The financial stability implications of increased capital flows for emerging market economies

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Introduction

Deepening economic and financial integration between emerging and advanced economies has become one of the salient features of global economic developments over the past decade. It has manifested itself, among other ways, in the recent surge in private capital flows from advanced economies to emerging markets, but also in the reverse flows of capital from emerging market countries running large external surpluses to some advanced economies and developing countries. Along with many economic and financial benefits, increased capital flows have brought with them considerable policy challenges.

This paper examines some key financial stability challenges of increased capital flows for emerging market economies. It focuses in particular on the implications of, and policy responses to, increased cross-border banking flows. These financial stability issues have received less attention than the macroeconomic implications of capital flows (such as exchange rate appreciation and internal and external imbalances) and standard policy responses to these challenges (greater exchange rate flexibility, sterilisation, etc).

To set the stage for the subsequent discussion of financial stability issues, Section 1 examines some stylised facts on recent trends in capital flows to emerging market countries. The trends in gross inflows and outflows of private capital clearly point to growing financial integration of emerging market economies with the rest of the world. The trends in net inflows suggest a build-up of moderate macroeconomic pressures in Asia and Latin America, and very large pressures in central and eastern Europe. Of particular interest to financial stability are the large increases in gross inflows of investments to banks and the non-bank private sector, and in gross outflows to debt securities. The latter have been part of the recent phenomenon of "recycling" of capital inflows by emerging market economies, in which institutional investors such as pension funds and sovereign wealth funds are increasingly playing an important role.

Section 2 examines how cross-border banking flows affect some key risks to financial stability in emerging markets. The analysis is selective rather than exhaustive. First, the risks stemming from cross-border banking flows in the emerging markets with a significant presence of foreign-owned banks are examined. It is argued that the solvency risk is generally lower in such markets, but the credit risk and the potential for capital flow volatility and cross-border contagion are higher. Second, financial stability risks emanating from increased investment by non-residents and foreign-owned financial institutions in foreign exchange and money markets of selected EMEs are examined.

Section 3 concludes with a review of policy responses to these risks. These responses have involved not only general macroeconomic and financial market reforms, but also the strengthening of a whole range of prudential regulations and banking supervision in general.

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[1] The author thanks Marjorie Santos and Jimmy Shek for excellent research assistance, and Byung Chan Ahn, Michael Chui, Már Gudmundsson, Hoe Ee Khor, Ramon Moreno, Ilhyock Shim, Philip Turner, Bill White, and participants of the Deputy Governors' Meeting and a joint seminar at Singapore Management University and IMF's Singapore Regional Training Institute for valuable comments on an earlier draft of this paper.

1. Recent trends in emerging market capital flows

Definitions and data

Most of the literature on capital flows to emerging market countries analyses *net* flows, which indicate how large the balance of external funds that enter or leave an economy is. While the composition of net capital flows matters for financial stability, net flows per se are primarily important from the macroeconomic (ie demand) management perspective rather than the financial stability perspective.

As this paper discusses the financial stability consequences of capital flows it will focus mainly on *gross* inflows and outflows of capital. Gross capital flows are important on at least three grounds: first, as a measure of financial integration between emerging and advanced economies; second, as a source of information for macroeconomic analysis; and third, as a key source of information for financial stability analysis. For instance, gross inflows and outflows could be more or less balanced in terms of size, leading one to conclude that capital flows raise no major macroeconomic or financial stability issues. However, whether gross inflows and outflows are each equivalent to 1% or to 20% of GDP is not inconsequential for macroeconomic and financial stability. The flows of private capital of 20% of GDP are bound to affect the domestic financial system and the economy, even though in net terms the funds that stay in the country might not appear exceptionally large. Balanced net flows might also conceal major discrepancies in terms of the composition (eg, FDI vs portfolio and other investments; debt vs equity flows) and other characteristics of capital flows (eg maturity and currency composition). Therefore, from the financial stability perspective it is essential to analyse gross and not just net capital flows.

The paper will focus on *private* as opposed to official flows of capital. Over the past decade, private capital flows have clearly come to dominate official flows in all emerging markets (Appendix Table A3), including those with less developed financial markets such as Africa.

The period examined is mostly 2001–07, with some comparisons made to capital flows in the 1990s. The country groupings used in the paper are emerging Asia (China, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand); Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela); and central and eastern Europe (CEE: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Turkey). The aggregate for all emerging market economies also includes, in addition to these countries, Russia, Saudi Arabia and South Africa.

The main data source is detailed country balance of payments data in IMF's *International Financial Statistics* (IFS). Gross private capital inflows and outflows are added up item by item (rather than derived as a difference between current account balances, change in reserves and official flows, as is often the case in the literature) and flows involving the official sector (government and monetary authorities) are excluded.[2] Data for 2007 are mainly estimates from the IMF's April 2008 *World Economic Outlook*. Data on cross-border loans come from the BIS locational banking statistics.

The data are mostly analysed by emerging market regions rather than by individual countries. Because of the focus on financial stability issues, the paper considers not only total regional capital flows but also averages for countries within each region (equation 1). The former is useful from the global economy (or global investment) perspective, for instance, when considering global flows of capital (or opportunities for diversification) and associated imbalances. The latter is useful as an indicator of the effects of capital flows on

[2] Because of limited availability of data in the IFS, Slovakia is not included in the CEE aggregate.

an *average* country in the region. For this reason, regional averages are not weighted by the size of the economy.[3]

Total regional capital flows (as a percentage of regional GDP) $\frac{\sum_{i=1}^{n} KF_i}{\sum_{i=1}^{n} Y_i}$ vs $\frac{1}{n}\sum_{i=1}^{n}\frac{KF_i}{Y_i}$ Average capital flows for countries within a region (as a percentage of GDP) (1)

Size and composition of gross capital inflows

The recent wave of gross inflows of private capital to the emerging market economies started around 2002 and accelerated in the past two to three years (Graph 1). In emerging Asia, gross private capital inflows averaged almost 15% of GDP in 2007 (top right-hand panel). This was 5 percentage points higher than before the 1997–98 crisis, even though the region is now running a large current account surplus. In Latin America, gross private inflows picked up from 1% of GDP in 2002 to almost 6% on average in 2007 (bottom left-hand panel), about 3 percentage points below the historical peaks from the early 1990s. In CEE, opportunities created by accession to the European Union have boosted gross private capital inflows to over 20% of GDP on average in recent years (bottom right-hand panel), an unprecedented level for EMEs in recent history. As a result, this region now receives around 26% of gross private capital inflows to emerging markets (compared with around 11% in the mid-1990s); Latin America receives around 12% (against 29%); emerging Asia 47% (against 51%); and other emerging markets around 19% (against 9%).

The latest surge in gross private capital inflows has been for the most part due to FDI and other investment inflows, which increased by a cumulative $1.5 trillion and $1.2 trillion, respectively, between 2002 and 2007 (Graph 2). Portfolio inflows increased by a cumulative of $0.9 trillion over the same period. As a result, the share of FDI in gross inflows has dropped since the start of the decade to around 30% of the total in 2007, while the shares of portfolio and other investment inflows have increased considerably, to 32% and 38%, respectively (Graph 3).

