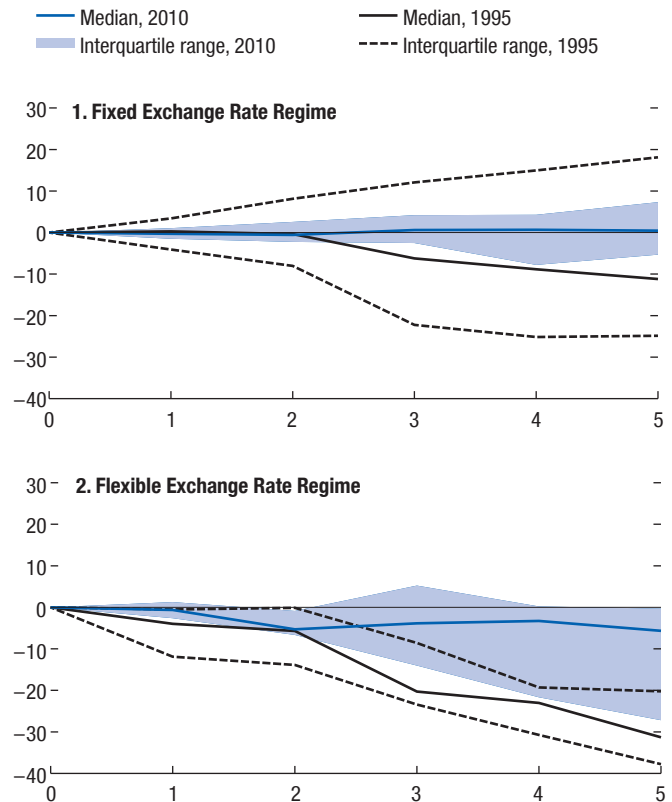
Sources: IMF, Information Notice System; and IMF staff calculations.
Note: Calculations are based on a balanced sample of 45 emerging market economies. See Annex 2.1 for the complete list of sample countries included in each panel. Flexible exchange rate regimes include those classified in categories 3 or 4 in the Reinhart and Rogoff (2004) "coarse" index, and fixed exchange rate regimes those in categories 1 or 2.

- To understand the drivers of the slowdown in cap-ital flows to emerging market economies, the aver-age of capital flows to a broad sample of emerging market economies is regressed on key economic explanatory factors such as differentials in the growth rates and interest rates between emerging market and advanced economies, measures of global investors' risk appetite, the gap between

ing it difficult to obtain clear causal estimates. The main goal of the analysis is therefore to establish robust correlations, examining which variables track the evolution of capital flows more strongly.

Table 2.2. Large Depreciations, Banking Sector Stress, and External Crises during Slowdown Episodes

Episode	Funding Costs (Percent)	Advanced Economy Growth (Percent)	Emerging Market Growth (Percent)	Number of Large Depreciations	Number of Large Depreciations Associated with Banking Sector Stress	Number of External Crises
1995–2000	13.0	3.0	4.7	18	14	11
2010–15	5.8	1.6	5.3	8	3	4

Sources: IMF, *International Financial Statistics*; IMF, Information Notice System; J.P. Morgan Emerging Market Bond Index (EMBI) Global; and IMF staff calculations.

Note: Funding costs are calculated as the sum of EMBI sovereign spreads and 10-year U.S. Treasury bond yields. Advanced economy growth refers to the aggregated real GDP growth rate of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. Emerging market growth refers to the aggregated real GDP growth rate of the 45 emerging market economies listed in Annex 2.1. External crises are defined as by Catão and Milesi-Ferretti (2014), based on sovereign default or rescheduling events and IMF borrowing in excess of 200 percent of quota. Large depreciations are defined in the same way as in Chapter 3 of the October 2015 *World Economic Outlook*, with the details described in Annex 2.1. Banking sector stress is defined based on the Laeven and Valencia (2013) data set and includes borderline cases. A large depreciation is associated with banking sector stress if the stress occurs within a window from three years prior to three years subsequent to the year of the large depreciation. Funding costs in the first column are calculated for a sample consisting of Argentina, Brazil, Bulgaria, China, Ecuador, Mexico, Poland, and South Africa. The event counts in the last three columns are based on the full sample of 45 emerging market economies. A complete list of counted events in each column is provided in Annex 2.1.

long- and short-maturity bond yields in the United States (henceforth the *U.S. yield gap*), spreads on U.S. high-yield corporate bonds, and percentage changes in oil prices. The advantage of this specification is that it can be used to track the drivers of the slowdown in aggregate flows documented in previous sections.[33]

- To zoom in on how structural characteristics and policies of recipient countries shape the dynamics of capital flows (during the recent slowdown in particular), the relationship of capital flows to growth and interest rate differentials for each country (measured relative to a weighted basket of advanced economies' growth and interest rates, respectively), as well as to emerging market structural characteristics and policies on capital flows, is explored.[34]

Within each step, inflows and outflows are examined separately given the earlier finding that both components have contributed to the recent slowdown in net flows.

Relationship to Existing Literature

In general terms, the empirical specifications used in this section can be motivated by international investors' optimal portfolio allocation decisions. Cross-border capital flows reflect decisions by residents and nonresidents to allocate investments across countries. Investments in a particular country are more desirable the higher the risk-adjusted returns relative to those from investing in other countries. Expected returns from investing in a particular

country can be related to factors such as growth and interest rate differentials, the risk appetite of investors, and the quality of domestic policymaking and institutions.

An extensive empirical literature has sought to explain determinants of cross-border capital flows, focusing on gross inflows or net flows. Ahmed and Zlate (2013) estimate a panel regression for 12 emerging market economies to examine determinants of net capital inflows during 2002–12. Key country-specific and global explanatory variables that these authors consider are emerging market–advanced economy growth rate differentials, emerging market–U.S. interest rate differentials, and global risk aversion, as well as capital controls as a policy variable. In another recent paper, Nier, Sedik, and Mondino (2014) estimate a similar panel regression for gross non-FDI capital inflows of 29 emerging market economies with the same key explanatory variables and add market capitalization and public debt as country-specific structural characteristics and policy variables. In both of these studies, GDP growth rate differentials and global risk aversion emerge as the most robust statistically significant determinants of aggregate capital flows to emerging market economies. In an extensive survey of the empirical capital flow literature, Koepke (2015) similarly lists emerging market economic performance and global risk aversion among the most important determinants of capital flows to emerging market economies.

The empirical specifications used in this section are broadly consistent with these earlier studies. The chapter's findings in terms of the significance of various

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[33]For a detailed description of the methodology, see Annex 2.3.
[34]For a detailed description of the methodology, see Annex 2.3.

explanatory factors are also broadly similar to those in the literature. The key addition of the chapter's analysis to the existing literature is to use the regression model to estimate the contribution of specific economic factors to the 2010–15 slowdown in net capital inflows to emerging market economies. A further contribution is to use an augmented panel regression specification to study the impact of emerging market structural characteristics and policies on capital inflows in general, and during the 2010–15 slowdown in particular.

Data

The sample of 22 countries included in the analysis was selected on the basis of quarterly data availability for the first quarter of 2000 through the second quarter of 2015 (see Annex 2.1 for the list of countries).[35] The starting point for the time period is motivated by data coverage for some of the explanatory variables and helps to mitigate econometric issues associated with structural breaks in capital flow dynamics during the 1980s and 1990s. For a detailed description of included variables and their sources, see Annex 2.2.

Estimation Results

Linking the Overall Emerging Market Slowdown to Contributing Economic Factors

Average growth and interest rate differentials between emerging markets and advanced economies, global investor risk appetite, the U.S. yield gap, and spreads on U.S. high-yield bonds are estimated to be statistically significant determinants of average capital inflows to emerging market economies. The regression results for average capital inflows to emerging market economies are presented in Annex Table 2.3.1.

To gauge the economic significance of the explanatory variables, panels 1 and 2 of Figure 2.17 compare actual average capital inflows with predictions from this regression. Panel 1 points to a tight empirical link between the actual and predicted capital inflows—for the estimation period as a whole as well as during 2010–15. Predictions from this regression model can match almost the entire slowdown in capital inflows between 2010 and 2015. Panel 2 breaks down the

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[35]The sample includes China and Russia (before 2014), but the results are qualitatively similar when these two countries are excluded. The results are also robust to the inclusion of Russia's post-2014 data and the introduction of an intervention dummy for the effect of sanctions on capital flows.

Figure 2.17. Role of Global Factors in the Recent Slowdown
(Percent of GDP)

The decline in gross capital inflows to emerging markets during 2010–15 shows a strong association with the shrinking growth differential between emerging markets and advanced economies. The behavior of gross capital outflows remains, however, more difficult to track.
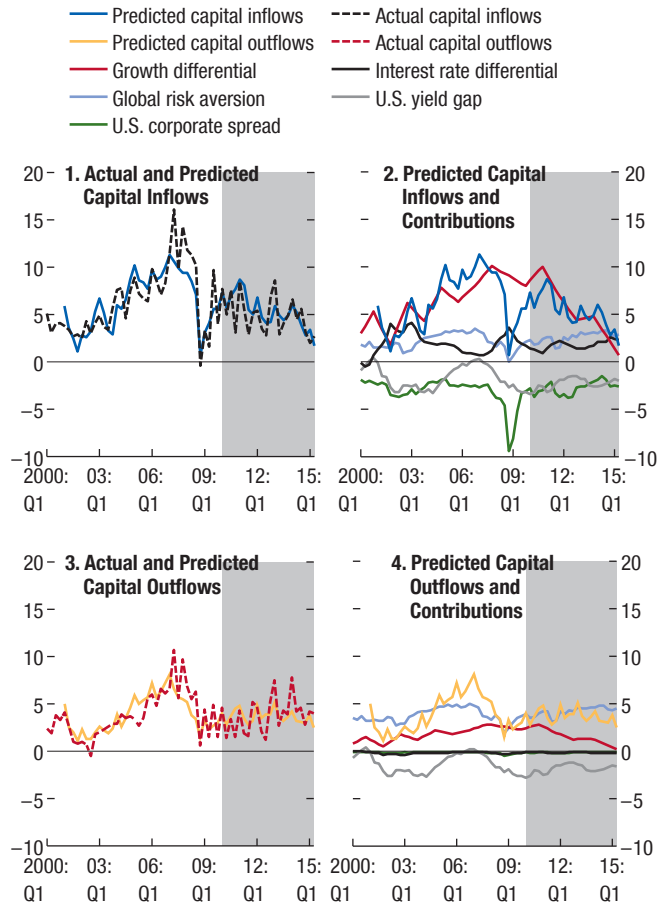
Sources: CEIC Asia database; CEIC China database; Fernández and others 2015; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; Standard & Poor's; World Bank, World Development Indicators database; World Bank, World Governance Indicators; and IMF staff calculations.
Note: Average gross capital inflows (outflows) are regressed on overall emerging market economy–advanced economy growth and interest rate differentials, global risk aversion, the change in the oil price, the U.S. yield gap, the U.S. corporate spread, and seasonal dummies. Contributions of the change in the oil price are very small and thus not reported. Predicted capital flows refer to the predicted values from these regressions. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the estimation methodology.

