



IMF Working Paper

Surging Capital Flows to Emerging Asia: Facts, Impacts, and Responses

*Ravi Balakrishnan, Sylwia Nowak, Sanjaya Panth,
and Yiqun Wu*

IMF Working Paper

Asia and Pacific Department

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Facts, Impacts, and Responses**

Prepared by Ravi Balakrishnan, Sylwia Nowak, Sanjaya Panth, and Yiqun Wu

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Abstract

Net capital flows to emerging Asia rebounded at a record pace following the global financial crisis, raising concerns about overheating and financial stability. This paper documents the size and composition of the most recent surge to Asian emerging markets from a historical perspective and compares developments in the broader economy, asset prices, and corporate variables across the different episodes of strong inflows. We find little evidence of a significant build-up of imbalances and resource misallocation during the most recent surge. We also review country experiences in managing the risks associated with inflows and argue that Asian countries have used regulatory measures during past surges, although there is not strong evidence of their efficacy without supporting monetary and fiscal policies.

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Authors' E-Mail Addresses: rbalakrishnan@imf.org, snowak@imf.org, spanth@imf.org, ywu2@imf.org

Contents	Page
I. Introduction.....	3
II. Capital Flows across Episodes: The Facts	5
A. Identifying Surges of Capital Inflows to Asia	5
B. Volatility and Financial Depth.....	10
III. Broader Economic and Asset Valuation Patterns across Time.....	11
A. Macroeconomic Dynamics around Surges	11
IV. Capital Flow Management Measures.....	18
V. Conclusion	22
References.....	23
 Figures	
1. Emerging Asia: Net Private Capital Flows.....	4
2. Drivers of Inflows	5
3. Distribution of Capital Inflows Episodes.....	6
4. Emerging Asia: Net Private Capital Flows.....	8
5. Emerging Asia: Average Net Private Capital Flows during Episodes	9
6. Emerging Asia: Volatility of Net Private Capital Flows by Flow Type and Recipient Economies.....	10
7. Foreign Holdings of Local Government Bonds.....	10
8. Cumulative Gross Capital Inflows in 2010:Q1–2011:Q2 to Financial Depth.....	11
9. Emerging Asia: Macroeconomics Dynamics around Surges.....	12
10. Emerging Asia: Exchange Market Pressure Index	14
11. Real Effective Exchange Rate	15
12. Selected Asia: 10-Year Bond Spreads	13
13. Indonesia and Thailand: Capital Flows.....	21
 Tables	
1. Episodes of Large Net Private Capital Inflows—Summary Statistics.....	7
2a. Financial Indicators across Episodes of Large Net Capital Flows to Emerging Asia	16
2b. Corporate Indicators across Episodes of Large Net Capital Flows to Emerging Asia	17
3. Selected Asia: Impact of Macroprudential Measures	21

I. INTRODUCTION

Net capital flows to emerging Asia rebounded at a record pace following the global financial crisis (GFC), raising concerns about overheating and financial stability (Figure 1). In response, countries used traditional macroeconomic policies to manage domestic demand (see IMF, 2011b). However, many countries also used other regulatory measures to help modulate or curb some of the impacts of the inflows on asset markets. Of course, since mid-2011, concerns have re-centered on how to deal with spillovers from troubles in the euro zone, financial volatility, and capital outflows. But it still remains important to understand the post-GFC surge in capital flows and the actual policy responses before the global dislocations took center stage—when some normalcy returns to the global environment, substantial capital flows are likely to return to Asia, especially given longer-term sizable portfolio rebalancing towards Asia is likely still in the pipeline. This backdrop leads to the following questions:

- How does the recent rebound compare with previous surges, in particular the episodes before the Asian crisis and the GFC? Is there significant “within Asia differentiation?”¹
- What has been the impact so far of the inflows on the broader economy and financial stability and how does it compare with the previous episodes? In particular, are unsustainable imbalances and bubbles developing? Is there evidence of misallocation of resources associated with the inflows?
- How do recent non-macroeconomic measures compare with those taken in previous episodes and what lessons do they provide?

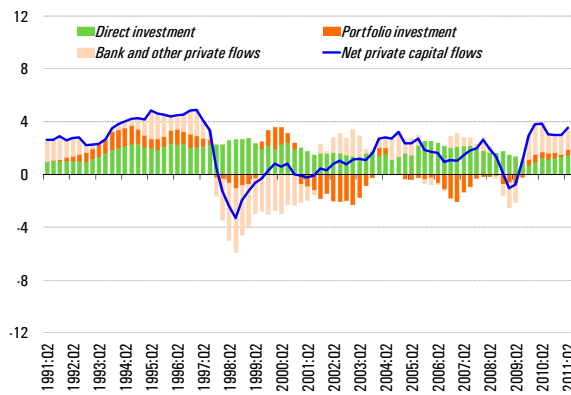
To address these questions, this paper is structured as follows: Section II documents the size and composition of recent flows to Asian emerging markets from a historical perspective. Section III compares developments in the broader economy, asset prices, and corporate variables across the different episodes of strong inflows. Section IV reviews country experiences in managing the risks associated with inflows. Section V concludes.

The analysis finds that net inflows in the recent episode have yet to reach previous peaks and that there is significant variation in magnitudes across countries. Unlike in previous episodes, there is little evidence of a significant buildup of imbalances and resource misallocation, and the measures taken mostly targeted specific types of portfolio flows and leverage of banks’ foreign currency exposure, rather than generalized controls on all flows. The paper argues that the use of regulatory types of measures taken in response to capital inflows is not a new development. Asian countries have used such measures during past surges as well, although there is no strong evidence of their efficacy without supporting monetary and fiscal policies.

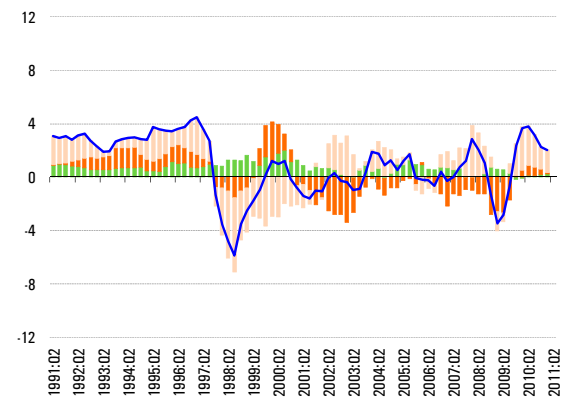
¹ We focus on emerging Asia, in other words, Asia excluding Japan, Australia, New Zealand, and low income countries. Throughout the paper, NIEs refer to Hong Kong SAR, Korea, Singapore, and Taiwan Province of China whereas ASEAN-5 refers to Indonesia, Malaysia, the Philippines, Thailand, and Vietnam.

Figure 1. Emerging Asia: Net Private Capital Flows¹
(In percent of GDP; 4-quarter moving average)

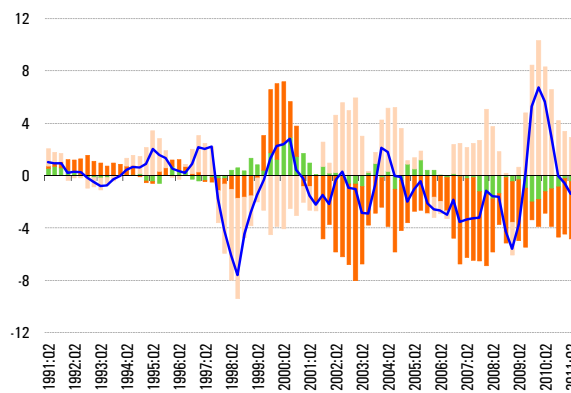
Emerging Asia



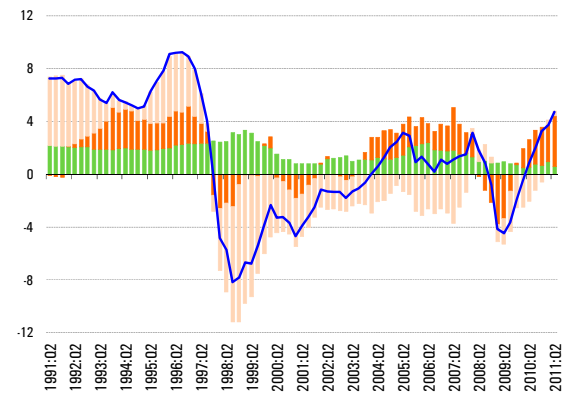
Emerging Asia (excl. China)