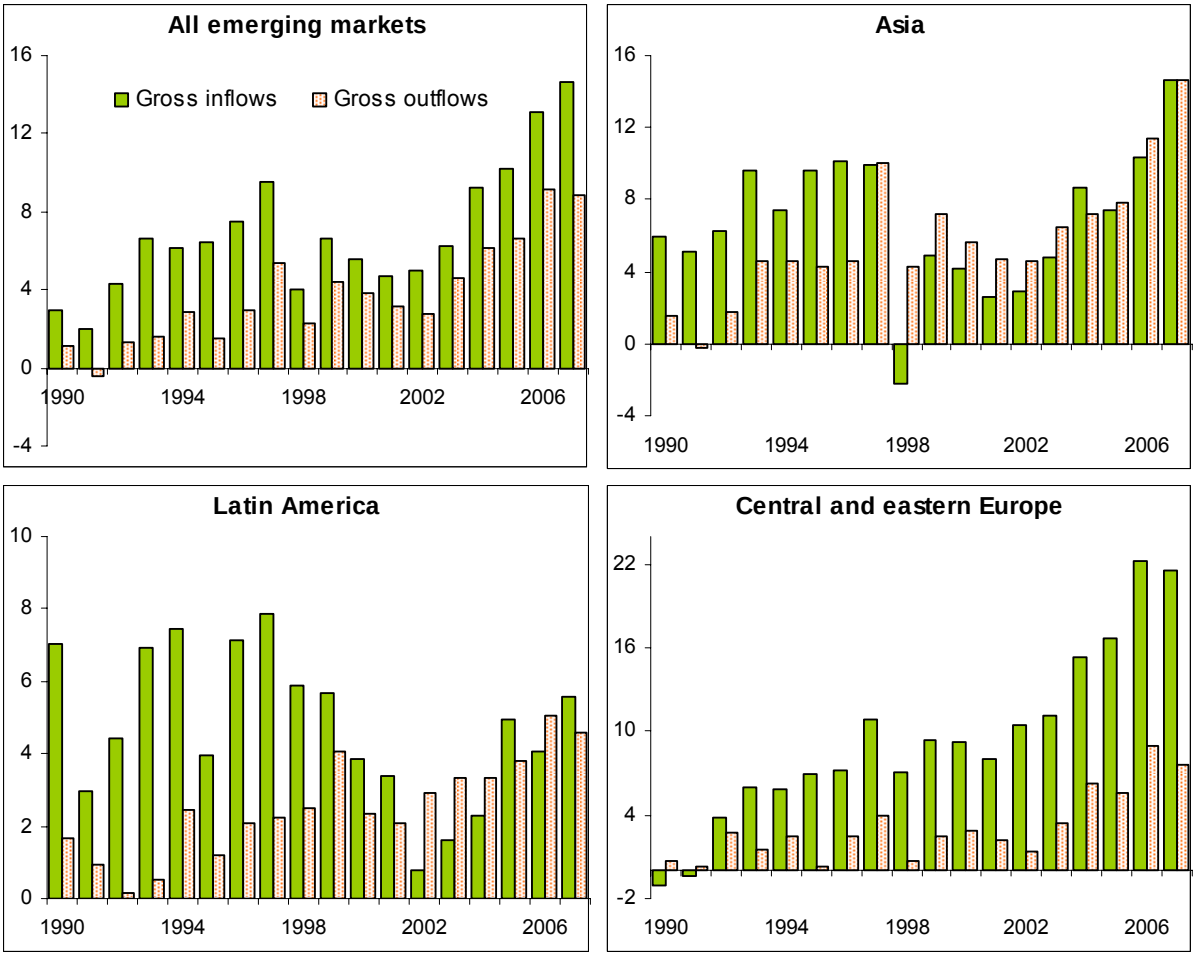
What is special about the current wave of gross capital inflows to EMEs, compared to the previous ones, is that it is taking place against the background of much stronger external current account positions (with the exception of CEE) and the accompanying substantial accumulation of official foreign exchange reserves. For instance, the aggregate current account balance of EMEs switched from a deficit of around $60 billion per year on average during 1990–97 to a surplus of over $500 billion in 2007 (Appendix Table A1). During 1990–97, EMEs accumulated on average around $55 billion per year in official reserves, while in 2007 alone their reserves increased by over $1 trillion. One consequence of this huge increase in reserves has been a sharp increase in gross capital outflows from EMEs.

[3] Hong Kong SAR is not included in the emerging Asia region because of extremely large flows relative to the size of the economy, which would distort country averages for this region. While capital flows relative to the size of the economy are also very large in Singapore, they are smaller than in the case of Hong Kong SAR.

Graph 1

Inflows and outflows of private capital

Unweighted country averages, as a percentage of GDP

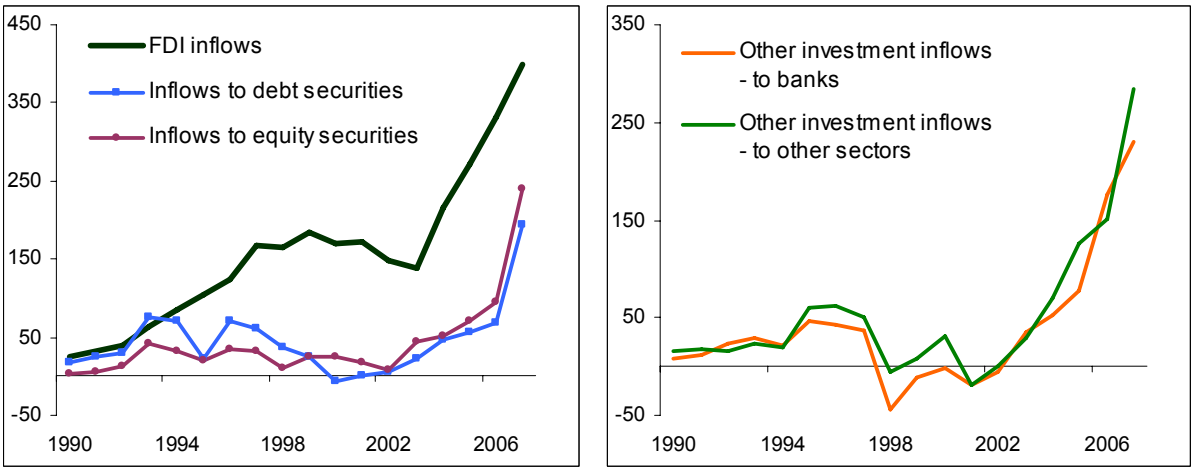


Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; author's estimates.