predicted capital inflows series into contributions from each explanatory variable. The decline in inflows during 2010–15 shows a strong association with the shrinking real GDP growth differential between emerging markets and advanced economies. Diminished emerging market growth prospects relative to advanced economies counterbalance the effect of decreasing risk

aversion, which would predict an increase in capital inflows to emerging market economies during this period. Other factors, such as global risk appetite, commodity prices, and accommodative monetary policy in advanced economies, contribute, but substantially less.[36] Overall, the strong association between capital flows and real GDP growth stands out as very robust to alternative sets of explanatory variables and sample breakdowns.[37]

Panels 3 and 4 in Figure 2.17 present symmetric results for overall emerging market capital outflows, with the regression results reported in Annex Table 2.3.2. The model does not perform that differently in regard to its predictions for outflows before the global financial crisis than it does in regard to its predictions for inflows. After 2010, however, the model does fall short of explaining the large outflows associated with the 2013 "taper tantrum" and the very recent pickup in outflows (Figure 2.17, panel 3). As discussed in Box 2.2, this deficiency is partly due to large temporary shifts in market expectations regarding the course of monetary policy in the United States, which are difficult to control for in a relatively parsimonious regression specification using quarterly data. This change in the correlation pattern between inflows and outflows is a relatively new phenomenon; Broner and others (2013) show that in earlier episodes, rising inflows were typically accompanied by pickups in outflows. Karolyi, Ng, and Prasad (2013) highlight that outflows are increasingly driven by new, structural factors, notably portfolio rebalancing by domestic institutional investors facilitated by greater access to information. Such structural drivers of outflows are not easily picked up by regression analysis based on macroeconomic data.

Role of Country Characteristics and Policies

The second step of the analysis focuses on the role of structural characteristics and policies in shaping the dynamics of capital flows to emerging

market economies. To this end, the section uses a panel data specification that relates country-specific capital flows to country-specific growth and interest rate differentials and to country characteristics, as well as country and time fixed effects.[38] The regression, shown in the first column of Annex Table 2.3.3, results in a positive and statistically significant coefficient on the growth differential, while the estimated coefficients on the real interest rate differential and other country characteristics are not statistically significant.

The time fixed effects included in this specification are highly correlated with average capital inflows to emerging market economies used in the previous analysis (Figure 2.18) and are thus capturing, by and large, the effects of global variables fleshed out previously—namely, the emerging market–advanced economy growth and interest rate differentials, as well as global financial conditions, including changes in the U.S. monetary policy stance and global risk appetite.

The extent to which the estimated common trend in capital inflows (that is, the estimated time effects) accounts for the total variation in capital inflows depends on policy characteristics that are country specific (Figure 2.19).[39] This in turn indicates that individual emerging market economies are not simply bystanders—their policy choices matter for how they

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[36]When total capital inflows are broken up into debt and equity components, the growth differential still shows a very strong association with both components, and a stronger slowdown is predicted for debt than for equity, in line with the behavior of actual flows. The strong association between debt flows and real GDP growth is consistent with well-established evidence of the beneficial effects of growth in lowering default risk.

[37]This includes separating commodity exporters from non–commodity exporters in the sample. Evidence on the significance of commodity price changes and associated effects on country-specific terms of trade and capital flows is provided later in the chapter.

[38]The methodology is explained in greater detail in Annex 2.3. The initial regression included not only expected growth and interest rate differentials, but also changes in the country's terms of trade, an indicator of its institutional quality, whether the country is participating in a large IMF-sponsored adjustment program, whether the country is in default with creditors, and the degree to which capital inflows to the country are restricted by law. The sample excludes some quarterly observations of very high interest rates (Argentina, Brazil, and Turkey in the early 2000s). All variables except the growth differential were determined to be nonsignificant and were therefore dropped from the regression. The statistically nonsignificant and negatively signed coefficient on changes in a country's terms of trade is noteworthy. To the extent that lower real GDP growth picks up the effects of lower commodity prices among commodity exporters, the statistical nonsignificance of the terms-of-trade variable is partly due to its collinearity with GDP growth. The negative sign of the coefficient on that variable (albeit statistically nonsignificant) can be rationalized by the fact that weaker terms of trade tend to reduce the current account balance (all other factors held constant), necessitating higher external financing. Results are robust to the use of different measures of institutions and capital controls.

[39]Indeed, recent work by Aizenman, Chinn, and Ito (2015) shows that interactions between global liquidity trends and global growth are critical for understanding the exposure of individual emerging markets to swings in international capital flows.

Figure 2.18. Estimated Time Fixed Effects and Average Gross Capital Inflows to Emerging Market Economies
(Percent of GDP)

Estimated time fixed effects, which are common to all countries, are highly correlated with the simple and GDP-weighted averages of gross capital inflows to emerging markets and broadly capture the effects of global growth and interest rate differentials, global risk aversion, and global liquidity on capital flows.
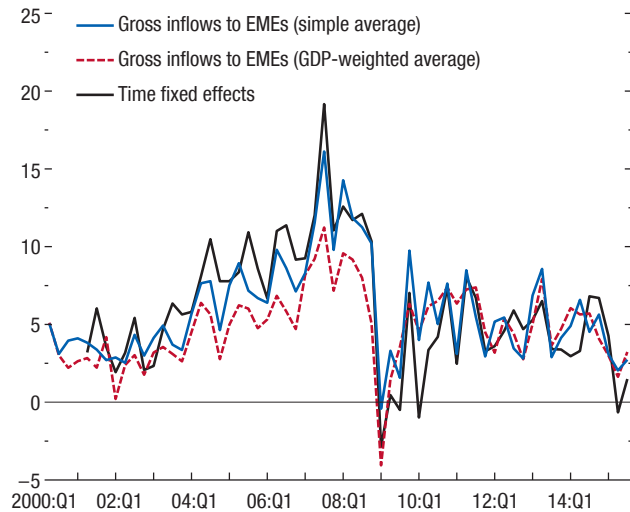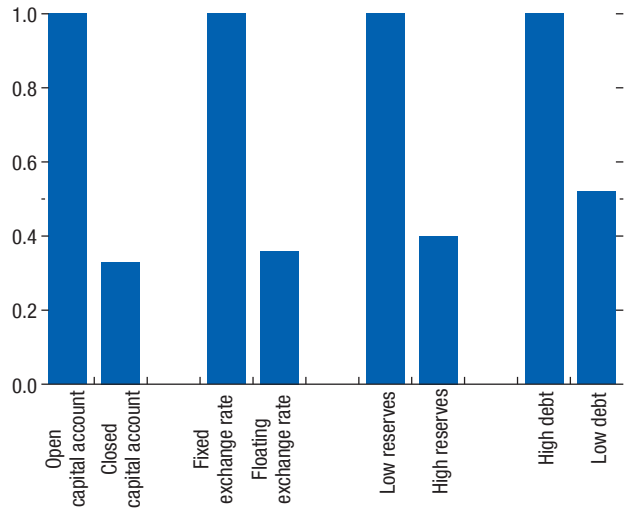

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Time fixed effects are estimated from a regression of gross capital inflows to emerging market economies (EMEs) on country characteristics and country and time fixed effects. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.

Figure 2.19. Share of Variation in Gross Capital Inflows Explained by Global Factors

Over the 2000–15 period, global factors had a smaller correlation with gross capital inflows in countries with less open capital accounts, more flexible exchange rates, higher reserves, and lower public debt.

Sources: CEIC Asia database; CEIC China database; Fernández and others 2015; Haver Analytics; IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER); IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: *R*-squared values are from a regression of country-specific gross capital inflows on average gross capital inflows, normalized using within-group standard deviations of flows, with the base group set to 1. Capital account openness is measured using Fernández and others' (2015) measure for controls on capital inflows, split at 0.5. Fixed and floating exchange rates are defined using the IMF's AREAER classification. High and low reserves are measured in months of imports, split at the sample median. High and low government debt are split at the sample median. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.

mitigate the volatility of their own capital inflows relative to global volatility:

- Emerging market economies that are financially more open appear more exposed to the common trend in capital inflows to emerging markets. This is evident in Figure 2.19 from the fact that a higher share of the total variance of capital inflows is explained by the common time effect (with differences in countries' expected growth performance controlled for) in countries with more open capital accounts. While this evidence may seem tautological at first, it does suggest that capital control regulations can have a real impact without implying, however, that they can be as effective (and certainly not as desirable) as other policy tools.
- More flexible exchange rates also reduce the share of the total variance of capital inflows explained by common global factors. This effect appears to be

quantitatively very important and is further elaborated on in the discussion later in this section.[40]

- By contrast, countries that have higher reserves and lower public debt tend to have a lower percentage of the fluctuations in their capital inflows attributable to global factors.