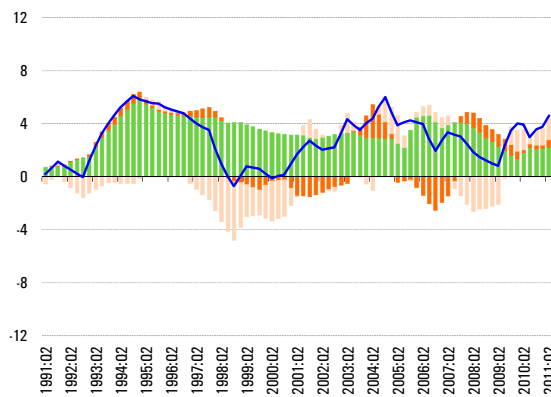
NIEs



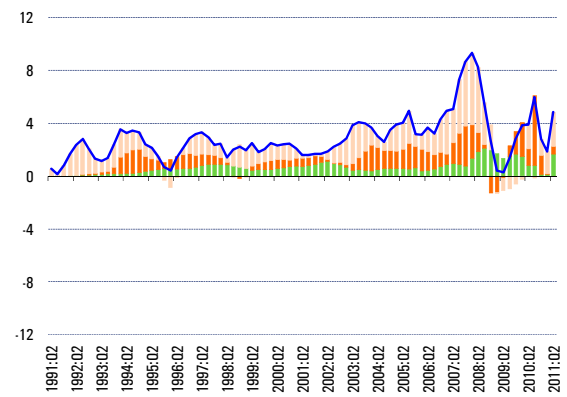
ASEAN-5



China



India



Sources: CEIC Data Company Ltd.; IMF, *Balance of Payments Statistics*; WEO database; and staff calculations.

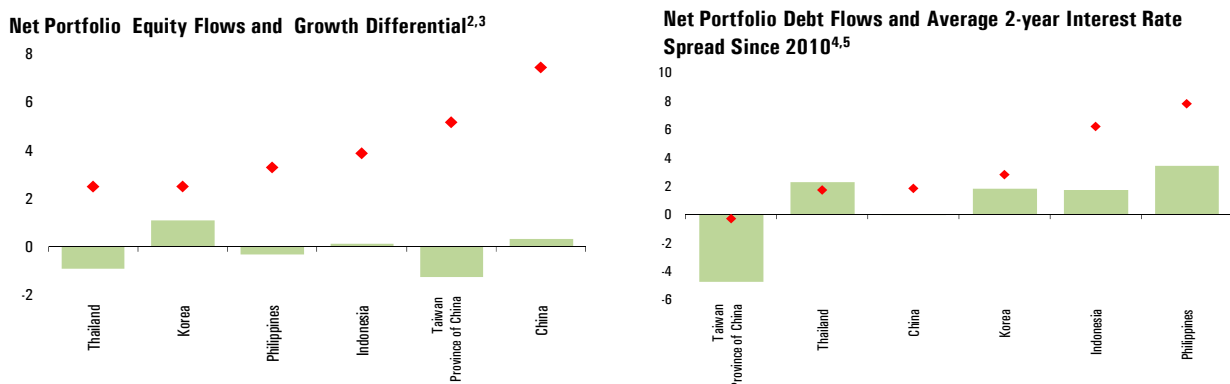
¹ Missing historical observations have been approximated by annual data obtained from IMF WEO database.

II. CAPITAL FLOWS ACROSS EPISODES: THE FACTS

There have been two other major episodes of inflows to Asia over the past two decades. The first episode began in the early 1990s and ended abruptly with the 1997–98 financial crisis, while the second began in the early 2000s and again ended abruptly with the GFC (Figure 1). For the region as a whole, the global peak in net capital flows was in the second quarter of 1996, at about $6\frac{3}{4}$ percent of aggregate regional GDP, a figure nearly reached again in the first quarter of 2004. In contrast, net capital flows peaked at around $4\frac{1}{4}$ percent of GDP in the recent episode. Of course, as Asia has changed and developed since the Asian crisis, so has the nature of the flows, which now go to markets that are deeper than existed in the late 1990s. What is remarkable about this episode is the speed of the recovery. Within just five quarters, net inflows rose from a recent trough (in early 2009) to their recent peak (in mid-2010). In contrast, the length between the troughs and peaks was about 25 quarters during the pre-Asian crisis period and the period before the GFC.

Growth and interest rate differentials do not appear to explain much of the recent inflows (Figure 2). In particular, there does not appear to be a strong association between equity inflows and growth differentials with advanced economies. Indeed, many countries have faced equity outflows perhaps reflecting that uncertainty regarding the global outlook has offset the “pull” of sizable growth differentials. There does appear to be somewhat of a stronger relationship between bond flows and interest rate differentials for some countries (Indonesia, Korea, the Philippines, and Thailand). In line with our results, Ghosh and others (2012) also show that for a larger sample of emerging economies, global factors—including U.S. interest rates and risk aversion—are more important in determining whether a surge in capital inflows will occur than growth differentials.

Figure 2. Drivers of Inflows¹



Sources: CEIC Data Company Ltd; IMF, *Balance of Payments Statistics*; WEO database; and staff calculations.

¹ Dots denote growth differential (or average interest spreads) and bars denote net portfolio flows.

² Net portfolio equity flows in percent of GDP since 2010-Q1.

³ Average growth differential relative to advanced economies in 2010 and 2011.

⁴ Net portfolio debt flows in percent of GDP since 2010-Q1.

⁵ Spread over 2-year US Treasury bond interest rate.

A. Identifying Surges of Capital Inflows to Asia

In order to put the recent surge of capital inflows into a historical perspective, this section identifies episodes of large net private capital inflows to Asia. We analyze the dynamics of net capital flows to focus on the joint behavior of foreign and domestic agents. This is critical when considering policy responses motivated by concerns about overheating, external competitiveness, asset prices, and financial stability. Broner and others (2011) find some evidence that changes in the net capital inflows are driven mostly by foreigners in developing countries, with domestic investors' behavior being most relevant for the behavior of net flows in high-income countries. Forbes and Warnock (2011) also find that in recent years the size and volatility of gross flows in many countries have increased, while net capital flows have been more stable.

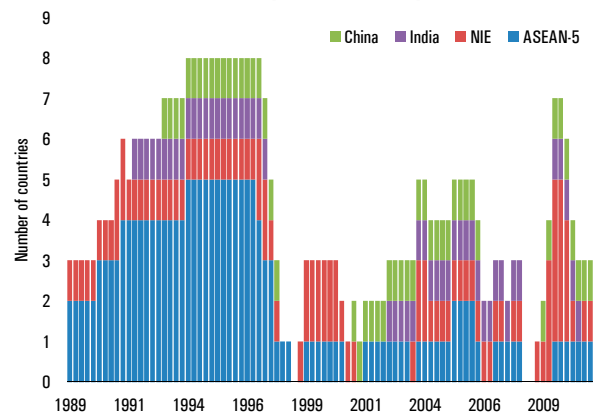
The focus is on net capital flows after stripping out official flows, and a “surge” in capital flows is defined by largely following the methodology outlined in IMF (2007).² Broadly speaking, under this definition, an episode of large net private capital flows for a particular country is a period of two or more quarters during which these flows (as a share of GDP) are significantly larger (1 standard deviation) than their historical trend or above the 75th percentile of their distribution over the whole sample.³ The main findings are as follows:

² Specifically, we exclude all flows to the general government and monetary authorities within the “other investment” component of the financial account, which is expected to be largely driven by nonmarket driven factors (e.g., bilateral sovereign loans and transactions with the IMF). This concept of capital flows is different from the “private” concept used in IMF (2007), as it still includes nonresident purchases of government bonds.