Graph 2

Gross private capital inflows to emerging market economies

In billions of US dollars, emerging market totals

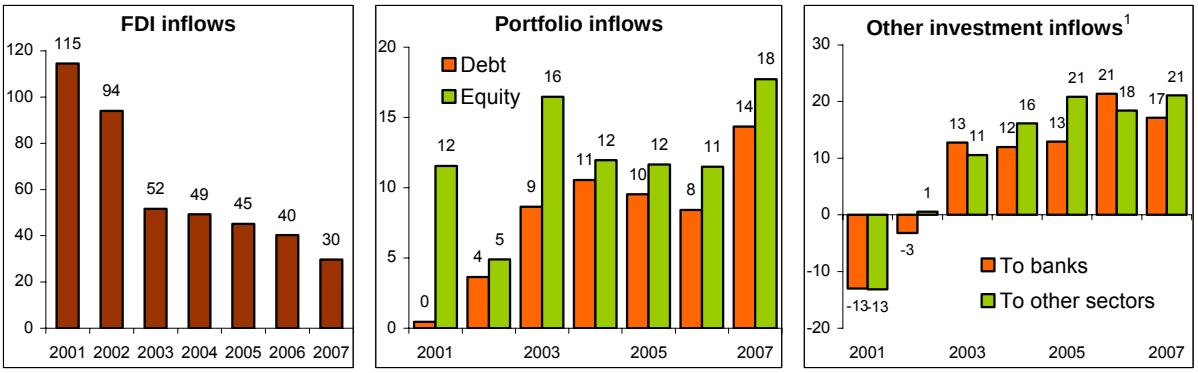


Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; author's estimates.

Graph 3

Composition of gross private capital *inflows*

In percent of gross private capital inflows, emerging market totals



[1] Negative numbers indicate a decrease in foreign ownership of domestic assets classified as other investment inflows.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; author's estimates.

Size and composition of gross capital outflows

As in the case of private capital inflows, the surge in private capital outflows started around 2002 and accelerated in the past two to three years (Graph 1). The change has been particularly pronounced in emerging Asia, where gross capital outflows increased by a cumulative $1 trillion in the past three years alone, reaching over $500 billion in 2006 (Appendix Table A2). In Latin America and CEE, gross outflows increased by a cumulative $260 billion and $180 billion, respectively, since 2005, reaching around $105 billion and $55 billion, respectively, in 2007 (Appendix Table A2). Relative to GDP, gross capital outflows now exceed previous historical peaks in all three regions; they range from 3% of GDP on average in Latin America and CEE, to almost 8% of GDP in emerging Asia (Graph 1).

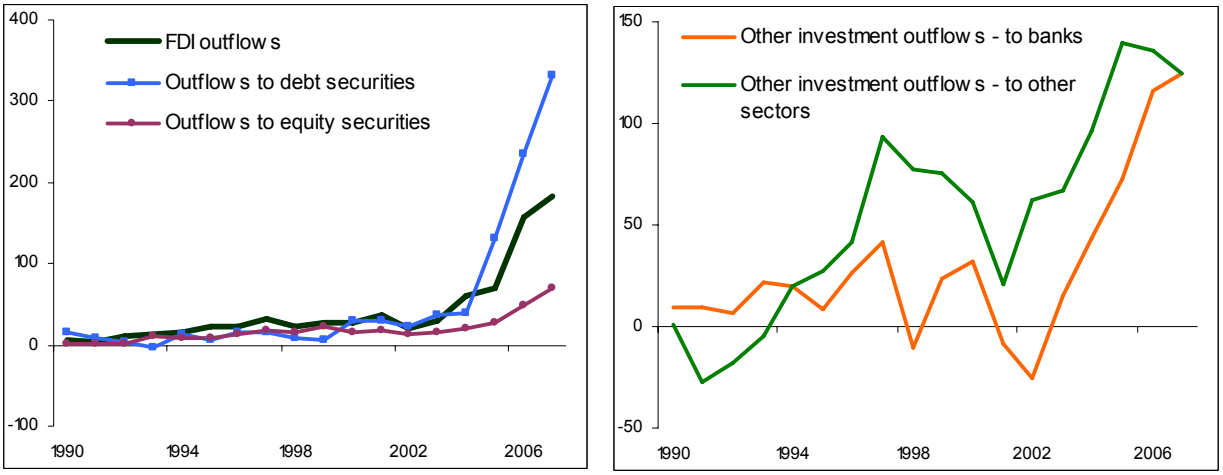
The surge in gross capital outflows has been mostly due to outflows to foreign debt securities, which increased by a cumulative $800 billion since 2002 (Graph 4, left-hand panel). FDI outflows increased by a cumulative $520 billion over this period; other investment outflows to banks by a cumulative $350 billion and to the non-bank private sectors by $630 billion; and outflows to equities by a cumulative $190 billion. Private investors from Asia accounted for most of the increase in all categories of private capital outflows from EMEs.

Unlike gross capital inflows, the composition of gross capital outflows has become less balanced over time. The share of FDI fell to less than a quarter of gross outflows, from close to 40% in 2001 (Graph 5, left-hand panel); the share of equity fell to around 8% of the total (centre panel); and that of other investment outflows to banks to 15% (right-hand panel). The share of portfolio debt outflows increased at the same time to 40% of gross outflows from EMEs. From the financial stability perspective, the more balanced composition of other investment outflows is probably a positive development, given how skewed toward the non-bank sectors these outflows were in the past (Graph 5, right-hand panel). The growing imbalance between debt and equity portfolio outflows might be more of a mixed blessing, however, as it may reflect the use of capital controls and an increase in quasi-official flows (discussed below).

Graph 4

Gross private capital *outflows* from emerging market economies

In billions of US dollars, emerging market totals



Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; author's estimates.

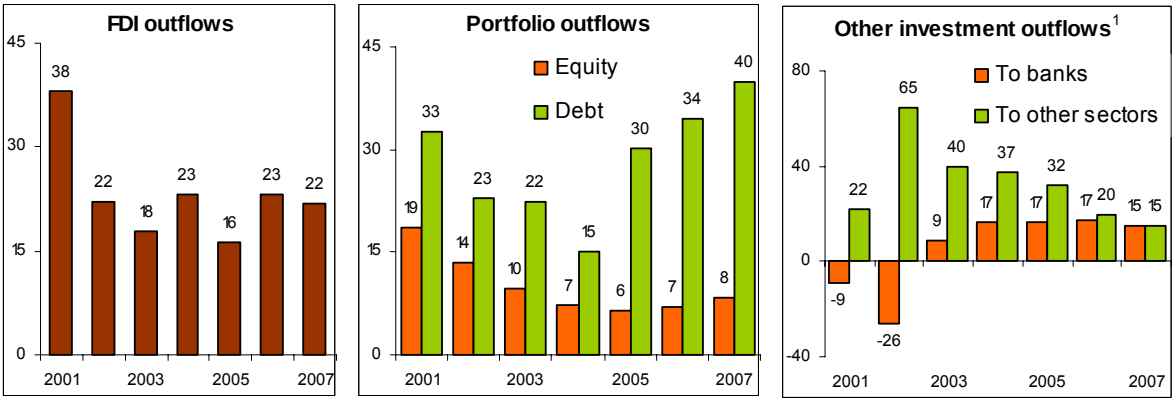
The regional distribution of capital outflows has not changed as much as that of inflows since the mid-1990s. Emerging Asia still accounts for roughly one half of total private capital outflows from EMEs, Latin America for 13%, CEE for 9% and other EMEs in this sample for 28%.