The findings for most of these characteristics seem intuitive. For instance, countries that have flexible exchange rate regimes would tend to see immedi-

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[40]Aside from the discussion on the existence of a monetary policy trilemma referred to earlier, a large literature has studied the effectiveness of the exchange rate as a shock absorber. There is scarce evidence, however, on its role in smoothing the global capital flow cycle. Magud, Reinhart, and Vesperoni (2014) provide evidence that exchange rate flexibility smoothens the domestic credit cycle but find no evidence, in their regression analysis, that it dampens capital flows in itself (see Magud, Reinhart, and Vesperoni 2014, Table 4).

Figure 2.20. 2010–15 Gross Capital Inflow Slowdown and Country-Specific Characteristics
(Percent of GDP)

During 2010–15, in particular, countries with more open capital accounts, less flexible exchange rates, lower reserves, and higher public debt experienced substantially larger declines in their gross capital inflows.

Sources: CEIC Asia database; CEIC China database; Fernández and others 2015; Haver Analytics; IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER); IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
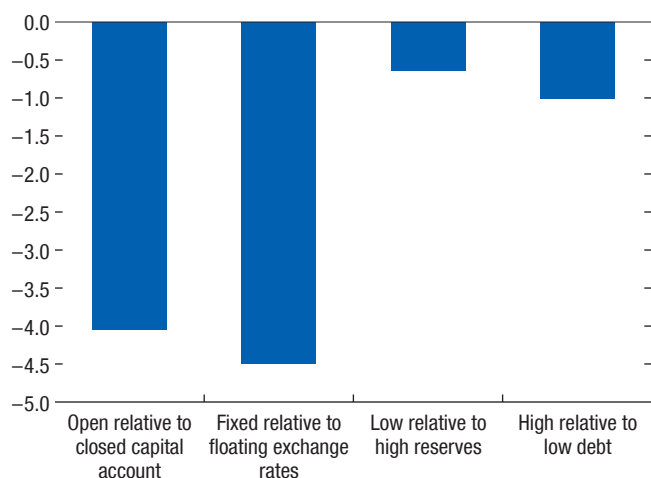Note: The figure shows estimated coefficients from a regression of gross capital inflows on the country-specific forecast growth differential, time fixed effects, and interactions of capital account openness, exchange rate flexibility, level of reserves, and level of public debt with the time fixed effects. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.

ate currency depreciations in response to a broader downward trend in the supply of capital to emerging market economies. By making domestic assets cheaper, a weaker currency would tend to attract capital into a country. Thus, exchange rate flexibility would reduce the sensitivity of capital inflows to global factors.

Likewise, because higher levels of reserves and lower public debt levels reduce country risk, foreign investors would be less tempted to pull out from countries with those characteristics, making their capital inflows more resilient to shifts in the global factors affecting all emerging market economies.

In light of these findings, the common time effects are interacted with dummy variables that split countries with low and high levels of capital controls, countries with less or more flexible exchange rates, countries with lower and higher levels of reserves, and countries with higher and lower debt levels. *F*-statistics confirm that the resulting interaction terms are

highly statistically significant (see Annex Table 2.3.5). The relevance of these interaction terms is corroborated by a sizable increase in the regression's fit: once such interactions of country-specific characteristics with the global trend are allowed for, the regression can explain an extra 31 percent of fluctuations in inflows (as gauged by the adjusted *R*-squared values rising from 0.12 to 0.43).

Policy-controlled variables, including the degree of capital account openness, exchange rate flexibility, and the level of reserves and public debt, also help explain the diversity of experiences across countries during the 2010–15 slowdown more specifically. All else being constant, economies that had an above-average degree of openness in their capital accounts lost 4 percentage points of GDP in capital inflows compared with those that had below-average degrees of openness (Figure 2.20). More generally, economies that were more open to inflows received far more inflows in the upswing of the global cycle (2002–07), and they tended to receive far less in the downswing phase. Regarding differences in the domain of reserves and fiscal variables, for countries with below-average levels of reserves or above-average ratios of public debt to GDP, the decline in inflows was 0.6–1 percentage point of GDP larger than was the case for countries with higher levels of reserves or lower debt levels.

Yet the biggest difference stems from exchange rate flexibility. Consistent with the foregoing discussion about the insulation properties of a floating exchange rate, the second bar in Figure 2.20 shows that countries with less flexible exchange rate arrangements lost about 4.5 percent of GDP in capital inflows during 2010–15 compared with those with more flexible exchange rates.

This finding can be elaborated further by delving into how exchange rate flexibility interacts with each of the main global factors highlighted in Figure 2.17—that is, the overall growth and interest rate differentials between emerging markets and advanced economies, as well as global risk aversion. As illustrated in Figure 2.21, a 75 basis point narrowing in the expected growth differential between emerging markets and advanced economies (which was roughly the annual average change in that differential during 2010–15) reduces capital flows by more than 4 percent of GDP, all else being constant, if a country has a fixed exchange rate regime. But if a country has a more flexible exchange rate, the expected drop declines to about 1.5 percent of GDP.

More dramatically, an increase in global risk aversion from 2015 levels to its historical average can reduce capital inflows by about 6.5 percent of GDP for countries with fixed exchange rate regimes, but by less than 2 percent of GDP for those with more flexible exchange rates.[41]

Finally, there is some—albeit more subtle—evidence that a country's degree of exchange rate flexibility also affects the sensitivity of capital inflows to changes in the country's own growth. Extending the panel specifications reported in Annex Table 2.3.3 by adding terms for the interaction between the degree of exchange rate flexibility and growth differentials suggests that in countries with more flexible exchange rates, inflows are less sensitive to changes in the country's own growth differential relative to advanced economies. Though the econometric precision of such estimates is not as high as that for other estimates reported elsewhere in this chapter, this is an effect that seems important to bear in mind when evaluating the effects on capital flows of differences in growth performance across emerging markets.

Conclusions

This chapter documents a sizable slowdown in net capital inflows to emerging market economies during 2010–15, to which both inflows and outflows contributed. The slowdown during the period is observed in about three-quarters of emerging market economies, and it is broad based across regions.

Capital flows to emerging market economies over the last several decades have exhibited distinct cycles, with previous slowdowns in the early 1980s and late 1990s showing a size and breadth that are broadly comparable to those of the current episode. As such, the current slowdown is not unprecedented. Nevertheless, the current episode is distinct in that substantial structural changes and policy shifts have taken place in emerging market economies since the late 1990s. Emerging market economies are now far more financially integrated into global financial markets, and currency mismatches (notably in public sector

[41]In a sample spanning 2000–15, such a historical average may be more elevated than that in a longer sample, because of the big spikes in global risk aversion in 2008 and 2009. This makes the comparison exercise embodied in Figure 2.21 more extreme than might seem likely, but it does deliver the important point that countries with floating and fixed exchange rates can differ substantially in regard to their resilience to "pushes" in global risk aversion.

Figure 2.21. Differences in the Contribution of Global Factors between More and Less Flexible Exchange Rate Regimes
(Percent of GDP)

Exchange rate flexibility also weakens the link between key global factors (such as aggregate growth differentials, short-term interest rate differentials, and global risk aversion) and gross capital inflows.
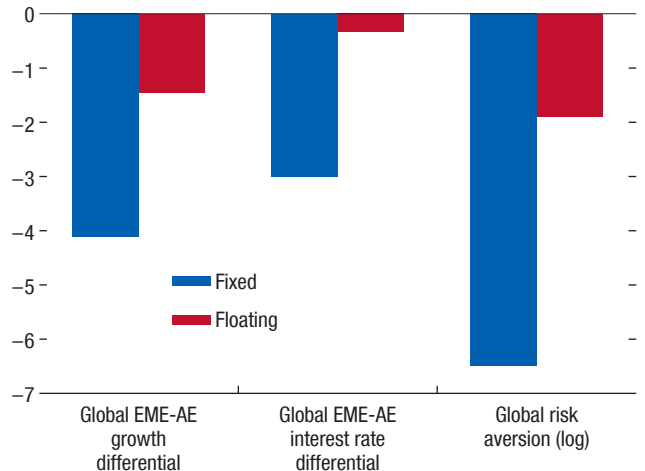
Source: IMF staff calculations.
Note: The figure shows the effect of a 0.75 percentage point decrease in the growth and interest rate differentials, respectively, and an increase of 3 in the Chicago Board Options Exchange Volatility Index (VIX), based on coefficients reported in Annex Table 2.3.6, column 3. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology. AE = advanced economy; EME = emerging market economy.

borrowing) have been reduced. As emerging market residents now face lower capital controls than they did in the 1980s and 1990s and are wealthier—especially after years of brisk growth prior to the global financial crisis of 2008–09—they seek to diversify their portfolios internationally. This turns capital outflows into an increasingly important component of the overall dynamics of capital flows. Also in contrast with the past, emerging market economies now have much higher foreign reserves, which can be deployed as a buffer. As documented in this chapter, changes in the pace of reserve accumulation, including some decumulation, have counterbalanced much of the 2010–15 slowdown in net capital inflows. Moreover, exchange rates have become more flexible and are adjusting in a more orderly way in the current slowdown than in previous episodes.

The chapter's regression-based analysis shows that the emerging market–advanced economy growth differential is the economic factor most tightly associated with capital inflows to emerging market

economies and can explain the bulk of the 2010–15 slowdown. Nevertheless, flexible exchange rates have helped mitigate the slowdown associated with a declining growth differential. Such insulation effects are consistent with the existence of the classical trilemma in monetary policy choices, rather than a mere dilemma between more or fewer capital controls. While the chapter's estimation results are less robust and harder to interpret for the determinants of capital outflows, its contribution on this count is to highlight the increasing importance of such outflows and to point out the need for more research on what drives them.