³ The trend is taken to be the eight quarter moving average. There are a number of other supplementary rules to avoid very short gaps between episodes of surges: (i) if only one quarter with positive inflow separates two adjacent surges, it is combined with the two adjacent episodes to form one continuous episode; (ii) if inflows remain elevated following the first period of a surge, they are counted in the surge (the elevated level is defined as above 50 percent of the flow in the previous [surge] quarter); and (iii) if inflows dip for one period following a surge and then return to elevated levels, they are counted in the surge. We have also made a correction to take into account large errors and omissions in the balance of payments that could represent unrecorded capital flows. Specifically, we find that if the errors and omissions are counted as part of net capital flows, Vietnam would stop qualifying as a surge after mid-2008 and we have made that adjustment.

- Distribution.* In total, there have been 32 surge instances over the last 20 years (Table 1 and Figure 3). While the 2000s episode had the highest number of surges (13), the surges of the 1990s were of longer duration. There have been nine surges since the global financial crisis. The NIEs (Hong Kong SAR, Korea, Singapore, and Taiwan Province of China) and India all experienced surges recently, but most of them ended before the end of 2010 (Figure 4).⁴ Only China had an ongoing surge as of mid-2011.⁵ Turning to the ASEAN-5, only the Philippines and Vietnam qualify as having experienced a surge during this episode.

Figure 3. Distribution of Capital Inflows Episodes



Source: IMF, Balance of Payment Statistics and IMF staff calculations.

- Size.* For emerging Asia as a whole, the surges during the 1990s were the biggest, with a weighted average net capital inflow of 5 percent of GDP (Table 1). The surges during the pre-global financial crisis period and the recent rebound are around the same size, with a weighted average inflow of about 4 percent of GDP.

Perhaps unsurprisingly, aggregate numbers hide some sizable country variations (Figure 5). More than half of total inflows to Asia are now in the form of (relatively risky) bank-related and other private flows, while such flows were only about 20 percent of inflows during 1987-98 and about half of total inflows during 1999-08. For ASEAN-5 countries, banking flows and FDI have fallen substantially since the mid-1990s in favor of sizable portfolio debt flows. Overall, the pre-Asian crisis surges in the ASEAN economies were far bigger than subsequent surges. In India, by contrast, net capital flows had been on a secular rise since the capital account liberalization of 1991, but declined in 2011. In China, the surges have gradually decreased over time, with the composition shifting from FDI to banking flows.

⁴ Given how we define surges, capital flow data for future quarters may result in some changes in the categorization of ongoing surges.

⁵ Note that IMF (2011c), using a different methodology, also identifies three large gross capital inflows episodes for China since 1990s, which covers longer periods than this paper (1993Q1-98Q2; 2002Q3-08Q2; 2009Q3-ongoing). For India, it identifies the period since 2009Q2 and ongoing as the current inflow episode, which is also longer than this paper.

Table 1. Episodes of Large Net Private Capital Inflows— Summary Statistics

	Emerging Asia	ASEAN-5	NIEs	China	India
Number of episodes	32	12	14	3	3
1989—1998	10	5	3	1	1
1999—2008	13	5	6	1	1
Recent	9	2	5	1	1
Percentage of episodes that ended in a sudden stop ¹	62	60	85	0	33
Average size (percent of GDP) ²					
1989—1998	5.1	6.9	5.6	4.8	2.4
1999—2008	4.3	3.2	5.4	3.7	4.8
Recent	4.4	2.2	7.9	3.8	4.8
Median duration (in quarters)	7	9	5	20	23
1989—1998	25	30	10	20	23
1999—2008	6	7	5	22	23
Recent	4	4	4	10	5

Sources: IMF, *Balance of Payment Statistics*; and IMF staff calculations.

¹ An episode is considered to end in a "sudden stop" if the ratio of net private capital inflows to GDP in the year after the episode ends is more than 5 percentage points of GDP lower than at the end of the episode.

² Market GDP-weighted average across episodes.

In contrast to the aggregate trend, the NIEs—in particular Hong Kong SAR and Korea—had larger surges following the global financial crisis. This shows up in an average inflow for NIEs of almost 8 percent of GDP, relative to about 5½ percent during the 1990s and 2000s. In Hong Kong SAR, the recent surge was dominated by extraordinary banking-related flows, likely reflecting its status as a financial center. In Korea, portfolio debt flows were at record levels. The average level of flows is also highest for the recent surge in the case of India (nearly 5 percent of GDP), as portfolio flows rose dramatically—although net inflows actually peaked in the pre global financial crisis surge, reflecting large external commercial borrowing by Indian enterprises.

The profile and composition of recent capital flows also differs widely across countries.

Korea's unprecedented surge petered out to insignificant inflows, as large portfolio inflows were offset by FDI and banking-related outflows.⁶ Indonesia and Thailand had significant net capital flows recently, again reflecting strong portfolio inflows, although neither country was in a "surge." Malaysia has generally suffered from capital outflows both before and after the GFC, although, yet again, with substantial portfolio inflows through the first half of 2011. India's surge was also mainly because of portfolio inflows, but of the equity kind.

⁶ It is worth noting that in Korea and several other countries capital outflows (presumably including resident capital flight) are at times much larger than the accumulation of past inflows and pose a major risk to the economy.

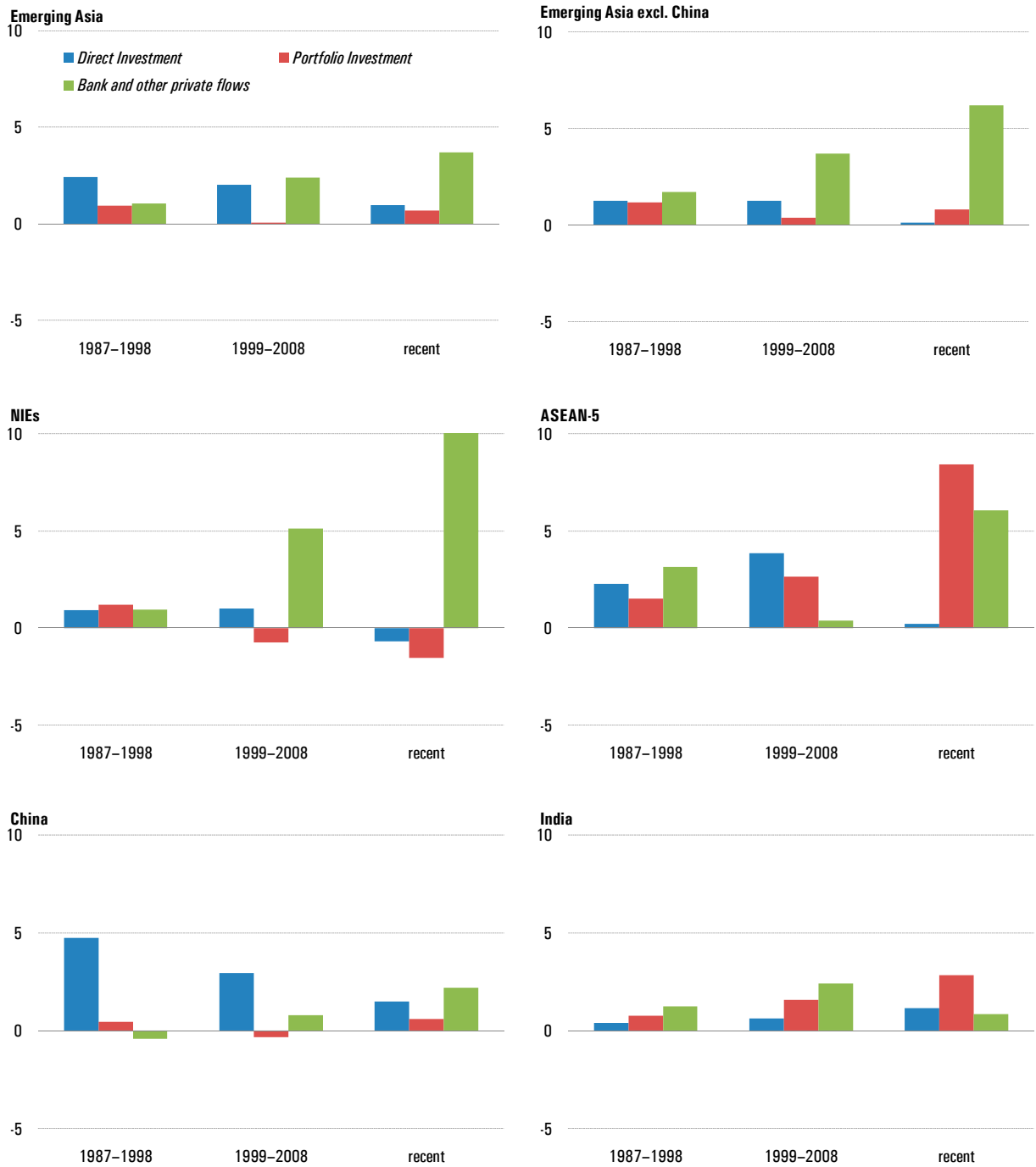
Figure 4. Emerging Asia: Net Private Capital Flows¹
(In percent of GDP)



Sources: CEIC Data Company Ltd; IMF, *Balance of Payments Statistics*; WEO database; and staff calculations.