All in all, trends in gross inflows and outflows of private capital over the past few years clearly point to growing financial integration of emerging market economies. What merits attention from the financial stability viewpoint is especially the large increase in inflows to emerging market banks and the non-bank private sector, and the large increase in outflows to foreign debt securities.

Graph 5

Composition of gross private capital *outflows*

As a percentage of gross private capital outflows, emerging market totals



[1] Negative numbers indicate a decrease in domestic ownership of foreign assets classified as other investment outflows.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; author's estimates.

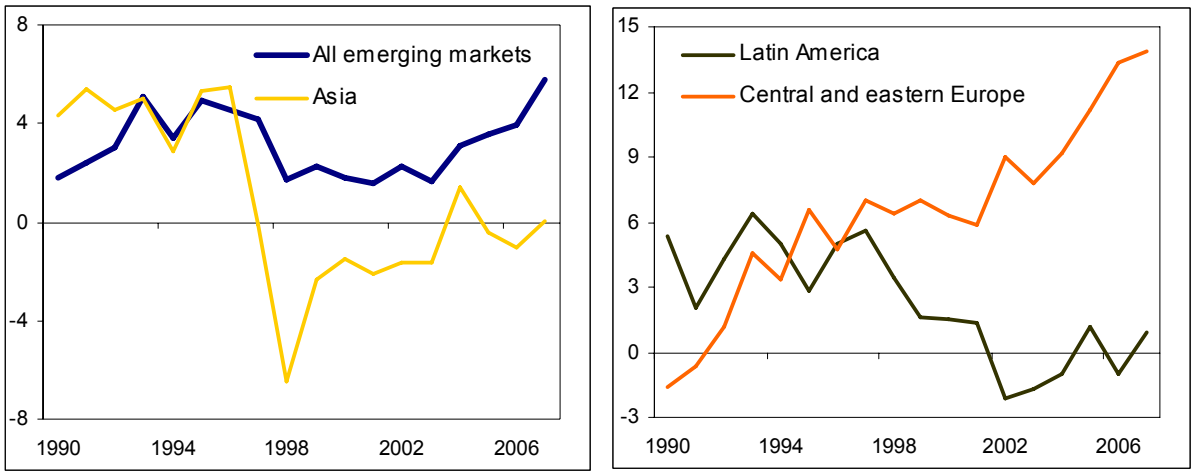
Trends in *net* capital inflows

As noted above, what matters for macroeconomic management is primarily trends in *net* capital inflows, ie any balance of gross inflows and outflows of capital that influences aggregate demand. With the exception of central and eastern Europe, the broad picture of recent trends appears reassuring in this regard: relative to GDP, net capital inflows to emerging Asian and Latin American countries were on average close to zero in recent years (Graph 6). In CEE countries, however, net inflows of private capital reached 14% of GDP on average in 2007 (Graph 6, right-hand panel), generating massive pressures in local financial markets and the real economy.

Graph 6

***Net inflows* of private capital to emerging market economies**

Unweighted country averages, as a percentage of GDP



Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; author's estimates.

That net inflows in emerging Asia are close to balance despite very large gross inflows is mainly the consequence of record high outflows of portfolio capital. In 2007, emerging Asian countries thus had on average a "surplus" of 1.6% of GDP in net FDI inflows, offset by "deficits" of –0.8% each in net portfolio and other investment inflows (Graph 7, left-hand panel). Latin American countries also had positive net FDI inflows (2.4% of GDP on average), offset by negative net inflows of portfolio and other investment capital (Graph 7, centre panel). In CEE countries, net inflows of FDI amounted to 5.6% of GDP on average in 2007, and net other investment inflows to as much as 9.7% of GDP on average (Graph 7, right-hand panel). Only net portfolio inflows were negative (around –1.4% of GDP on average).

Net inflows of FDI have been relatively stable in all three emerging market regions since 2001 (Graph 7). However, net portfolio inflows have been subject to reversals. Net other investment inflows decreased over time in Asia and Latin America, but increased significantly in CEE, raising a number of financial stability issues that are discussed below.

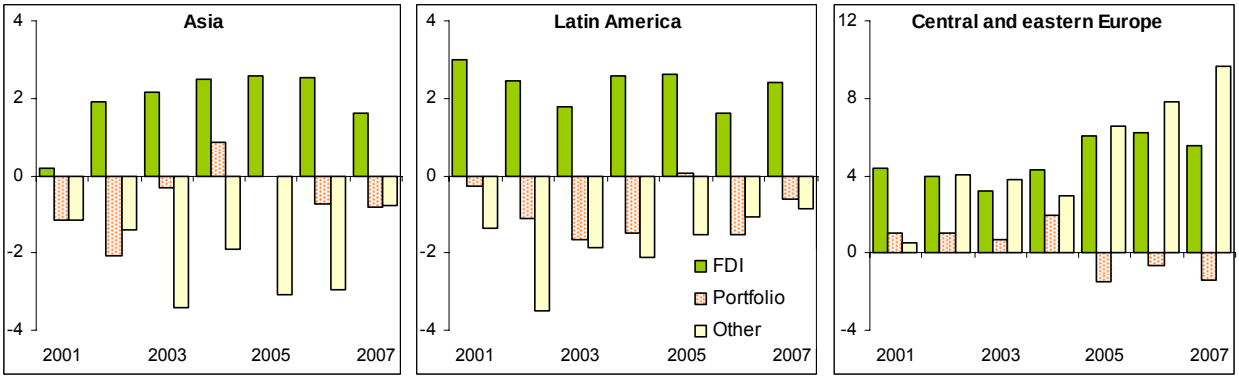
In sum, recent trends would suggest that macroeconomic pressures stemming from net inflows of private capital are low in Asia and Latin America, but very large in CEE. However, as noted above, behind the low net flows in Asia and Latin America are often hidden very large gross flows, which do raise a number of macroeconomic and financial stability issues. Of particular interest would seem to be large net inflows of other investment to banks and the non-bank private sectors in emerging Asia and in particular in CEE, and huge portfolio debt

and equity outflows from emerging Asia. The next two subsections examine developments in cross-border banking flows and in portfolio outflows from emerging market countries.

Graph 7

Composition of *net inflows* of private capital

Unweighted country averages, as a percentage of GDP



Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; author's estimates.

Cross-border banking flows

The balance of payments data on capital flows are highly aggregated and include, among items that are of interest for this paper, money market and negotiable instruments as part of portfolio debt flows; and cross-border loans, trade credit and transactions in currency and deposits as part of other investment flows. In addition, financial derivatives assets and liabilities are shown as a separate item. However, given their limited statistical coverage in EMEs, the financial derivatives flows will not be analysed separately in this paper.

Money market instruments comprise a small and relatively stable proportion of portfolio flows in Asia and CEE (around 2% of gross portfolio inflows, respectively outflows, in the past few years). In Latin America, however, they accounted for 20–50% of gross portfolio inflows (respectively, outflows). This issue is potentially important for financial stability; however, it is not pursued in this paper because it would need to be analysed at a disaggregated country level.