In terms of policy implications, the chapter documents that policy frameworks have played a role in mitigating the individual-country effects of global factors, implying that countries are not simply bystanders to the global financial cycle. Policy frameworks have generally improved over time, reducing the vulnerabilities stemming from a potentially disorderly retrenchment of capital flows and the balance sheet effects that accompany exchange rate adjustments. These improvements notwithstanding, a persistent narrowing of growth differentials in relation to advanced economies and the accompanying slowdown in capital inflows reinforce the need for a continued policy upgrade in emerging market economies to ensure an orderly external sector adjustment. The necessary policies include prudent fiscal policies (as the slowdown can raise the cost to an economy of servicing its debt), proactive macroprudential policies (to limit currency mismatches), exchange rate flexibility (which can work as a shock absorber), and foreign reserve management (which can insulate the domestic economy from shocks, though not indefinitely). The chapter's analysis also highlights the need for increased vigilance with regard to capital outflow dynamics, which can pose substantial risks, but are not yet sufficiently well understood.

Annex 2.1. Sample of Emerging Market Economies

The broadest sample of emerging market economies used for the analysis in this chapter comprises 45 emerging market economies. Countries were selected for the sample based on the availability of key capital flow data—capital inflows, capital outflows, and net capital inflows—based on annual balance of payments statistics for the 2000–14 period and quarterly balance of payments statistics for the first three quarters of

2015. The complete list of countries, grouped by region, is shown in Annex Table 2.1.1.

The country sample for the regression analysis includes the following subset of 22 emerging market economies: Argentina, Brazil, Bulgaria, Chile, China, Colombia, the Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, the Philippines, Poland, Romania, Russia, the Slovak Republic, South Africa, Taiwan Province of China, Thailand, and Turkey. The country sample for the regression analysis is more restricted, given the more limited availability of (1) explanatory variables used in the regressions and (2) balance of payments data at quarterly frequency (relative to annual data), including for breakdowns into equity and debt flows.

The remainder of this annex provides additional details on selected figures and tables in the chapter.

- Figure 2.1: Unbalanced sample including all 45 economies. External crisis episodes are shown in Annex Table 2.1.2.
- Figure 2.4: Panel 1: 45 economies. Panel 2: 33 economies, with Albania, Costa Rica, El Salvador, Georgia, Guatemala, the Kyrgyz Republic, Malaysia, Paraguay, Saudi Arabia, Sri Lanka, Uruguay, and Vietnam excluded. Panel 3: 34 economies, with Albania, China, Georgia, India, the Kyrgyz Republic, Malaysia, Moldova, Paraguay, Saudi Arabia, Sri Lanka, and Vietnam excluded. Panel 4: 44 economies, with Malaysia excluded. Panel 5: 35 economies, with Albania, Armenia, Ecuador, Indonesia, the Kyrgyz Republic, Mexico, Peru, Saudi Arabia, Sri Lanka, and Vietnam excluded. Panel 6: 22 economies (Armenia, Brazil, Bulgaria, Chile, Costa Rica, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Korea, Latvia, Lithuania, Peru, the Philippines, Poland, Russia, the Slovak Republic, Slovenia, South Africa, and Taiwan Province of China). Panel 7: 31 economies, with Ecuador, Georgia, India, Indonesia, the Kyrgyz Republic, Malaysia, Moldova, Paraguay, Peru, Romania, Saudi Arabia, Sri Lanka, Ukraine, and Vietnam excluded. Panel 8: 44 economies, with Malaysia excluded.
- Figure 2.9: Panel 1: 12 economies (Brazil, Bulgaria, Chile, Colombia, Hungary, Indonesia, Malaysia, Mexico, the Philippines, Poland, South Africa, and Turkey). Panel 2: 23 economies (Argentina, Bulgaria, Belarus, Brazil, Chile, China, Colombia, Ecuador, Georgia, Hungary, Indonesia, Kazakhstan, Lithuania, Mexico, Malaysia, Peru, the Philippines, Poland, South Africa, Sri Lanka, Turkey, Uruguay, and Vietnam). Panel 3: 21 economies (Argentina,

Annex Table 2.1.1. Countries in the Chapter's Emerging Market Economies Sample

Region (Number of Countries)	Countries
Commonwealth of Independent States (8)	Armenia, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Ukraine
Cooperation Council for the Arab States of the Gulf (1)	Saudi Arabia
East Asia (10)	China, India, Indonesia, Korea, Malaysia, Philippines, Sri Lanka, Taiwan Province of China, Thailand, Vietnam
Eastern Europe (12)	Albania, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia
Latin America (12)	Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico, Paraguay, Peru, Uruguay
Other Emerging Markets (2)	South Africa, Turkey

Annex Table 2.1.2. External Crisis Episodes, 1980–2015

1980–89		1990–2007		2008–15	
Country	Year of External Crisis	Country	Year of External Crisis	Country	Year of External Crisis
Korea	1980	Bulgaria	1990	Ecuador	2008
Philippines	1980	Albania	1991	Hungary	2008
Costa Rica	1981	Croatia	1992	Latvia	2008
Poland	1981	Slovenia	1992	Turkey[1]	2008
Sri Lanka	1981	Argentina	1995	Ukraine	2008
Thailand	1981	Mexico	1995	Armenia	2009
Argentina	1982	Korea	1997	Belarus	2009
Mexico	1982	Thailand	1997	Georgia	2009
Romania	1982	Armenia	1998	Romania	2009
Brazil	1983	Indonesia	1998	Sri Lanka	2010
Chile	1983	Moldova	1998	Moldova	2011
Ecuador	1983	Ukraine	1998	Ukraine	2014
Philippines	1983	Brazil	1999	Albania	2015
Uruguay	1983	Ecuador	1999		
India	1984	Turkey	2000		
South Africa	1985	Argentina	2001		
Thailand	1985	Brazil	2001		
Paraguay	1986	Moldova	2002		
		Uruguay	2002		
		Paraguay	2003		

Sources: Catão and Milesi-Ferretti 2014; IMF, *International Financial Statistics*; and IMF staff calculations.
[1]Turkey in 2008 is a special case. Because the disbursement of the preapproved final tranche under the ongoing IMF program at the time brought Turkey's IMF exposure to more than 200 percent of quota, the chapter's coding classifies it as a crisis event, even though Turkey's country risk was clearly dropping and the country did not experience an external crisis.

Bulgaria, Brazil, Chile, China, Colombia, Ecuador, Georgia, Hungary, Indonesia, Kazakhstan, Malaysia, Mexico, Peru, the Philippines, Poland, South Africa, Sri Lanka, Turkey, Uruguay, and Vietnam).
- Figure 2.11: 22 economies (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, India, Indonesia, Korea, Malaysia, Mexico, Paraguay, the Philippines, Poland, South Africa, Sri Lanka, Taiwan Province of China, Thailand, Turkey, and Uruguay).

- Figure 2.12: Balanced sample with 22 economies (Albania, Argentina, Bulgaria, Chile, Colombia, Costa Rica, El Salvador, Guatemala, India, Korea, Malaysia, Mexico, Paraguay, Peru, the Philippines, Poland, Romania, South Africa, Sri Lanka, Thailand, Turkey, and Uruguay).
- Figure 2.13: 22 economies (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, India, Indonesia, Korea, Malaysia, Mexico, Paraguay, the Philippines, Poland, South Africa, Sri

Annex Table 2.1.3. Large Depreciation Episodes, 1995–2000

Country	Year	Banking Sector Stress
Albania	1997	X
Belarus	1997	X
Brazil	1999	X
Georgia	1999	
Indonesia	1998	X
Kazakhstan	1999	
Korea	1998	X
Kyrgyz Republic	1997	X
Kyrgyz Republic	1999	X
Malaysia	1998	X
Mexico	1995	X
Moldova	1999	
Paraguay	1998	X
Philippines	1998	X
Romania	1996	X
Romania	1999	
Russia	1998	X
Ukraine	1998	X
Number	18	14

Sources: IMF, Information Notice System; and IMF staff calculations.
Note: For the definition of these episodes, see Table 2.2.

Annex Table 2.1.4. Large Depreciation Episodes, 2010–15

Country	Year	Banking Sector Stress
Belarus	2011	
Belarus	2015	
Brazil	2015	
Colombia	2015	
Georgia	2015	
Moldova	2015	X
Russia	2015	X
Ukraine	2014	X
Number	8	3

Sources: IMF, Information Notice System; and IMF staff calculations.
Note: For the definition of these episodes, see Table 2.2.

Lanka, Taiwan Province of China, Thailand, Turkey, and Uruguay).

- Figure 2.14: Panel 1 (government): Balanced sample, with Estonia and India excluded. Panel 2 (nongovernment): Balanced sample, with Albania, Moldova, and the Slovak Republic excluded.
- Figure 2.16: Panel 1: 25 economies with fixed exchange rate regimes (Albania, China, Costa Rica, Croatia, the Czech Republic, Ecuador, El Salvador, Estonia, Georgia, Guatemala, Hungary, India, Kazakhstan, Latvia, Lithuania, Moldova, Peru, the Philippines, Russia, Saudi Arabia, the Slovak Republic, Slovenia, Sri Lanka, Uruguay, and Vietnam). Panel 2: 13 economies with flexible exchange rate regimes as classified by Reinhart and Rogoff (2004) (Armenia, Brazil, Chile, Colombia, Indonesia, Korea, Mexico, Paraguay, Poland, Romania, South Africa, Thailand, and Turkey).
- Table 2.1: Episode 1995–2000: Balanced sample with 13 economies (Albania, Armenia, the Czech Republic, Estonia, Guatemala, Hungary, Lithuania, Peru, Romania, Russia, the Slovak Republic, Slovenia, and Sri Lanka). Episode 2001–07: Balanced sample with 20 economies (Albania, Armenia, Brazil, Bulgaria, Croatia, the Czech Republic, Ecuador, Estonia, Hungary, Kazakhstan, Korea, Latvia, Lithuania, Paraguay, Peru, the Philippines, Romania, Russia, Sri Lanka, and Ukraine). Episode 2010–15: Balanced sample with 33

economies (Albania, Armenia, Belarus, Brazil, Chile, China, Colombia, Costa Rica, Croatia, the Czech Republic, El Salvador, Georgia, Guatemala, Hungary, India, Indonesia, Kazakhstan, Korea, Malaysia, Mexico, Moldova, the Philippines, Poland, Russia, Saudi Arabia, South Africa, Sri Lanka, Taiwan Province of China, Thailand, Turkey, Ukraine, Uruguay, and Vietnam).
- Table 2.2: Large depreciations are defined based on two numerical thresholds: (1) a threshold set at the 90th percentile of all annual depreciations with respect to the dollar among emerging market and developing economies between 1970 and 2015 and (2) a threshold requiring the change in the depreciation rate compared with the previous year to be unusually large (greater than the 90th percentile of all changes), so that the same large exchange rate depreciation episode is not captured more than once. To ensure that the results are not unduly influenced by high-inflation episodes, the analysis considers only large depreciations that occur when the inflation rate is less than 50 percent. Episode 1995–2000: Large depreciations and large depreciations associated with banking sector stress are listed in Annex Table 2.1.3. Episode 2010–15: Large depreciations and large depreciations associated with banking sector stress are listed in Annex Table 2.1.4. External crises are listed in Annex Table 2.1.2.