¹ Missing historical observations have been approximated by annual data obtained from IMF WEO database.

Figure 5. Emerging Asia: Average Net Private Capital Flows during Episodes
(In percent of GDP)

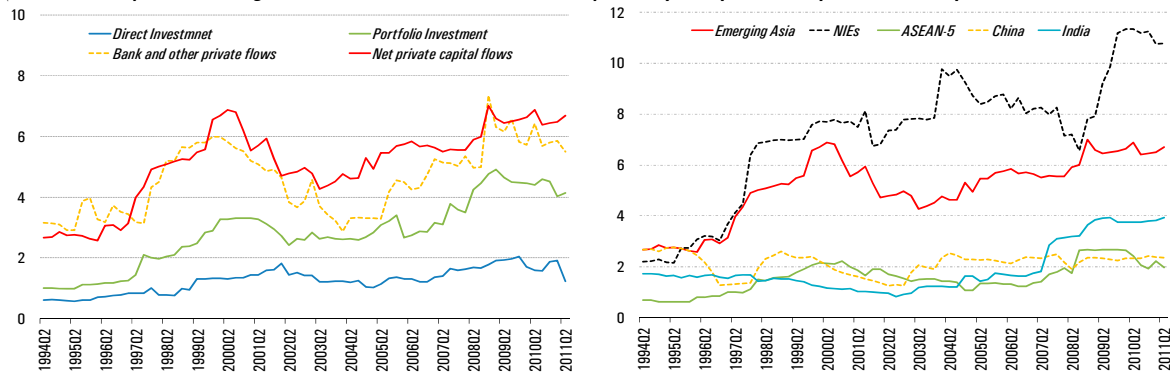


Source:IMF staff calculations.

B. Volatility and Financial Depth

A perennial concern of policymakers in emerging market countries is the volatility of capital flows, which is understandable given that over 60 percent of surges in Emerging Asia have ended in sudden stops (Table 1). Moreover, Figure 6 shows that the volatility of net capital flows has generally increased across time for all types of flows and regional groupings (see also IMF, 2011b). This likely reflects continued financial globalization, which has generally led to increasing gross inflows and outflows over time.⁷

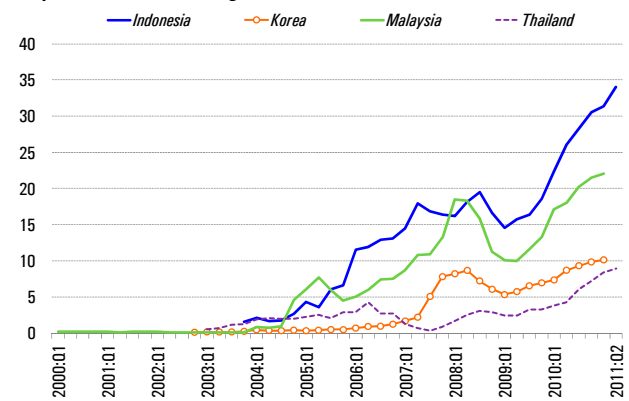
Figure 6. Emerging Asia: Volatility of Net Private Capital Flows by Flow Type and Recipient Economies
(median, 16-quarter rolling window, standard deviation of quarterly net private capital flows in percent of GDP)



Sources: CEIC Data Company Ltd; Asian Bonds Online; and IMF, *Balance of Payments Statistics*; WEO database; and staff calculations.
Note: Missing historical observations have been approximated by annual data obtained from IMF WEO database.

A more recent concern relates to the increasing share of Emerging Asian sovereign bonds owned by foreigners (Figure 7). For the four countries most associated with the Asia crisis, this has risen considerably since the early 2000s, and especially for Indonesia and Malaysia, where foreign ownership has reached around 30 and 20 percent respectively. Combined with a potential increase in U.S. interest rates triggering capital flight on a larger scale than before (IMF, 2011b), this may suggest an increasing vulnerability to a sudden withdrawal of foreign capital in some countries.

Figure 7. Foreign Holdings of Local Government Bonds
(In percent outstanding)



Source: Asian Bonds Online.

⁷ However, Broner and others (2011) show that the volatility of net capital flows has generally increased less than the volatility of gross capital flows because gross capital inflows and gross capital outflows are positively correlated.

A related concern is the level of inflows in relation to the financial depth of countries. Here, the picture has not been uniform (Figure 8). Indonesia has received the largest amount of inflows relative to the size of its financial markets and Korea the least. The presence of large inflows in relatively shallow markets raises several concerns, including that asset price

bubbles can form more quickly and that any sudden withdrawals can be particularly destabilizing to the recipient country.

III. BROADER ECONOMIC AND ASSET VALUATION PATTERNS ACROSS TIME

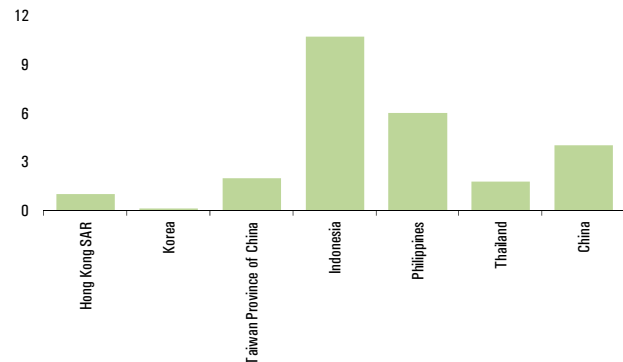
The rapid recovery of the region following the global financial crisis is in marked contrast to the aftermath of the Asian crisis. This section

addresses whether different

macroeconomic and asset imbalances

can help explain this contrast and whether imbalances are building up currently.

Figure 8. Cumulative Gross Capital Inflows in 2010:Q1-2011:Q2 to Financial Depth¹