Other investment flows consist for the most part of trade credit and cross-border loans on the gross inflows side (Graph 8, left-hand panel), and trade credit and currency and deposits on the gross outflows side (right-hand panel). To obtain better insight into trends in cross-border banking flows over time, it is useful to look at the BIS locational banking statistics.[4]

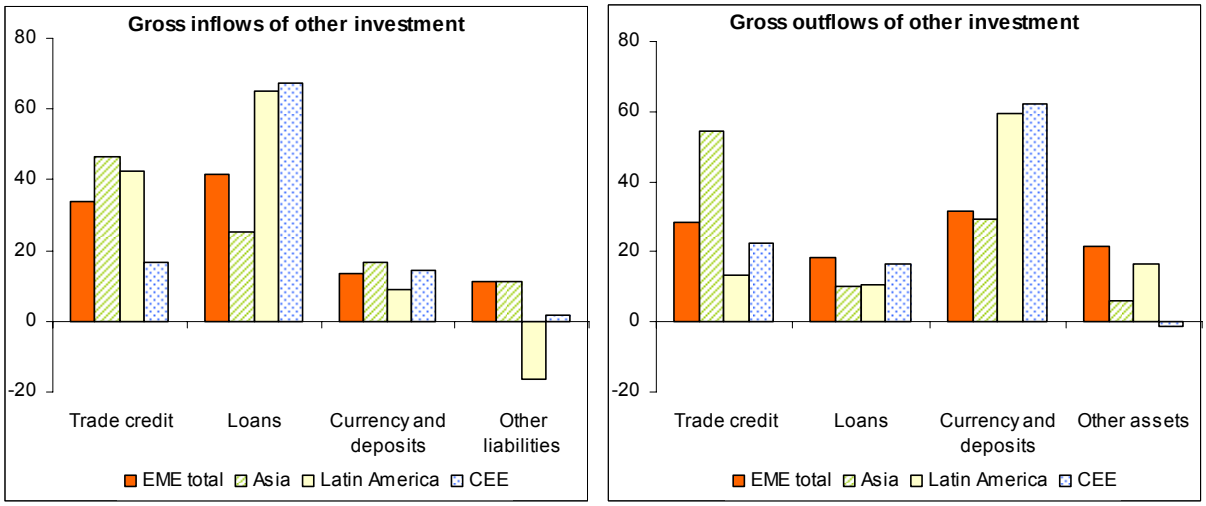
Cross-border claims of BIS reporting banks on EMEs considered in this paper were estimated at $2.3 trillion in 2007 (Table 1), an increase of $1.4 trillion over the past five years. While emerging Asia and CEE secured the bulk of these inflows, relative to GDP they were much more important in the latter case, with the ratio of cross-border claims to GDP doubling to 32% between 2002 and 2007. The CEE countries are thus exposed to significant risks from a possible reversal in bank-intermediated capital flows. By contrast, cross-border loans decreased in Latin America by 4% of regional GDP in the past five years. While in Asia these flows increased slightly (by 2% of regional GDP), relative to the 1990s they were significantly lower.

[4] For an introduction to the BIS banking statistics, see Wooldridge (2002).

Graph 8

Composition of other investment flows

As a percentage of gross inflows/gross outflows of other investment
Unweighted country averages for 2004–06



Source: IMF, *International Financial Statistics*.

Table 1

External positions of BIS reporting banks vis-à-vis emerging market countries

	Amount outstanding					
	USD billions			Per cent of GDP		
	1998	2002	2007	1998	2002	2007
Emerging markets[1]						
Vis-à-vis all sectors	1,017	865	2,290	19.3	14.6	17.3
Vis-à-vis non-bank private sector	366	354	914	6.9	6.0	6.9
Asia[2]						
Vis-à-vis all sectors	574	442	1,068	26.6	14.7	16.9
Vis-à-vis non-bank private sector	105	87	270	4.9	2.9	4.3
Latin America[3]						
Vis-à-vis all sectors	263	233	350	13.9	15.1	11.1
Vis-à-vis non-bank private sector	170	156	213	9.0	10.1	6.8
Central and eastern Europe[4]						
Vis-à-vis all sectors	82	118	579	12.1	16.5	32.4
Vis-à-vis non-bank private sector	44	70	289	6.5	9.8	16.2

Assets of BIS reporting banks vis-à-vis individual emerging market countries; end of period. Totals for positions in US dollars; simple averages for positions as a percentage of GDP.

[1] Sum of the regions below, plus Russia, Saudi Arabia and South Africa. [2] China, India, Indonesia, Korea, Malaysia, Singapore and Thailand. [3] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [4] Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Turkey.

Sources: IMF; BIS locational banking statistics.

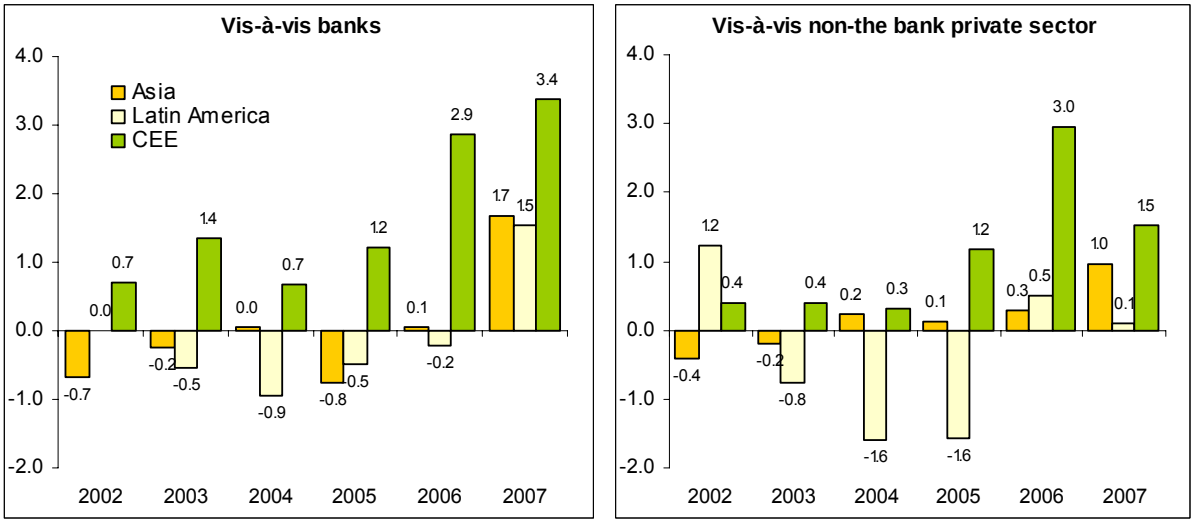
Very large external positions of BIS reporting banks vis-à-vis CEE countries clearly represent a potential source of external vulnerability. Not surprisingly, some analysts (eg Sorsa et al (2007)) have started to draw parallels with the experience of Latin American and emerging Asian countries, which had also run up large bank-intermediated external debt in the 1980s. An important difference is that, unlike that of Latin America in the 1980s and emerging Asia in the 1990s, the external borrowing of CEE countries is taking place against the background of a process of rapid economic and financial integration with the European Union, which acts as a "convergence club" for this region (see Herrmann and Winkler (2008)). In addition, as discussed in Section 2, banking systems in CEE are for the most part foreign-owned and highly competitive. By contrast, in Latin America and emerging Asia, the expansion of cross-border credit was taking place in an environment of, for the most part, financially repressed banking systems (and, in Latin America, as part of import-substitution development policies).