Annex 2.2. Data

Capital flow data are from the IMF's Financial Flows Analytics database. Total gross inflows and outflows exclude derivatives flows; equity flows refer to the sum of foreign direct investment (FDI) and portfolio equity; and debt flows refer to the sum of portfolio debt and other flows. All flows are measured as shares of GDP.

Annex Table 2.3.1. Role of Global Factors in Explaining Gross Capital Inflows

	Total	Equity	Debt
Global Emerging Market Economy–Advanced Economy Growth Differential	2.404***	0.555	1.443***
	(0.633)	(0.440)	(0.321)
Global Emerging Market Economy–Advanced Economy Interest Rate Differential	0.707*	0.462	0.216
	(0.405)	(0.366)	(0.254)
Global Risk Aversion (log)	−1.981*	−1.135	−1.836**
	(1.019)	(0.788)	(0.850)
Change in Oil Price	0.000	0.002	0.009
	(0.018)	(0.011)	(0.012)
U.S. Yield Gap	−0.950**	−1.072***	−0.204
	(0.407)	(0.256)	(0.208)
U.S. Corporate Spread	−2.772**	0.119	−3.144**
	(1.214)	(0.831)	(1.275)
Number of Observations	58	58	58
Adjusted R^2	0.56	0.41	0.74

Source: IMF staff estimates.
Note: The dependent variable is mean inflows to emerging markets as a percent of GDP. Seasonal dummy variables are included but not reported. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.
*p <.10; **p < .05; ***p < .01.

Country-specific forecast growth and interest rate differentials are measured as the difference between a particular emerging market's rate and a weighted average of rates in advanced economies (with the latter group consisting of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States), with country-specific weights depending on average portfolio exposures during 2001–12 based on data from the IMF's Coordinated Portfolio Investment Survey (see Annex 2.3). Forecast growth is measured using one-year-ahead *World Economic Outlook* growth forecasts. Interest rate differentials are based on policy rates, deflated using one-year-ahead *World Economic Outlook* inflation forecasts. Institutional quality is measured using the rule of law measure from the World Bank's Worldwide Governance Indicators. Capital controls on inflows and outflows are based on Fernández and others 2015. A country is defined as having a large IMF-supported adjustment program if its IMF borrowing is more than 100 percent of its quota and growing. Default is measured following Standard & Poor's (S&P) definition (see Catão and Mano 2015). Fixed and floating exchange rates are defined using the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* classification, as this measure is available through 2015.

Global growth differentials are based on weighted averages of the growth rates of 20 emerging markets and the advanced economies listed previously, with weights depending on average portfolio exposures using Coordinated Portfolio Investment Survey data (see Annex 2.3). Global risk aversion is measured

using the logarithm of the Chicago Board Options Exchange's Volatility Index (VIX). The change in the oil price refers to the year-over-year change in the West Texas Intermediate oil price.

Annex 2.3. Methodology

Overall Slowdown

The overall slowdown of capital flows to emerging market economies is studied in this chapter using a time series regression of average gross capital inflows to emerging markets (that is, the average gross-capital-inflow-to-GDP ratio across countries) on key economic explanatory factors: emerging market–advanced economy growth and interest rate differentials, investor risk aversion (measured using the logarithm of the Chicago Board Options Exchange's Volatility Index [VIX]), the U.S. yield gap, the U.S. corporate bond spread, and the percentage change in the oil price (with seasonal dummy variables also controlled for):

$$\overline{Kflows}_t = \gamma_0 + \gamma_1 \, (\bar{g}_t^{\text{EM}} - \bar{g}_t^{\text{AE}}) + \gamma_2 \, (\overline{ir}_t^{\text{EM}} - \overline{ir}_t^{\text{AE}}) + \gamma_3 riskaversion_t + \gamma_4 yield\,gap_t^{\text{U.S.}} + \gamma_5 corp.bond\,spread_t^{\text{U.S.}} + \gamma_6 \Delta P_t^{\text{oil}} + \varphi \boldsymbol{S}_t + u_t,$$

in which $(\bar{g}_t^{\text{EM}} - \bar{g}_t^{\text{AE}})$ and $(\overline{ir}_t^{\text{EM}} - \overline{ir}_t^{\text{AE}})$ are average growth and interest rate differentials, as defined later in this annex. These results are reported in Annex Table 2.3.1 for inflows and Annex Table 2.3.2 for outflows. Results are robust to using a GDP-weighted average instead of a simple average of capital-flow-to-GDP ratios across countries.

Annex Table 2.3.2. Role of Global Factors in Explaining Gross Capital Outflows

	Total	Equity	Debt
Global Emerging Market Economy–Advanced Economy Growth Differential	0.676	0.378	0.484**
	(0.464)	(0.539)	(0.214)
Global Emerging Market Economy–Advanced Economy Interest Rate Differential	−0.066	0.072	0.076
	(0.316)	(0.290)	(0.139)
Global Risk Aversion (log)	−1.781*	−0.801	−0.888*
	(0.909)	(0.917)	(0.474)
Change in Oil Price	−0.002	−0.000	−0.004
	(0.012)	(0.014)	(0.006)
U.S. Yield Gap	−0.764***	−0.503**	−0.296***
	(0.295)	(0.227)	(0.108)
U.S. Corporate Spread	−0.137	0.774	−1.196**
	(0.967)	(1.018)	(0.561)
Number of Observations	58	58	58
Adjusted R^2	0.40	0.15	0.52

Source: IMF staff estimates.
Note: The dependent variable is mean outflows from emerging markets as a percent of GDP. Seasonal dummy variables are included but not reported. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.
*$p < .10$; **$p < .05$; ***$p < .01$.

Cross-Country Distribution

The cross-country distribution of gross capital inflows is modeled using a panel regression (with country fixed effects) of capital inflows on country-specific economic factors, such as country-specific forecast growth differentials relative to advanced economies, interest rate differentials, institutions, capital controls, whether the country has a large IMF loan, whether the country is in default, and percentage changes in the terms of trade (with time fixed effects controlled for):

$$Kflows_{it} = \theta_0 + \theta_1 \, (g_{it} - \bar{g}_{it}^{\mathrm{AE}}) + \theta_2 \, (ir_{it} - \bar{ir}_{it}^{\mathrm{AE}}) +$$
$$\theta_3 institutional \ quality_{it} + \theta_4 capital \ controls_{it} +$$
$$\theta_5 IMF \ loan_{it} + \theta_6 default_{it} +$$
$$\theta_7 \Delta termsoftrade_{it} + \tau T_t + \varepsilon_{it},$$

in which $(g_{it} - \bar{g}_{it}^{\mathrm{AE}})$ and $(ir_{it} - \bar{ir}_{it}^{\mathrm{AE}})$ are growth and interest rate differentials, as defined later in this annex, and T_t are a set of quarter dummy variables. These results are reported in the first columns of Annex Table 2.3.3 for inflows and Annex Table 2.3.4 for outflows.

As only the forecast growth differential is found to be statistically significant in this general regression, the specification is subsequently restricted to

$$Kflows_{it} = \alpha_0 + \alpha_1 \, (g_{it} - \bar{g}_{it}^{\mathrm{AE}}) + \beta T_t + e_{it}.$$

These results are reported in the second columns of Annex Table 2.3.3 for inflows and Annex Table 2.3.4 for outflows.

Regressing gross capital inflows on the predicted values $\widehat{\beta T_t}$ from this regression yields the R-squared values used in Figure 2.19.

This specification is also used to examine how country characteristics affect the impact of the common trend for various types of countries using terms for the interactions between the time dummies and dummies for exchange rate regime, reserves, and public debt (reported in Annex Table 2.3.5 and Figure 2.20, adding also interactions for capital controls), and the differential impact of global factors, such as global growth and interest rate differentials and global risk aversion, for countries with fixed/flexible exchange rates, high/low levels of reserves, and high/low public debt levels (as reported in Annex Table 2.3.6 and Figure 2.21).

Weighting

In the country-specific regressions, the (growth or interest rate) differential for emerging market i ($i = 1, \ldots, 20$) at time t is given by the difference between the emerging market's own growth rate and a weighted average of advanced economy growth rates ($j = 1, \ldots, 7$):

$$g_{it} - \bar{g}_{it}^{\mathrm{AE}} = g_{it} - \sum_{j=1}^{7} w_{ij} g_{jt},$$

with weights (varying by emerging market)

$$w_{ij} = \frac{PF_{ij}}{\sum_{j=1}^{7} PF_{ij}},$$

in which PF_{ij} is the average portfolio flow from advanced economy j to emerging market i over the years 2001–12 from the IMF's Coordinated Portfolio Investment Survey.