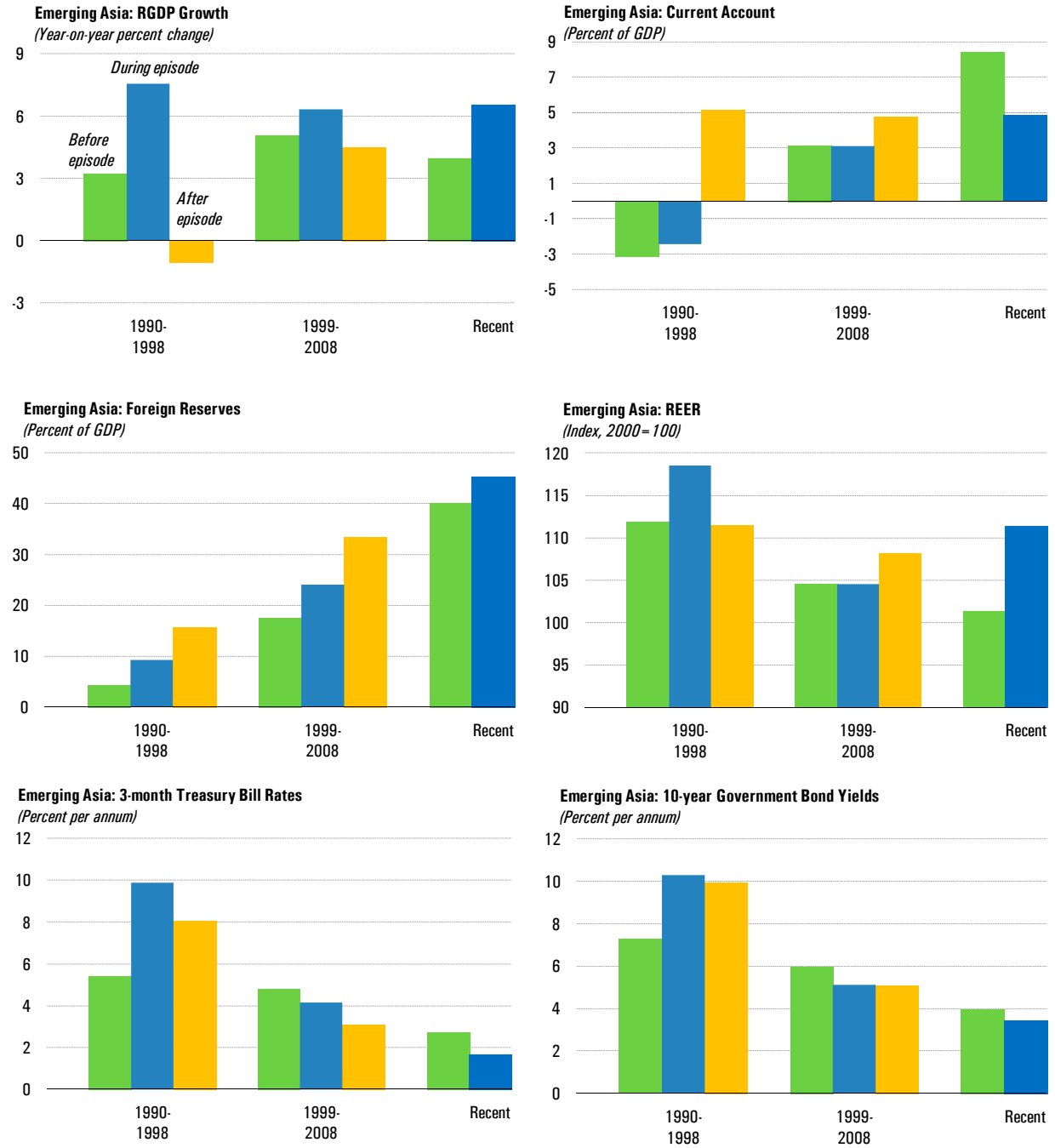
Sources: CEIC Data Company Ltd; IMF, *Balance of Payments Statistics*; WEO database; and staff calculations.

¹ Financial depth is defined as the sum of equity market capitalization, debt securities outstanding, and bank deposits.

A. Macroeconomic Dynamics around Surges

Macroeconomic developments have differed substantially across time (Figure 9). In particular, growth did not collapse after the global financial crisis as it did after the Asian crisis. Moreover, the increase in the growth rate was more marked during pre-Asian crisis surges than in subsequent ones. Many analysts have pointed to the role of better fundamentals in explaining these differences. Certainly current account balances were much healthier in the run up to the global financial crisis, with surpluses being the norm rather than the sizable deficits of before the Asian crisis. Reserve levels were also significantly higher and real effective exchange rates (REERs) were more depreciated on average. During recent surges, both short-term and long-term interest rates appear to have fallen, whereas during the pre-Asian crisis surges they tended to increase, perhaps reflective of the increasing role of portfolio debt flows after the global financial crisis. Moreover, external buffers look even larger now, at least in terms of current account surpluses and reserves levels.

Figure 9. Emerging Asia: Macroeconomics Dynamics around Surges



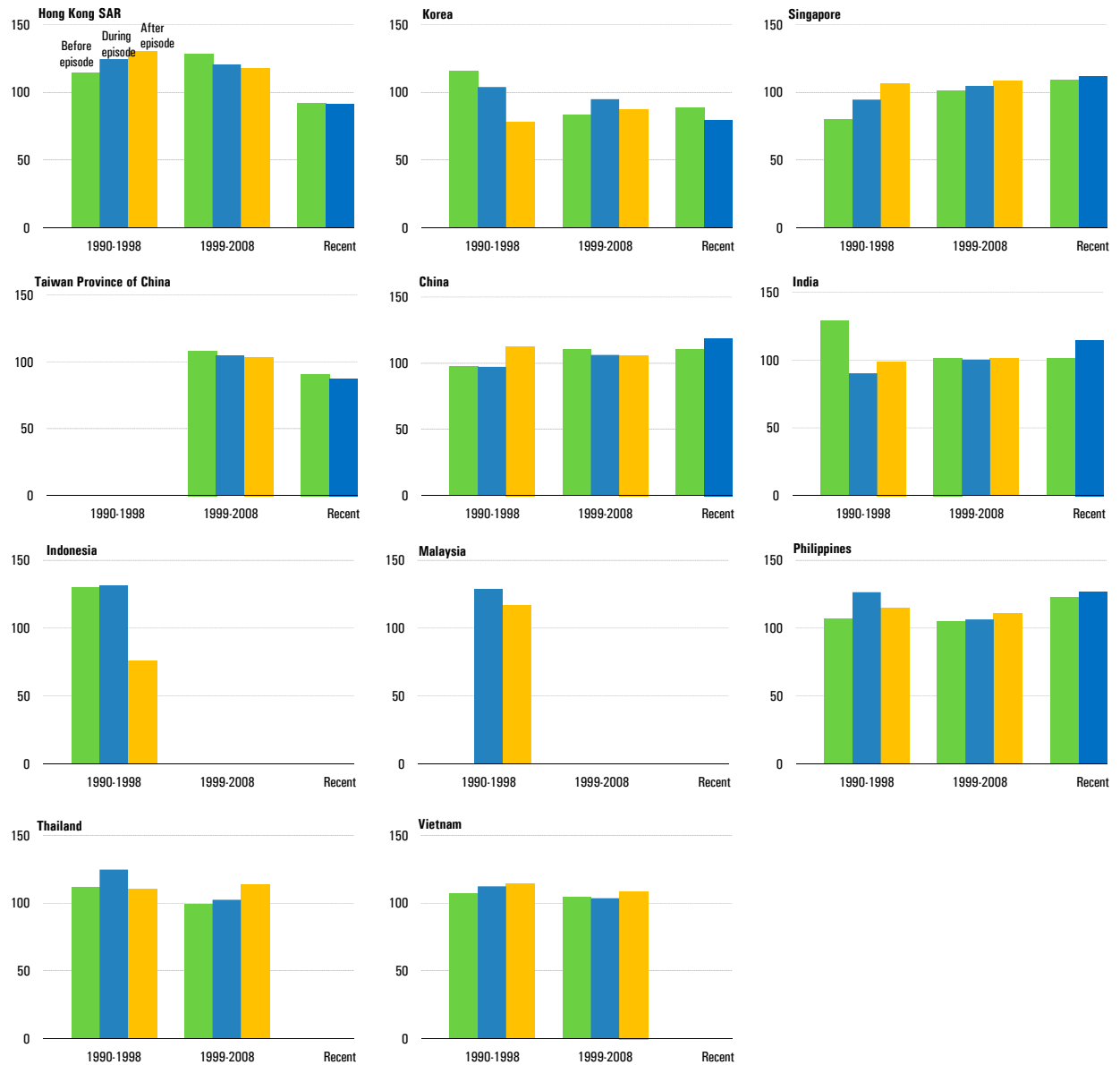
Source: IMF staff calculations.

Figure 10. Emerging Asia: Exchange Market Pressure Index (Index)



Source: IMF staff calculations.