The split of cross-border claims between bank and non-bank sectors differs across EME regions. In CEE, the BIS reporting banks have roughly equal claims vis-à-vis banks and the non-bank private sector (Table 1). In Latin America, claims against the non-bank sector are somewhat higher (60% vs 40%), while in emerging Asia 75% of cross-border claims are held against banks. In all three regions, cross-border claims vis-à-vis banks increased over the past three years, in CEE by a cumulative of 7.5% of GDP (Graph 9, left-hand panel). The increase in cross-border claims vis-à-vis the non-bank private sector was not as pronounced (Graph 9, right-hand panel).

Graph 9

Cross-border claims of BIS reporting banks vis-à-vis emerging markets

Changes in amounts outstanding at end-period, as a percentage of GDP



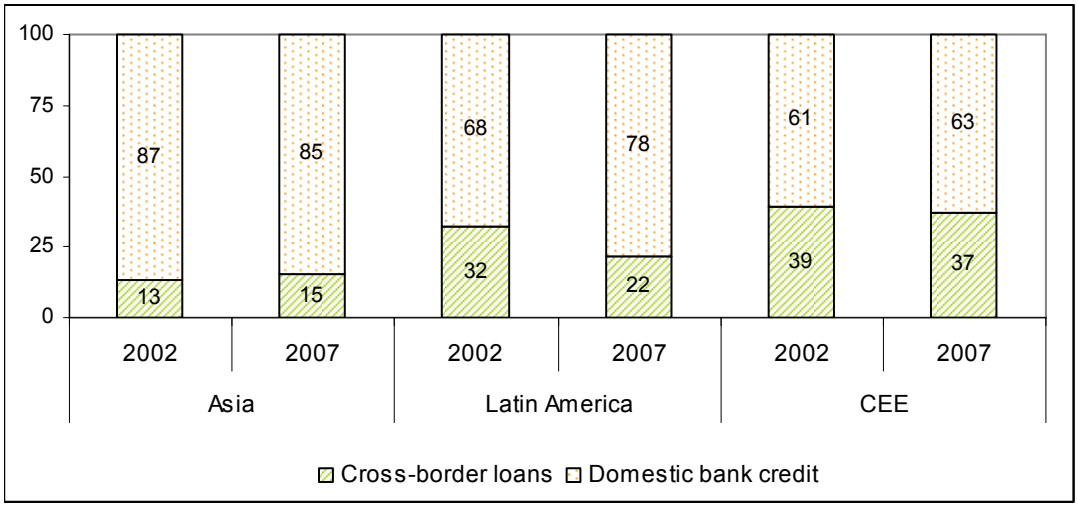
Source: BIS, Locational Banking Statistics; IMF, *World Economic Outlook*.

Cross-border loans play an important role in total bank credit in emerging market countries. In 2007, cross-border loans accounted for 15% of total bank credit (ie, domestic and external bank loans) in emerging Asia, 22% in Latin America and as much as 37% in CEE (Graph 10). In Latin America, the importance of cross-border loans has decreased significantly since 2002, while in emerging Asia and CEE it has been relatively stable.

Graph 10

Cross-border and domestic bank credit in emerging market economies

As a percentage of total bank credit



Sources: IMF; national data; BIS locational banking statistics.

Foreign assets of emerging market economies

Faced with macroeconomic pressures resulting from very large net capital inflows, many emerging market countries have started "recycling" the inflows more actively in recent years by acquiring foreign assets. The gross foreign assets of the EMEs considered in this paper were estimated at about $5.8 trillion at the end of 2006, equivalent to about 54% of their combined GDP (Table 2). They have increased by $4 trillion (11% of combined GDP) since 2001, with Asian economies accounting for two thirds of the increase. Gross foreign assets of EMEs were almost equally split between official foreign exchange reserves (47%) and private sector assets (53%) in 2006.

Gross foreign assets increased at a measured pace over the past five years, while gross foreign liabilities declined significantly between 2001 and 2004, and subsequently levelled off (Graph 11, left-hand panel). This resulted in net foreign liabilities of 12% of GDP in 2006, compared with 27% in 2001.

On a regional level, emerging Asia became a net holder of foreign assets (to the tune of 7% of regional GDP in 2006, compared with –19% in 2001), and Latin America significantly reduced its net foreign liabilities (to 29% of regional GDP in 2006), while CEE increased its net foreign liabilities to almost 50% of GDP (Table 2).

Excluding official foreign reserve assets (for which no breakdown by type of asset is available), the bulk of foreign assets of EMEs were other investment assets (ie, investments in foreign banks and the non-bank private sector) and outward FDI (Graph 11, right-hand panel). As suggested by the data in Graph 8 (right-hand panel), the former comprise for the most part currency and deposits held in banks abroad and trade credit extended to non-residents.

Table 2

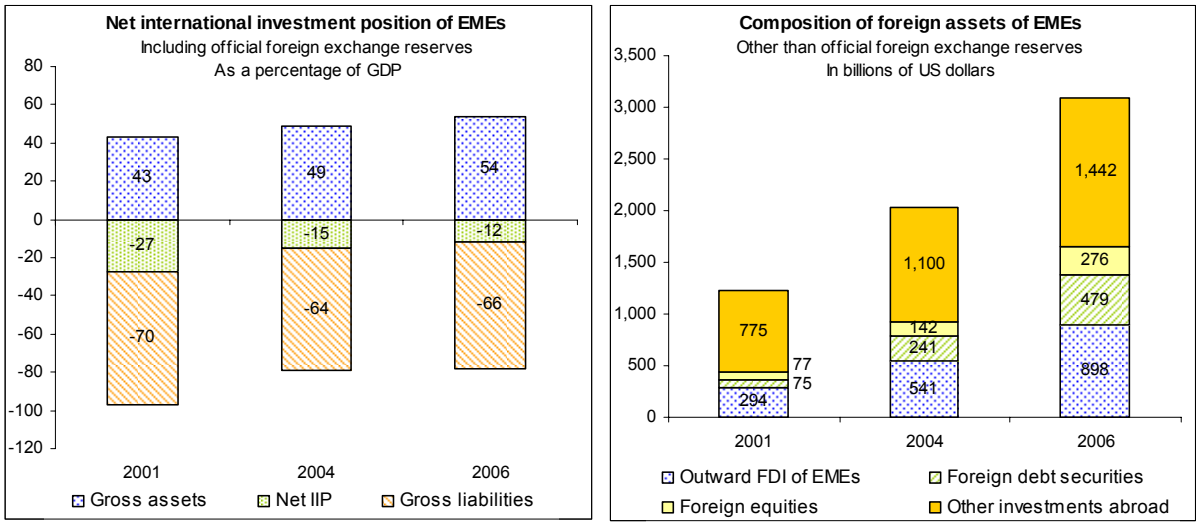
Foreign assets of emerging market economies[1]