Annex Table 2.3.3. Role of Country Characteristics in Explaining Gross Capital Inflows

Growth Differential (forecast)	2.480***	2.634***	2.301***
	(0.750)	(0.801)	(0.725)
Real Interest Rate Differential	−0.217		
	(0.139)		
Institutional Quality	5.346		
	(7.884)		
Capital Controls (inflows)	4.668		
	(3.008)		
Large IMF Loan	4.349		
	(2.826)		
Default	0.099		
	(2.531)		
Change in Terms of Trade	−0.078		
	(0.080)		
Global Emerging Market Economy–Advanced Economy Growth Differential			2.284***
			(0.485)
Global Emerging Market Economy–Advanced Economy Interest Rate Differential			1.243*
			(0.608)
Global Risk Aversion (log)			−3.050***
			(0.880)
Change in Oil Price			−0.000
			(0.013)
U.S. Yield Gap			−1.775*
			(0.880)
U.S. Corporate Spread			−3.670**
			(1.416)
Time Fixed Effects	Yes	Yes	No
Country Fixed Effects	Yes	Yes	Yes
Number of Observations	1,111	1,111	1,111
Adjusted R^2	0.161	0.150	0.135

Source: IMF staff estimates.
Note: Based on a sample of 22 emerging market economies. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.
*$p < .10$; **$p < .05$; ***$p < .01$.

In the global regressions, the differential for emerging market i is given by the difference between a weighted average of emerging market growth rates and a weighted average of advanced economy growth rates:

In the global regressions, the differential for emerging market i is given by the difference between a weighted average of emerging market growth rates and a weighted average of advanced economy growth rates:

$$\bar{g}_t^{\text{EM}} - \bar{g}_t^{\text{AE}} = \sum_{i=1}^{20} w_{it} g_{it} - \sum_{j=1}^{7} w_{jt} g_{jt}$$

with weights (that do not vary by emerging market)

$$w_i = \frac{\sum_{j=1}^{7} PF_{ij}}{\sum_{i=1}^{20} \sum_{j=1}^{7} PF_{ij}},$$

$$w_j = \frac{1}{20} \sum_{i=1}^{20} w_{ijt}.$$

This differential does not vary across emerging markets.

Annex Table 2.3.4. Role of Country Characteristics in Explaining Gross Capital Outflows

Growth Differential (forecast)	0.502	0.584	0.657*
	(0.335)	(0.417)	(0.362)
Real Interest Rate Differential	0.0750		
	(0.076)		
Institutional Quality	3.972		
	(5.201)		
Capital Controls (outflows)	2.587		
	(3.199)		
Large IMF Loan	2.042***		
	(0.422)		
Default	1.052		
	(1.562)		
Change in Terms of Trade	0.0530		
	(0.062)		
Global Emerging Market Economy–Advanced Economy Growth Differential			0.656**
			(0.265)
Global Emerging Market Economy–Advanced Economy Interest Rate Differential			0.132
			(0.420)
Global Risk Aversion (log)			−1.918***
			(0.541)
Change in Oil Price			0.000829
			(0.010)
U.S. Yield Gap			−0.955
			(0.693)
U.S. Corporate Spread			−0.283
			(0.888)
Time Fixed Effects	Yes	Yes	No
Country Fixed Effects	Yes	Yes	Yes
Number of Observations	1,111	1,111	1,111
Adjusted R^2	0.049	0.046	0.047

Source: IMF staff estimates.
Note: Based on a sample of 22 emerging market economies. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.
*$p < .10$; **$p < .05$; ***$p < .01$.

Annex Table 2.3.5. Role of Interaction Terms in Explaining Gross Capital Inflows

	2.275***	1.738***	1.760***
Growth Differential (forecast)	(0.606)	(0.607)	(0.541)
Time Fixed Effects	Yes	Yes	No
Time Fixed Effects × Dummies (exchange rate regime, debt, reserves)	No	Yes	No
Global Variables	No	No	Yes
Global Variables × Dummies (exchange rate regime, debt, reserves)	No	No	Yes
Number of Observations	1,328	1,164	1,167
Adjusted R^2	0.12	0.43	0.19
	F-statistic (p-value)		
Capital Account Openness	5.72 (0.000)		
Exchange Rate Regime	35.72 (0.000)		
Reserves	4.90 (0.001)		
Debt	7.84 (0.000)		

Source: IMF staff estimates.
Note: F-statistics (and corresponding p-values) refer to the null hypotheses that respective interaction terms are jointly zero. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.
***$p < .01$.

Annex Table 2.3.6. Role of Country Characteristics and Global Factors in Explaining Gross Capital Inflows

Growth Differential (forecast)	2.634***	2.842***	2.153***
	(0.801)	(0.868)	(0.539)
Capital Account Openness		−2.473**	
		(1.145)	
Floating Exchange Rate		−4.931***	
		(1.415)	
Low Reserves		−1.449	
		(1.164)	
High Debt		1.152	
		(0.921)	
Global Emerging Market Economy–Advanced Economy Growth Differential			5.492***
			(1.224)
Global Emerging Market Economy–Advanced Economy Interest Rate Differential			4.001**
			(1.509)
Global Risk Aversion (log)			−5.909***
			(1.538)
Change in Oil Price			0.047
			(0.030)
U.S. Yield Gap			−6.442**
			(2.450)
U.S. Corporate Spread			0.917
			(4.700)
Global Emerging Market Economy–Advanced Economy Growth Differential × Floating			−3.549**
			(1.280)
Global Emerging Market Economy–Advanced Economy Growth Differential × Low Reserves			−1.220
			(0.941)
Global Emerging Market Economy–Advanced Economy Growth Differential × High Debt			0.287
			(0.607)
Global Emerging Market Economy–Advanced Economy Interest Rate Differential × Floating			−3.542*
			(1.757)
Global Emerging Market Economy–Advanced Economy Interest Rate Differential × Low Reserves			−0.751
			(1.000)
Global Emerging Market Economy–Advanced Economy Interest Rate Differential × High Debt			0.408
			(0.729)
Global Risk Aversion (log) × Floating			4.184*
			(2.348)
Global Risk Aversion (log) × Low Reserves			−0.349
			(1.427)
Global Risk Aversion (log) × High Debt			−1.216
			(0.776)
Change in Oil Price × Floating			−0.074*
			(0.036)
Change in Oil Price × Low Reserves			0.046**
			(0.019)
Change in Oil Price × High Debt			−0.002
			(0.017)
U.S. Yield Gap × Floating			5.754*
			(2.807)
U.S. Yield Gap × Low Reserves			0.306
			(1.022)
U.S. Yield Gap × High Debt			−0.558
			(1.205)
U.S. Corporate Spread × Floating			−8.457
			(5.240)
U.S. Corporate Spread × Low Reserves			4.753*
			(2.657)
U.S. Corporate Spread × High Debt			3.266
			(2.082)
Number of Observations	1,111	1,096	1,096***
Adjusted R^2	0.15	0.16	−0.24

Source: IMF staff estimates.
Note: Based on a sample of 22 emerging market economies. See Annex 2.1 for a description of the sample, Annex 2.2 for a detailed description of included variables and sources, and Annex 2.3 for details on the methodology.
*$p < .10$; **$p < .05$; ***$p < .01$.

Box 2.1. Capital Flows to Low-Income Developing Countries

Low-income developing countries have typically been characterized by modest access to private external financing. Since the mid-2000s however, low-income developing countries have relied more on nonofficial inflows and increasingly have gained market access. Historical experience in other countries has emphasized not just the benefits of inflows—for instance, in providing financing for investment—but also the risks of inflow reversals that induce macroeconomic and financial volatility. This box documents recent experience with capital flows in 23 low-income developing countries, contrasting it with the 2010–15 slowdown in net capital inflows in emerging market economies.[1] The box extends the data set and analysis in Araujo and others 2015 and also draws on IMF 2015a.

Net capital inflows to low-income developing countries were broadly flat in the first half of the 2000s, with median net inflows fluctuating around 2 percent of GDP (Figure 2.1.1).[2] In line with improved growth prospects in a majority of low-income developing countries, inflows picked up in the second half of the 2000s, with median net inflows peaking at 5½ percent of GDP in 2008, before retrenching during the global financial crisis. After the crisis, median net capital inflows increased sizably, from 3¼ percent of GDP in 2009 to nearly 7½ percent of GDP in 2013. However, this increasing trend was reversed sharply in 2014, with median net capital inflows to low-income developing countries falling back to the 2010 level.

Thus, in contrast to the persistent 2010–15 net capital inflow slowdown in emerging market economies (as documented in this chapter), net capital inflows in low-income developing countries continued to expand strongly through much of the period, with a slowdown starting only in 2014. While this box does not identify the drivers behind the different capital

The author of this box is Juliana D. Araujo.

[1]The analysis imposes a balanced-sample requirement, which limits the low-income developing country sample to 23 nonsmall and nonfragile countries, with frontier markets representing more than half of the sample: Bangladesh*, Bolivia*, Cambodia, Ghana*, Honduras, Kenya*, the Kyrgyz Republic, Lesotho, Mauritania, Moldova, Mongolia*, Mozambique*, Nepal, Nicaragua, Nigeria*, Papua New Guinea*, Rwanda, Senegal*, Tanzania*, Uganda*, Uzbekistan, Vietnam*, and Zambia*, where asterisks denote frontier markets as defined in IMF 2015a. Country samples in each figure may vary depending on data availability.

[2]The data exclude other investment flows to the official sector (the general government and monetary authorities), whether or not they originate from official or private sources (the underlying data source provides a breakdown by debtor but not by creditor).

Figure 2.1.1. Net Capital Inflows to Low-Income Developing Countries, 2000–14
(Percent of GDP)
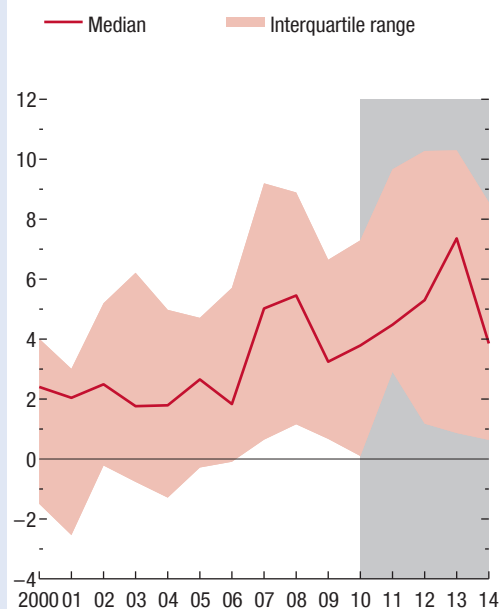
Sources: Araujo and others 2015; and IMF staff calculations.

inflow experience of the two groups of countries, differences in their growth experiences likely played an important role. Unlike in emerging market economies, which experienced a relatively persistent growth slowdown after 2010, growth in low-income developing countries remained stronger, averaging 6 percent in 2013–14. The strong growth performance was aided in part by improved macroeconomic frameworks but also by favorable external conditions (see Box 1.2).[3] Since mid-2014, many commodity-dependent low-income developing countries have also seen sharply lower global commodity prices, particularly that of oil, and decelerating growth.