Figure 11. Real Effective Exchange Rate
(Index, 2000 = 100)

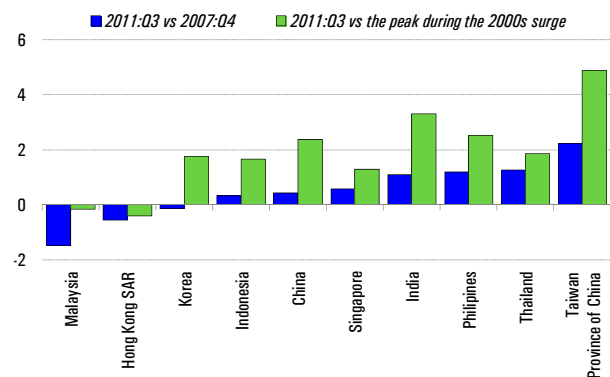


Source: IMF staff calculations.

There are fewer signs of imbalances in Asian asset markets now than during previous capital inflow surges. Comparing the deviations from long-term averages of current asset valuations with peak levels in previous episodes of large capital inflows suggests that (see Figures 10—12 and Table 2):⁸

- *Exchange Markets.* In general, in response to exchange market pressure (EMP), the region historically tended to intervene and accumulate reserves (Figure 10), although there was some exchange rate appreciation until financial volatility escalated in mid-2011, after which many currencies depreciated significantly. During the recent surge, EMP did not generally reach the peaks pre-global financial crisis except in the cases of Hong Kong SAR and Korea. Moreover, despite the appreciations of 2010, real effective exchange rates are significantly below historical peaks in most economies (Figure 11).
- *Equities and bonds.* Across all economies in Asia, equity valuations (forward-looking price-earnings ratios) reached significantly higher peaks during the previous episodes of large capital inflows, particularly in the build-up to the Asian crisis. The picture is almost identical for bonds. 10-year sovereign bond spreads were wider in the third quarter of 2011 than the low point reached before the global financial crisis and at the eve of the crisis (2007:Q4, see Figure 12).
- *Real estate markets.* There were strong signs of overheating in the build-up to the Asian crisis according to house price-to-rent and price-to-income indicators, with the possible exception of Indonesia.⁹ There were fewer such signs before the global financial crisis, except for price-to-rent ratios in Taiwan Province of China; and price-to-income ratios in China, India, Indonesia, and Taiwan Province of China. As of 2011:Q2, price-to-rent ratios appear relatively strong only in China, Hong Kong SAR, and Malaysia.

Figure 12. Selected Asia: 10-year Bond Spreads¹
(In percent; difference between 2011:Q3 and troughs in previous episodes of large net capital flows)



Sources: CEIC Data Company Ltd.; Haver Analytics; and IMF staff estimates.
¹ Spreads over 10-year U.S. treasury bond interest rate.

⁸ A z-score represents the deviation from the long-term average expressed in the number of standard deviations. Green signifies less than 1.5 standard deviations above, orange 1.5–2 standard deviations above, and red greater than 2 standard deviations above. For methodologies, see Annex 1.9 of IMF (2010c).

⁹ Pre-Asian crisis data is not available for China, India, Malaysia, and Taiwan Province of China.

Table 2a. Financial Indicators Across Episodes of Large Net Capital Flows to Emerging Asia

	Equity forward-looking price/earnings ratios ^{1,2}			Growth of credit-to-GDP ratios ^{1,4}		
	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode
China	24.0	32.8	14.2	10.6	10.5	24.8
Hong Kong SAR	15.8	21.1	17.2	26.5	14.5	26.6
India	23.6	21.7	17.5	1.5	5.4	2.1
Indonesia	22.2	15.6	14.4	16.3	3.7	2.6
Korea	20.7	12.3	12.2	24.9	20.3	15.8
Malaysia	27.2	17.1	15.5	24.9	9.4	21.4
Philippines	20.0	19.6	16.5	11.4	2.2	3.7
Singapore	27.2	22.6	14.3	11.8	21.0	8.8
Taiwan Province of China	33.2	23.9	29.4	16.9	8.3	1.4
Thailand	43.0	13.3	11.5	19.0	5.7	6.5
Vietnam	...	...	...	...	21.9	22.4

	Residential price/rent ratios ^{1,2,3}			Residential price/income ratios ^{1,2,3}		
	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode
China	...	100.0	108.5	...	151.0	129.6
Hong Kong SAR	151.6	119.6	137.9	198.5	129.9	142.7
India	...	103.1	91.9	...	111.9	95.2
Indonesia	253.1	258.4	99.7	154.5	176.1	99.8
Korea	121.8	101.1	100.5	275.7	106.5	98.0
Malaysia	...	107.7	108.5	...	122.2	107.3
Philippines	379.0	191.9	99.1	237.9	162.7	102.9
Singapore	155.2	130.9	117.5	165.4	124.7	101.6
Taiwan Province of China	...	120.8	112.7	...	103.7	99.8
Thailand	183.5	127.5	101.9	240.9	183.9	106.6
Vietnam	...	...	...	...	...	...

Sources: CEIC Data Company Ltd.; Haver Analytics; Thompson Reuters I/B/E/S database; Organization for Economic Co-operation and Development; and IMF, *International Financial Statistics* and staff estimates.

¹ Colors represent the extent of the deviation from long-term averages expressed in number of standard deviations (*z-scores*). Green denotes less than 1.5 standard deviations above long-term averages, orange between 1.5 and 2 standard deviations, and red greater than 2 standard deviations. For methodologies, see Annex 1.9 of IMF (2010a).

² For Indonesia, Korea, Malaysia, and Thailand, the period 1998–2000 is excluded in determining the peaks.

³ Indexes equal to 100 in 2002:Q3 for Taiwan Province of China and in 2008:Q4 for other economies.

⁴ Annual changes in credit-to-GDP ratios.

Table 2b. Corporate Indicators Across Episodes of Large Net Capital Flows to Emerging Asia

	Debt/equity ratios ¹			Short-term debt/Total debt ratios ¹		
	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode
	China	66.7	61.6	43.7	91.0	93.2	88.9
Hong Kong SAR	38.1	30.8	19.7	61.1	74.7	55.5
India	155.2	85.2	72.9	40.5	40.3	41.2
Indonesia	190.4	106.3	41.7	83.9	68.2	67.4
Korea	264.1	81.8	67.3	60.0	74.9	76.7
Malaysia	59.3	45.7	33.6	76.7	80.6	61.1
Philippines	67.0	39.8	16.1	65.1	70.3	48.7
Singapore	44.5	36.8	28.2	67.2	67.7	63.0
Taiwan Province of China	46.2	56.3	28.4	90.1	79.2	73.4
Thailand	166.0	68.2	34.3	84.82	74.4	76.4
Vietnam	...	53.8	47.4	...	78.9	79.7

	Debt/Asset ratios					
	Small firms			Large firms		
	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode
China	24.3	20.7	18.0	37.6	32.0	31.7
Hong Kong SAR	24.4	21.1	18.3	37.8	32.4	31.8
India	25.4	22.9	20.4	41.1	34.0	32.1
Indonesia	29.8	27.6	23.1	57.3	43.0	27.8
Korea	28.7	26.6	23.3	56.0	43.5	25.6
Malaysia	23.6	19.4	13.0	34.2	30.2	28.4
Philippines	26.1	23.9	21.3	43.0	34.0	32.6
Singapore	21.3	19.0	11.2	32.9	29.4	26.7
Taiwan Province of China	25.6	23.1	18.3	41.9	34.0	24.4
Thailand	25.3	22.5	20.3	40.5	33.9	31.6
Vietnam	...	21.8	23.2	...	42.6	25.2

	Export-oriented			Domestic-oriented		
	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode	Peak during the 1990s surge	Peak during the 2000s surge	Peak during the recent episode
	China	27.0	31.3	26.6	29.0	34.8	32.3
Hong Kong SAR	21.9	20.0	16.9	...	...	...
India	43.9	33.0	32.6	43.9	34.5	33.0
Indonesia	66.4	56.0	24.9	58.9	54.3	29.2
Korea	48.7	34.8	36.1	55.0	39.7	10.6
Malaysia	31.0	28.4	21.4	58.4	46.2	21.9
Philippines	34.0	24.9	17.5	30.6	29.8	33.6
Singapore	26.3	23.8	18.9	45.7	74.3	43.4
Taiwan Province of China	27.2	29.9	19.3	32.8	34.0	22.7
Thailand	53.9	40.1	25.3	52.1	48.3	24.6
Vietnam	...	22.9	26.1	..	...	...