	USD billions			Per cent of GDP		
	2001	**2004**	**2006**	**2001**	**2004**	**2006**
Emerging market countries[2]						
Gross foreign assets	**1,828**	**3,768**	**5,794**	**43**	**49**	**54**
Official FX reserves	605	1,737	2,689	14	23	25
Private sector assets	1,221	2,024	3,095	29	26	29
Direct investment abroad	294	541	898	7	7	8
Portfolio investment abroad	152	383	755	4	5	7
Debt securities	75	241	479	2	3	5
Equity securities	77	142	276	2	2	3
Other investments abroad	775	1,100	1,442	18	14	14
Banks[3]	186	219	315	4	3	3
Other sectors[3, 4]	278	346	438	7	4	4
Net foreign assets (net IIP)	*–1,126*	*–1,136*	*–1,232*	*–27*	*–15*	*–12*
Asia[5]						
Gross foreign assets	**784**	**2,201**	**3,370**	**56**	**56**	**64**
Official FX reserves	324	1,224	1,839	23	31	35
Private sector assets	460	975	1,528	33	25	29
Direct investment abroad	115	226	327	8	6	6
Portfolio investment abroad	72	229	487	5	6	9
Debt securities	39	169	359	3	4	7
Equity securities	33	60	128	2	2	2
Other investments abroad	273	520	714	19	13	14
Banks[3]	74	76	98	6	4	4
Other sectors[3, 4]	20	28	35	2	2	2
Net foreign assets (net IIP)	*–274*	*66*	*353*	*–19*	*2*	*7*
Latin America[6]						
Gross foreign assets	**512**	**657**	**925**	**29**	**35**	**34**
Official FX reserves	144	204	284	8	11	11
Private sector assets	368	452	640	21	24	24
Direct investment abroad	106	141	220	6	8	8
Portfolio investment abroad	39	64	117	2	3	4
Debt securities	26	32	61	1	2	2
Equity securities	13	32	57	1	2	2
Other investments abroad	222	247	302	13	13	11
Banks	34	22	30	2	1	1
Other sectors[4]	177	210	253	10	11	9
Net foreign assets (net IIP)	*–660*	*–686*	*–786*	*–37*	*–37*	*–29*
Central and eastern Europe[7]						
Gross foreign assets	**220**	**389**	**611**	**36**	**36**	**43**
Official FX reserves	93	170	237	15	16	17
Private sector assets	126	215	368	20	20	26
Direct investment abroad	11	28	90	2	3	6
Portfolio investment abroad	10	35	68	2	3	5
Debt securities	8	28	43	1	3	3
Equity securities	2	7	25	0	1	2
Other investments abroad	105	152	210	17	14	15
Banks	56	80	105	9	7	7
Other sectors[4]	32	58	92	5	5	6
Net foreign assets (net IIP)	*–212*	*–469*	*–694*	*–34*	*–44*	*–49*

[1] Based on international investment position data. [2] Sum of the regions below, plus Russia and South Africa (IIP data for Saudi Arabia are not available). [3] Excluding China, Malaysia and Singapore, for which no breakdown of other investment assets is available (only the totals). [4] Comprises non-financial corporations (private and public), insurance companies, pension funds, other non-depository financial intermediaries and households. [5] India, Indonesia, Korea, Malaysia, Singapore, Thailand and, from 2004, China. [6] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [7] Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Turkey.

Source: IMF, *International Financial Statistics*.

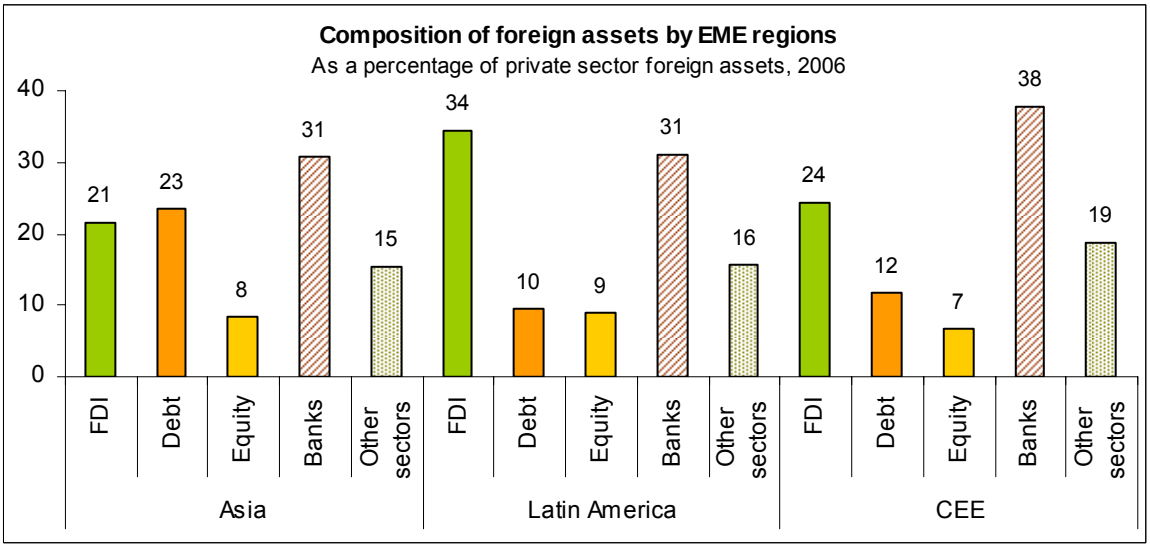
Graph 11



Source: IMF, *International Financial Statistics*.

The share of FDI in gross foreign assets of the private sector increased to 29% in 2006 (from 24% in 2001), that of portfolio assets doubled to 24%, and the share of other investment outflows decreased to 47% (from 63%). The composition of the foreign asset portfolio seems to be most balanced in Asia (Graph 12). In Latin America and CEE, it is skewed towards outward FDI investments in foreign banks.

Graph 12



Source: IMF, *International Financial Statistics*.

Of particular interest for financial stability is the increase in EME private sector holdings of foreign debt securities, which totalled about $400 billion since 2001 (Table 2 and Graph 11, right-hand panel). Private investors from Asia, and China in particular, accounted for the bulk of this increase (almost $140 billion in the case of China). A notable feature of this development is that a large share of these "private" investors are actually state-controlled entities – in China, for instance, such investors include large commercial banks which, while classified as private investors in official statistics, remain majority state-owned.

Another class of notionally "private" investors from emerging market economies who have contributed to capital outflows are ***sovereign wealth funds*** (SWFs), which can be defined as all government-owned asset pools except traditional monetary reserves and pension funds (Rozanov (2008)). SWFs can be grouped according to several criteria, including motives for their establishment, sources of funding and uses of their resources (see Mihaljek (2008)). Because relatively little is known about some funds (especially the largest ones), there are no reliable estimates of their size, let alone their growth. Moreover, it is not clear how these funds are classified in official statistics – as official or private investors.