The documented 2009–14 net capital inflow trends in low-income developing countries closely followed gross capital inflows, with outflows remaining broadly

[3]Several low-income developing countries also went through debt reduction programs, which started in the 1990s with bilateral creditor debt reduction negotiations and culminated in the mid-2000s with the Heavily Indebted Poor Countries Initiative and later the Multilateral Debt Relief Initiative.

Box 2.1 *(continued)*

stable (Figure 2.1.2, panels 1 and 2). Growth in net inflows after 2009 was broad based—nearly two-thirds of low-income developing countries received higher net capital inflows in 2013 relative to 2009. Turning to inflows by asset type, the post-2009 rise in gross capital inflows to low-income developing countries included both foreign direct investment (FDI) and non-FDI inflows (the latter comprising portfolio—debt and equity—inflows and other nonofficial investment—for example, bank deposits, corporate and bank loans, and trade credit).

Furthermore, by 2012–13, the size of both FDI and non-FDI inflows, relative to GDP, for low-income developing countries exceeded inflows in emerging market economies, especially for FDI (Figure 2.1.3, panels 1 and 2, and Figure 2.1.4). Meanwhile, within non-FDI inflows, portfolio flows to low-income developing countries were very limited until 2013, with the recent increases largely driven by frontier low-income developing countries (Figure 2.1.3, panel 3). Examples of recent sovereign bond issuers include Mongolia (with a 2012 issue equivalent to 20 percent of GDP) and Kenya (with a debut issue of more than 3 percent of GDP in 2014). Côte d'Ivoire, Ethiopia, Ghana, Senegal, Vietnam, and Zambia also issued sovereign bonds in 2014. Finally, net capital inflows in low-income developing countries followed similar trends in sub-Saharan Africa (corresponding to nearly half of the sample) and Asia (about a quarter of the sample), despite some recent deceleration in net capital inflows to Asian low-income developing countries (Figure 2.1.3, panel 4).[4]

Trends in reserve accumulation indicate that during the post-2009 period, foreign reserves have played less of a buffer role for low-income developing countries, compared with emerging market economies, with the current account counterbalancing the bulk of the net capital inflow movement. Despite the surge in net capital inflows, the pace of foreign reserve accumulation in low-income developing countries during 2009–13 remained broadly unchanged at about 2.6 percent of GDP (Figure 2.1.4, panel 1). During the same period, the current account balance for the median low-income developing country decreased markedly—from –6.5 to –10 percent of GDP (Figure 2.1.4, panel 2). Furthermore, in tandem with the sharp net capital

[4]See the April 2011 and October 2013 *Regional Economic Outlook: Sub-Saharan Africa* reports for an examination of capital flows to sub-Saharan Africa.

Figure 2.1.2. Capital Inflows and Outflows of Low-Income Developing Countries, 2000–14
(Percent of GDP)
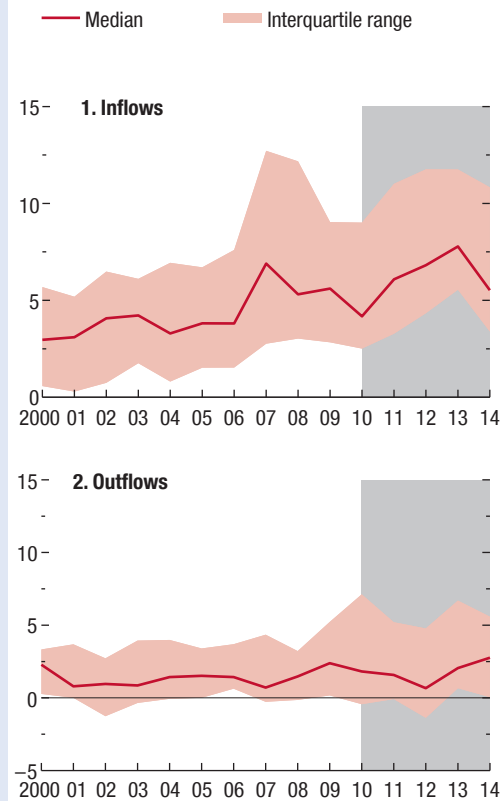
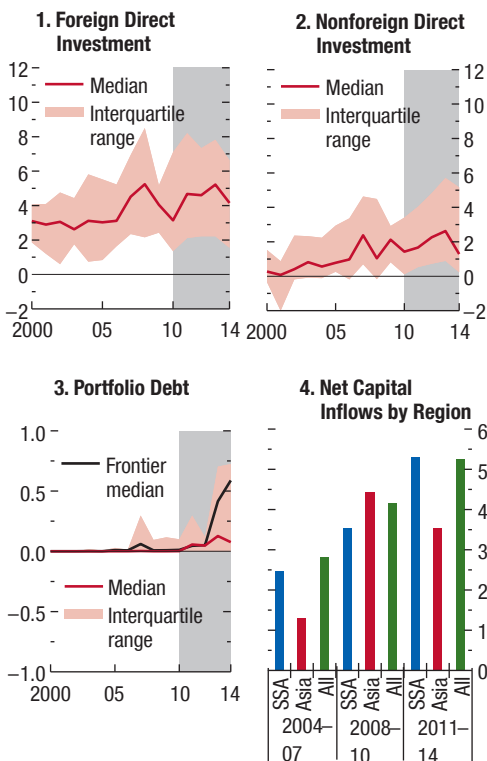Sources: Araujo and others 2015; and IMF staff calculations.

inflow reversal in 2014, the current account balance for the median low-income developing country improved.[5]

In contrast, reserves played a more important buffer role prior to the global financial crisis. Net reserve accumulation peaked in 2007, with a median and top-quartile accumulation of 3¼ percent of GDP and

[5]Nonetheless, the interpretation of current account developments in countries with large investment projects financed externally could be more challenging. More generally, FDI-related imports could create a direct link between capital inflows and the current account balance. During 2009–14 the remaining components (median and interquartile) of the balance of payments identity—other investment flows to the official sector, capital account balance, and net errors and omissions—remained broadly stable.

Box 2.1 *(continued)*

Figure 2.1.3. Capital Inflows to Low-Income Developing Countries by Asset Type and Net Capital Inflows by Region, 2000–14
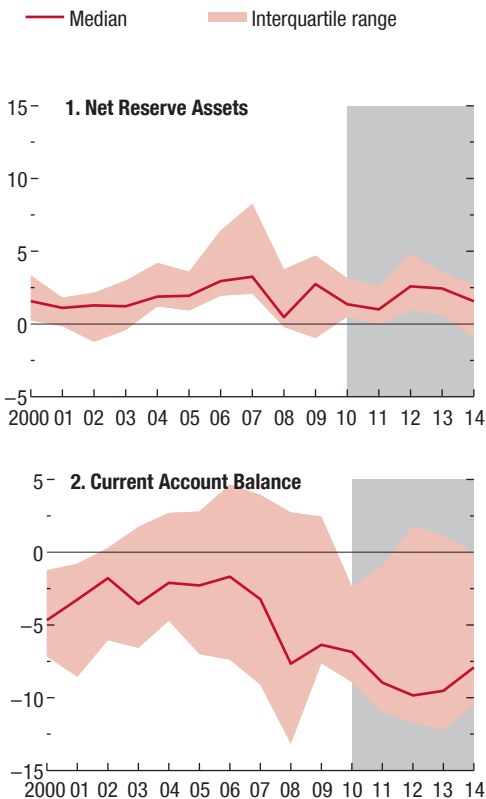*(Percent of GDP)*

1. Foreign Direct Investment

— Median
Interquartile range

2. Nonforeign Direct Investment

— Median
Interquartile range

3. Portfolio Debt

— Frontier median
— Median
Interquartile range

4. Net Capital Inflows by Region

SSA Asia All 2004–07
SSA Asia All 2008–10
SSA Asia All 2011–14

Sources: Araujo and others 2015; and IMF staff calculations.
Note: SSA = Sub-Saharan Africa.

Figure 2.1.4. Net Reserve Assets and Current Account Balance, 2000–14
(Percent of GDP)

— Median   Interquartile range

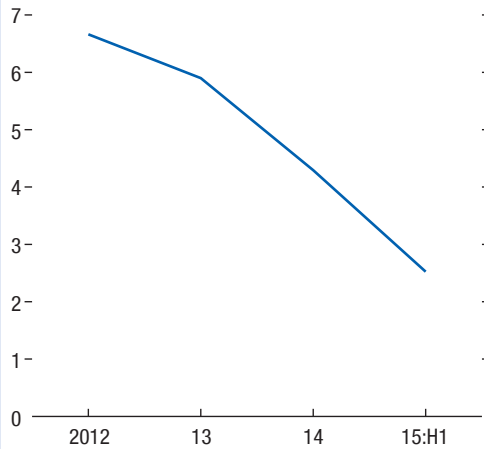**1. Net Reserve Assets**

2. Current Account Balance

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.

8¼ percent of GDP, respectively. The median current account was broadly flat during that period.