Source: Thomson Reuters Worldscope.

¹ Colors represent the extent of the deviation from long-term averages expressed in number of standard deviations (*z-scores*). Green denotes less than 1.5 standard deviations above long-term averages, orange between 1.5 and 2 standard deviations, and red greater than 2 standard deviations. For methodologies, see Annex 1.9 of IMF (2010a).

- *Credit growth.* Most countries showed signs of excessive credit expansion during the capital inflows episodes of the 1990s. Although there were fewer signs of excessive credit growth before the global financial crisis, more recently credit dynamics have been particularly strong in China, Hong Kong SAR, Malaysia, and Vietnam. Moreover, as shown in Elekdag and Wu (2011), credit booms seem tightly interconnected with large capital inflows in Emerging Asia. For the 16 Emerging Asia credit booms which have been identified since 1983, bank and other flows increase during the build up phase, particularly for booms that are followed by credit busts. This suggests that there will be a need for continued vigilance as and when capital inflows pick up again.
- *Corporate sector.* Firms have deleveraged markedly since the Asian crisis, before which corporate debt-to-equity ratios were in the red or orange zone for all countries except for Taiwan Province of China. There also appears little duration risk in the debt that has been accumulated as only Korea is in the orange zone. At a disaggregated level, the picture does not change significantly for large and small firms, as well as domestically and export oriented firms.

External buffers are larger and asset price valuations appear more in line with fundamentals now than during previous surges. However, Asian economies are still at an early stage of the capital flow cycle. The equity booms of the 1990s all took at least ten quarters to peak from the start of a surge episode. Moreover, as suggested in IMF (2011a), the few signs of recent overheating pressures more likely reflect domestic imbalances than capital inflows, suggesting that imbalances often develop outside of capital inflow surges. Finally, concerns about the volatility of capital flows remain. Given the relatively shallow markets in some countries, this suggests that asset price bubbles can still form quickly, and that sudden stops remain a real possibility. In sum, potential for imbalances to develop very much remains.

IV. MACROPRUDENTIAL AND OTHER CAPITAL FLOW MEASURES

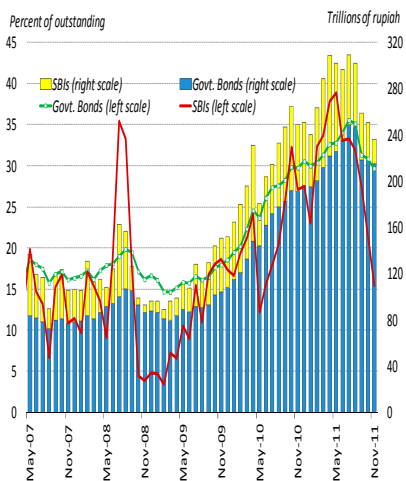
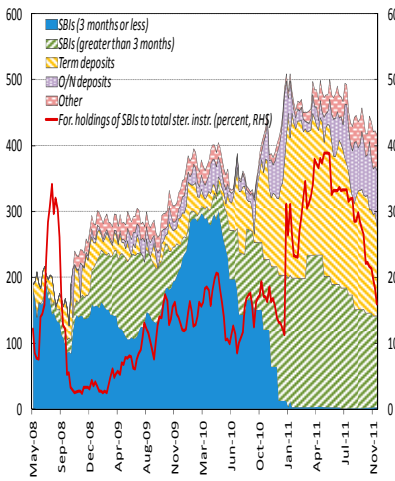
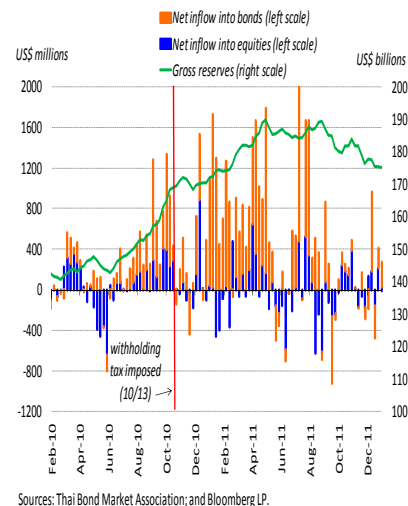
The use of prudential or regulatory measures to address surging inflows and asset imbalances is not a new phenomenon. Most recently, the implemented measures have essentially targeted five broad objectives: (i) to mitigate complications for central bank market operations that stemmed from inflows to short-term instruments, (ii) to limit inflows to local bond markets, (iii) to reduce risks in both the banking system and the real economy, (iv) to limit vulnerabilities stemming from private sector external borrowing; (v) and to reduce currency speculation. We briefly discuss below selected country cases to provide a flavor of the background behind, and implications so far, of some of these measures. While it is too early to fully assess the efficacy of the measures taken in the recent episode, evidence from measures taken previously suggests that they may not be sufficient, by themselves, to address the imbalances.

Macroprudential, structural, and capital flow management measures are all part of the policy toolkit. Macroprudential and structural measures designed to strengthen the capacity of the economy to absorb capital inflows are always encouraged. Beyond this, when confronted with surging inflows, appropriate macroeconomic policies should be put in place. Capital flow management measures, which encompass a broad range of administrative, tax, and prudential measures that are designed to influence capital flows, are also part of the policy toolkit.¹⁰ They can be used to address specific macroeconomic and financial stability risks related to inflows under certain circumstances, but are not a substitute for macroeconomic policy adjustment. In addition, measures that do not discriminate on the basis of residency are generally preferable (IMF, 2011c).

In Indonesia, the focus has been on managing the impact of inflows on central bank operations. Foreign holdings of central bank bills reached almost a third of the outstanding stock by mid-2010, leading to concerns that efforts to sterilize the foreign purchases were simply attracting even more inflows. This appears to be related to two factors: (i) large interest rate differentials; and (ii) arbitrage opportunities between offshore and onshore short-term local currency interest rates. To tackle the problem, over 2010, Bank Indonesia introduced a one month holding period for central bank bill purchases and phased out shorter maturity bills. Then in May 2011, the minimum holding period for SBIs was extended from one month to six months and Bank Indonesia introduced longer tenors for SBIs. Since the measures were imposed, foreign holdings of both central bank bills and government bonds (Figure 13) have increased in absolute terms and as a proportion of the total outstanding. Foreign ownership of SBIs as a proportion of outstanding liquidity absorbing instruments has declined, however, as non-tradable term deposits have become a more important sterilization tool.

Thailand sought to limit inflows into local bond markets. The country faced historically high portfolio flows in the third quarter of 2010, mostly into sovereign debt. In response, Thailand reinstated a 15 percent withholding tax on nonresidents' interest earnings and capital gains on new purchases of state bonds in October 2010. Immediately afterwards, inflows fell, but by December they resumed again (Figure 13). The limited effect is primarily due to the double taxation agreements Thailand has with many countries. The uncertainty surrounding the operational aspects of the tax also dampened both debt and equity inflows. Korea re-introduced a similar withholding tax on foreign purchases of state bonds in January 2011.

¹⁰ More specifically, these measures comprise: (i) residency-based measures, affecting cross-border financial activity that discriminate on the basis of residency—often referred to as capital controls; and (ii) other measures that do not discriminate on the basis of residency, but are nonetheless designed to influence flows, including some macroprudential measures (IMF, 2011c).

Figure 13. Indonesia and Thailand: Capital Flows**Indonesia: Foreign Holdings of Government Bonds and SBIs****Indonesia: Composition of Sterilization Instruments**
(In trillions of rupiah)**Thailand: Weekly Foreign Portfolio Inflows and Reserves**

In Taiwan Province of China, the authorities were concerned that high frequency onshore and NDF trading were mostly driven by speculators, leading to excessive volatility in the exchange rate. The central bank, therefore, sought to limit local banks' capacity to provide liquidity to NDF markets, including by discouraging nonresident deposits by imposing punitive reserve requirements. Volatility, however, rose in late 2010 and early 2011, with foreign exchange (FX) market turnover and inbound remittances for investment purposes remaining high.