How have net capital inflows in low-income developing countries evolved since 2014? Preliminary evidence for the first half of 2015 for a limited sample of eight countries with available balance of payments data suggests that the reversal in net inflows continued in 2015 (Figure 2.1.5). After decreasing by 1.6 percentage points of GDP in 2014 relative to 2013, median net capital inflows decreased by a further 1.8 percentage points in the first half of 2015.[6] Low-income developing countries' exchange rates fell sharply with respect to the dollar during 2014–15, although

[6]This most recent subsample has a limited coverage of sub-Saharan African countries.

less so compared with emerging market exchange rates (Figure 2.1.6). Moreover, depreciation was negligible in nominal effective terms. As also discussed in Box 1.2, since mid-2015, sovereign bond spreads in frontier low-income developing countries rose more sharply than those in emerging market economies.

Overall, low-income developing countries have displayed strong economic resilience in the aftermath of the global financial crisis, helping insulate them from the net capital inflow slowdown observed in emerging market economies. More recently, the deterioration of domestic conditions (such as lower growth and wider fiscal deficits) and external conditions have
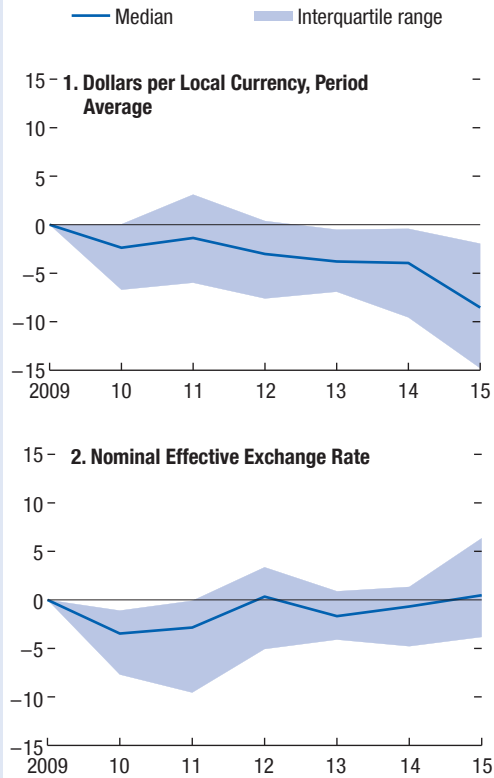
Box 2.1 *(continued)*

Figure 2.1.5. Net Capital Inflows to Low-Income Developing Countries, 2012–15, Restricted Sample
(Percent of GDP)

Sources: CEIC Asia database; CEIC China database; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Country sample comprises Bangladesh, Honduras, Lesotho, Moldova, Mongolia, Nicaragua, Uganda, and Vietnam.

Figure 2.1.6. Exchange Rates of Low-Income Developing Countries, 2009–15:Q3
(Percent change)

——— Median   Interquartile range

1. Dollars per Local Currency, Period Average

2. Nominal Effective Exchange Rate

Sources: IMF, Information Notice System; IMF, International Financial Statistics database; and IMF staff calculations.

played an important role in driving down the level of capital inflows and driving up the price of capital (for example, sovereign spreads; see also the October 2013 *Regional Economic Outlook: Sub-Saharan Africa* and IMF 2015a). Amid external conditions, lower commodity prices and lower growth among trading partners have likely had a substantial impact on low-income developing countries' economic prospects (see Box 1.2), coinciding with the recent period of capital flow slowdown in these countries.

Box 2.2. U.S. Monetary Policy and Capital Flows to Emerging Markets

In the immediate aftermath of the global financial crisis, capital flows to emerging market economies were buoyed by accommodative monetary policy conditions in Europe, in Japan, and especially in the United States, as well as by substantially better growth prospects than those in the slowly recovering advanced economies. Portfolio flows represented a large part of the increase.

Although this tide began to turn shortly after 2010, as documented in this chapter, a marked inflection point for many countries relates to the May 22, 2013, announcement by Federal Reserve Chairman Ben Bernanke of a gradual tapering of the Federal Reserve's quantitative easing program, possibly later that year. That surprise gave rise to the so-called taper tantrum—a period of several weeks during which large volumes of portfolio funds appeared to flee emerging markets, according to the emerging markets fund flows data collected by Emerging Portfolio Fund Research (EPFR) Global.[1] Emerging market currencies depreciated and emerging market asset prices generally fell. In contrast, following the actual rate liftoff on December 16, 2015, emerging market asset prices barely responded, and emerging market fund flows during the subsequent week, while negative, were not lower than the average in the previous six months.[2]

These two events point to the importance of changes in expectations regarding future U.S. policy interest rates in driving emerging market asset prices and asset flows in and out of emerging markets. They also illustrate how expectations of policy shifts can have distinct effects along the yield curve for U.S. Treasury bonds. The short-maturity end of the U.S. yield curve increased when the increase in the federal funds rate finally materialized in December 2015, whereas it did not move substantially during the taper tantrum (when market participants brought forward their expectations of the first rate hike, but did not

expect an imminent one). The difference in changes in the higher-maturity end of the yield curve during the two episodes, however, was far more striking. In the three weeks following May 22, 2013, 2-year and 10-year U.S. yields rose by 10 basis points and 25 basis points, respectively (they were up 20 basis points and more than 60 basis points, respectively, within five weeks after May 22, 2013). By contrast, 2-year U.S. yields were unchanged and 10-year yields were actually down 4 basis points three weeks after the December 2015 rate hike. This suggests that the anticipated policy move in December 2015 did not change the markets' expectations regarding slow and gradual further rate increases in the coming years.

Econometric analysis points to the importance of expected changes in U.S. interest rates in driving capital flows. Regression analysis reported in Table 2.2.1 helps explain the observation that the large shift in expectations of future interest rates during the taper tantrum, even in the absence of actual policy change, triggered outflows from emerging market investment funds whereas, with stable expectations around December 2015, the eventual rate hike did not have a meaningful short-term effect. The regression of EPFR weekly data on gross fund flows to emerging markets since the beginning of 2013 on the Chicago Board Options Exchange Volatility Index (VIX) (a measure of market risk aversion) and 3-, 12-, and 35-month federal funds rate futures shows that fund flows decline when markets become more risk averse (that is, the VIX is higher) and when market expectations of federal funds rates almost three years in the future increase.[3] Yet the regression shows no statistically significant relationship between the 3- or 12-month future rate and emerging market fund flows. To the extent that EPFR data track approximately actual fluctuations in total portfolio flows to emerging markets as measured by balance of payments data (Figure 2.2.1), these results suggest that longer-term market expectations could be more important than shorter-term rates in transmitting the effects of U.S. monetary policy to emerging market capital flows. Movements in shorter-term interest rates, which tend to be foreseen

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The author of this box is Frantisek Ricka.

[1]EPFR data track net flows (investor contributions and redemptions) for individual funds and fund groups. They exclude portfolio performance and currency effects. The data are collected by EPFR Global from managers and administrators of a universe of funds covering more than $23.5 trillion in globally domiciled funds. The emerging-market-specific sample covers country-specific, regional, and general emerging market bond and equity funds.

[2]According to the same EPFR data, bond outflows in the week leading up to the Federal Reserve's decision were above average, suggesting capital moved in anticipation of the rate increase.

[3]The estimated coefficient indicates that every percentage point increase in the expected 35-month federal funds futures rate reduces emerging market fund flows by more than $5 billion, suggesting a loss of at least $1 billion in fund flows during the week after the taper talk, when the 35-month future rate rose by 20 basis points.

Box 2.2 *(continued)*

Table 2.2.1. Short-Term Determinants of Emerging Market Fund Flows

| Variables	Weekly Emerging Market Fund Flows
Lagged Emerging Market Fund Flows	0.580***
	(0.0912)
Chicago Board Options Exchange Volatility Index (VIX) (change)	−350.6**
	(145.9)
Three-Month Federal Funds Futures (change)	−22,918
	(16,368)
Twelve-Month Federal Funds Futures (change)	7,517
	(6,760)
Thirty-Five-Month Federal Funds Futures	−5,625**
	(2,233)
Constant	−328.6
	(238.1)
Number of Observations	147

Source: IMF staff estimates.
Note: Newey-West standard errors are in parentheses. The reported regression results are based on weekly data from January 1, 2013, to December 31, 2015.
**$p < .05$; ***$p < .01$.

by markets and are thus subject to fewer surprises, are not statistically significant at a 5 percent confidence level—though the large absolute value of the estimated coefficient on the 3-month interest rate suggests that the respective effect on capital flows should not be dismissed altogether.

There are important caveats to bear in mind. First, the EPFR data used in the regressions shown in Table 2.2.1 cover only a subset of portfolio flows to emerging markets; while such data may be useful for picking up high-frequency movements in portfolio flows in the absence of comprehensive balance of payments data for intervals shorter than a quarter, a comprehensive picture of overall capital flows to emerging markets can come only from quarterly balance of payments data. Second, at quarterly or annual frequencies, shifts in policy rate expectations can be tightly correlated with growth expectations. If so, part of the effect picked up by the coefficient on the 35-month federal funds futures rate could reflect the impact of expected economic growth in the United States. The latter, by affecting the growth differential between advanced economies and emerging markets, can be an important driver of capital inflows to emerging markets, consistent with the econometric results presented in this chapter.

Figure 2.2.1. Correlation between Emerging Market Fund Flows and Total Emerging Market Portfolio Inflows
(Billions of dollars)
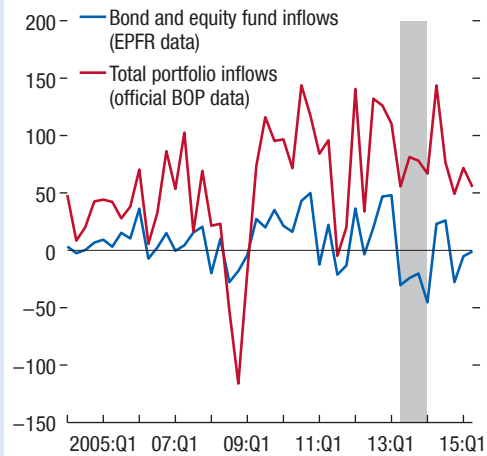
Sources: CEIC Asia database; CEIC China database; Emerging Portfolio Fund Research (EPFR) Global; Haver Analytics; IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; and World Bank, World Development Indicators database.
Note: BOP = balance of payments.

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