Apart from the measures discussed above, which are aimed at stemming certain types of inflows, there have also been measures targeted at specific asset imbalances. For example, several jurisdictions introduced or tightened real estate lending criteria in 2009–11, including China, Hong Kong SAR, India, Korea, Malaysia, Singapore, Taiwan Province of China, and Thailand. Hong Kong SAR and Singapore also raised sellers' stamp duty substantially, especially for properties held for short periods of time; and Singapore imposed an additional buyer's stamp duty targeted at foreign and corporate buyers.

Overall, the measures implemented so far have been less heavy-handed when compared with the past, at least outside of the real estate market. Certainly, we have seen nothing like the unremunerated reserve requirement of 30 percent on non-FDI inflows introduced in Thailand in late 2006. Yet the objectives of the interventions have not changed fundamentally, albeit managing flows into sovereign debt has been more prominent this time around. For example, during the capital flow surges of the 1990s, measures were put in place to: (i) reduce offshore commercial borrowing and restrict the activities of banks (Indonesia 1991, Malaysia 1992 and 1994, Thailand 1995); (ii) stem short-term inflows (Malaysia 1994, Thailand 1995); and reduce currency speculation in offshore markets (Thailand 1997, Malaysia 1998). The relatively different

measures now perhaps reflect that countries are at an early stage of any capital flows surge cycle and that the level of inflows has yet to reach historical highs. Moreover, policymakers have learnt from past experiences, such as the negative repercussions for the equity market of the 2006 Thai measure.

It is too early to assess the effectiveness of the macroprudential measures adopted in many emerging Asian economies over the past few quarters. However, it is possible to identify similar measures that were adopted in the past (since the mid-1990s), and to assess where they have been associated with changes in capital flows and key financial variables. We use IMF's online *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER) to identify macroprudential measures introduced in China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, Philippines, Singapore, and Thailand during 1999-2009. The old 1995-1998 measures were collected from printed AREAER reports, with the focus mostly on the countries at the epicenter of the Asia Crisis: Indonesia, Korea, Malaysia, and Thailand. The information about the most recent measures was obtained from IMF's desk economists. We look at policies that are broadly similar to those taken now, i.e. not outright capital controls that discriminate on the basis of residency. We classify measures into FX-related measures that target foreign-currency liabilities, housing-market prudential measures, and other prudential measures that do not target foreign liabilities.

We use the event study methodology to measure the ability of macroprudential policies to stem surges in net capital flow, limit exchange market pressures, and cool down real estate markets. The impact of each type of measures is tested over a relatively short period of a few quarters before and after each policy was introduced—the *event window*—covering four quarters prior and up to six quarters post the policy announcement. For capital inflows, the significance of the impact is assessed by averaging the differences between the post-announcement and prior-announcement inflows, across country events over the sample period. The significance of the average impact on each inflow type (total net capital inflows, portfolio investment, and bank loans/other investment) is then tested using a standard one-sided t-test. For FX and real estate market pressures, the impact is measured in the same way, with exchange market pressure index, residential price-to-rent ratios, and price-to-income ratios as our depended variables.

The result suggests that FX-related and other measures have been generally associated with some moderation in net capital inflows (the top panel of Table 3). The full-sample event study results suggest that macroprudential policies intended for limiting the buildup of systematic risk in the financial sector without target foreign liabilities are most likely to stem the net private capital inflows in a statistically significant manner. These policies reduced the net flows by 1.9 percentage points of GDP (relative to the preexisting capital flow volumes during the four quarters before the policy was implemented). The impact on portfolio and banking flows is also statistically significant, albeit of smaller magnitude (1.2 and 1.7 percentage points, respectively). In contrast, the FX-related macroprudential policies tend to lower net inflows by only 1.3 percentage points. In addition, the large variations in responses imply that FX-related measures are as likely to decrease inflows as they are to increase them. Overall, the results

suggest, in line with findings of Qureshi and others (2011), that prudential policies can enhance the country's economic resilience.

The impact of macroprudential policies seems weaker in the recent years (the bottom panel of Table 3). Among the policies introduced during 2000-2011, only the FX-related measures had some significant impact on the bank and other inflows. The overall impact of other prudential measures on net overall flows as well as portfolio and banking flows was mostly insignificant, largely due to strong flows to India and Philippines in the run-up to the global financial crisis, where the flows continued to increase regardless of the implemented measures. However, these countries could have experienced an even larger surge in capital inflows in the absence of the policy response (IMF, 2010a).

The adoption of housing-related measures has been followed by lower residential price-to-rent and price-to-income ratios. Overall, the policies are associated with an 11.5-point decline in price-to-rent ratios and a 2.0-point decline in price-to-income ratios, both of them statistically significant. The impact on price-to-income ratios in the 2000-2011 subsample is of similar magnitude and also statistically significant, with the response taking only 2 quarters (as opposed to 5 quarters in the full sample case). However, price-to-rent ratios did not seem to move much in response to housing measures introduced after the 1990s¹¹.

¹¹ Further analysis suggests that the significance of these results is driven by property cooling measures introduced in Singapore in the late 1990s and early 2000s. These included lowering LTV ceilings, hiking stamp duties and capital gains taxes, and measures to tighten access to public housing. Given the unique nature of Singapore (a city state with a large share of public housing), it's not clear how applicable these results are to other countries.

Table 3. Selected Asia: Impact of Macroprudential Measures
(In percentage points of GDP unless otherwise noted)

	FX-related prudential measures	Housing market prudential measures	Other prudential measures
<i>Full sample 1996-2011</i>			
Net private capital inflows	-1.3 (4)		-1.9 (5)
Portfolio investment	-0.6 (1)		-1.2 (4)
Bank loans/ other investment	-1.8 (4)		-1.7 (5)
Exchange Market Pressure Index	-1.4 (2)		
Residential price/rent ratios ¹		-11.5 (4)	
Residential price/income ratios ¹		-2.0 (5)	
<i>2000-2011</i>			
Net private capital inflows	-1.4 (1)		0.2 (6)
Portfolio investment	0.3 (1)		-0.1 (5)
Bank loans/ other investment	-1.6 (1)		0.2 (6)
Exchange Market Pressure Index	-1.4 (2)		
Residential price/rent ratios ¹		0.2 (6)	
Residential price/income ratios ¹		-2.3 (2)	

Sources: IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*, *International Financial Statistics*, and staff estimates.

Note: Only unique events, for which capital flows and asset valuation data are available, are considered in the analysis. The impact of each policy is assessed within the six quarters following the introduction of the measure, controlling for volumes/ levels during the year before the measure was introduced. The significance of the impact is tested using the standard one-sided t-test. The table reports the impact during the first quarter the policy is effective, or—for measures not statistically significant—most effective (the number in brackets informs which quarter it is). The results reported in bold are significant at the 10 percent level.

¹ The price/rent and price/income ratios are scaled to be equal to 100 in 2002:Q3 for Taiwan POC and 2008:Q4 for other countries.

V. CONCLUSION

The most recent surge of capital flows to emerging Asia did not reach previous peaks and there were only isolated signs of pressures, but policymakers should remain focused on potential risks to the real economy and financial stability from capital inflow surges. There was significant variation across countries in both the magnitudes and types of inflows experienced. Signs of risks from asset valuations and corporate indicators remain largely muted and external buffers are large. Nevertheless, there are isolated pockets of concern, such as credit dynamics in some countries and certain segments of property markets around the region. The strong pace of the surge until late 2010 and the volatile nature of subsequent flows point to a need for continued vigilance.

A mixed policy toolkit will likely be required to manage large capital inflows.

Macroprudential measures taken in the most recent surge have been appropriately narrowly

targeted. It is difficult to assess the efficacy of the measures taken this time around, given that it takes time to adequately judge their full impact and the dramatic change in the global environment during 2011. But experience with past surges suggests that such measures may not always suffice, by themselves, in preventing the buildup of risks. Thus traditional tools of macroeconomic management—monetary policy and fiscal policy—will remain essential in managing demand conditions to prevent risks to the real economy and financial stability from building up. Given the size of external buffers currently, allowing the exchange rate to take more of the burden of exchange market pressure will also help not just in managing inflows but in rebalancing global demand.

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