While the combined size of sovereign wealth funds from EMEs can be estimated at around $2.3 trillion in 2007 (Appendix Table A4), how large a part of "reverse" flows from EMEs to advanced economies originate in sovereign wealth funds, and thus the public sector of EMEs, can only be guessed. One well documented figure is that on commitments made by SWFs from China, Singapore and several Middle East countries to recapitalise troubled financial institutions from Europe and the United States in late 2007 and early 2008. That figure – around $80 billion in total – would represent roughly 10% of estimated private sector capital outflows from emerging market countries in 2007. If all assets managed by SWFs from emerging markets were invested abroad, they would account for 40% of foreign assets held by the public and private sectors of EMEs in 2006 (or 74% of foreign assets held by the private sector of EMEs).[5]

The increase in (notionally) private capital outflows into debt securities has come on top of substantial official capital outflows in the form of increases in foreign exchange reserves. In emerging Asia, official reserves rose by an average of 4–6% of GDP annually in recent years; in Latin America by slightly under 2% of GDP per year; and in CEE by 2–3% of GDP per year (Table 2).

As foreign reserves are also believed to be mainly invested in debt securities, particularly those of advanced economies, the combined private and official outflows into foreign debt securities probably account for three quarters of gross capital outflows from emerging markets. In view of the recent volatile exchange rate movements and in particular the sharp depreciation of the US dollar, the large holdings of foreign debt securities denominated in depreciating currencies expose the emerging market investors – including central banks and SWFs – to considerable valuation losses. While this is an important issue from the financial stability perspective, it will not be pursued further in this paper. The focus of the remaining discussion will be instead on bank-intermediated capital flows.

2. Financial stability challenges of increased capital flows

Following the crises of the 1980s and the 1990s, the literature has devoted considerable attention to the macroeconomic challenges of increased capital flows to emerging market economies. These challenges include, among others, currency appreciation pressures; rapid growth of domestic bank credit; the expansion of domestic demand and the risk of overheating; pressures on consumer prices, wages and asset prices (especially equity and property prices); and, in some cases, widening external current account deficits.

The financial stability consequences of increased capital flows have received less attention so far. This section first looks at some risks related to the growth of cross-border banking

[5] Calculated as total SWF assets held by EMEs ($2.3 trillion), divided by gross foreign assets of EMEs ($5.8 trillion for the public and private sectors, or $3.1 trillion for the private sector only). As data on international investment positions are not available for most Middle Eastern countries, these estimates probably exaggerate the share of SWFs in foreign assets of EMEs.

flows in EMEs with large presence of foreign-owned financial institutions. Second, it examines the risks related to increased capital flows intermediated through foreign exchange and money markets of selected EMEs.

Cross-border banking flows in EMEs with a large foreign bank presence

The development of financial systems and the growing presence of foreign financial institutions in EMEs have greatly expanded the scope of financial intermediation and lowered the cost of financial services in emerging markets, particularly in Latin America and central and eastern Europe (see Chopra (2007) and Mihaljek (2006)). At the same time, they have altered the nature of risks to financial stability by generally lowering the solvency risk but increasing the credit risk and the potential for capital flow volatility and cross-border contagion.

The main reason foreign ownership has so far tended to reduce the ***risk of a traditional banking solvency crisis*** is that foreign owners are generally large, reputable financial institutions from advanced economies. These institutions tend to be relatively well managed and supervised, and usually have a strong regulatory capital base. Concern about reputation risk and relatively centralised management suggest that these institutions are likely to support their emerging market subsidiaries with capital or liquidity injections, should these run the risk of insolvency or become subject to a bank run (IMF (2007c)).

One supporting piece of evidence is the absence of any significant bank failure in CEE following privatisations to foreign strategic partners in the late 1990s and early 2000s. These foreign-owned banks have so far shown resilience in the face of, at times, considerable volatility in local financial markets, and despite numerous "early warnings" from various macroprudential indicators devised for detecting banking system vulnerabilities. Swedish, Austrian and Italian banks with a large presence in the region tend to take a long-term view of the growth opportunities in CEE, and have consistently sought to protect their franchises. They also tend to focus on traditional commercial banking activities – as a result, they have not been affected by the fallout from the latest financial crisis originating in the United States.

While foreign-owned banking systems might be less prone to a traditional solvency crisis, their tendency to ***underestimate the build-up in credit risk arising from rapid credit growth*** in emerging market economies might be more pronounced than in predominantly domestically owned banking systems.

One set of factors that explain this tendency includes institutional weaknesses such as inadequate accounting, auditing, financial reporting and disclosure; the lack of an adequate credit bureau or register; and opaque ownership structure of emerging market corporate borrowers. For instance, the poor quality of economic and financial data on borrowers in many EMEs means that the foreign-owned institutions' risk management and measurement systems, which have been designed for mature financial markets, might not work well in many emerging markets. This makes it difficult for parent institutions to estimate reliably credit risk or risk-adjusted returns in their subsidiaries, and forces them to rely largely on the judgment of local managers. The resulting information asymmetry creates scope for local managers to report estimates of credit risk that are too low, so as to make lower provisions and report higher return on equity (Craig (2006)).[6]

[6] One should also mention that the increased volume of loans can easily overstretch the credit assessment and monitoring capacity of foreign-owned financial institutions, because experienced bank officers are often in short supply in EMEs, and might be particularly hard to find on the labour market during credit booms.

The lack of adequate credit risk data might lead creditors to rely more heavily on collateral to mitigate risk. However, weaknesses in the legal system can make it difficult to recover collateral. This can result, in turn, in an underestimation of expected loss-given-default.

Another incentive problem specific to foreign-owned institutions that might lead to an underestimation of the build-up in credit risk is the structure of managerial compensation. Top managers of foreign-owned subsidiaries or branches are often expatriate professionals working on fixed-term contracts. During their limited term in a given EME, they have an incentive to boost the volume of lending, which is typically used as a criterion for assessing the size of their bonus payments. Rapid credit growth can conceal deterioration in credit quality because the increase in the share of new loans temporarily depresses reported non-performing loans. And by the time most of these loans mature and some (or sometimes many) turn out to be non-performing, the manager who oversaw the credit expansion in country A might be already busy repeating the task in country B or C.

There are indications that in EMEs with competitive domestically owned banks (such as Brazil), local banks can make better judgments about credit risk and provisioning than foreign-owned banks (Mihaljek (2006)). They may also face fewer asymmetries with respect to incentives for loan growth.

Foreign-owned banks also tend to engage more readily in carry trades in the presence of interest rate differentials and appreciating exchange rates in emerging markets, typically channelling foreign currency loans to consumer and mortgage credit so long as the uncovered interest rate parity holds. This practice is widespread at the moment in central and eastern Europe, and was common in the past in many Asian countries. When borrowers lack a hedge against the foreign exchange risk, either because the market for hedging instruments is not developed or because of a perception that an exchange rate peg will not be allowed to fail, foreign currency lending can result in underpricing of, and/or underprovisioning for, foreign exchange risk. Foreign-owned banks also lend in foreign currency because the parent bank, or its supervisor, wants to limit the size of the exchange rate risk it bears directly. However, this risk is not eliminated by extending foreign currency loans; it is merely transformed into indirect credit risk that will materialise if a country is forced to devalue as a result of domestic macroeconomic or international financial disturbances.

More generally, greater presence of foreign-owned banks increases the scope for regulatory arbitrage between lending via subsidiaries, branches, non-bank financial institutions owned by foreign banks or direct-cross border loans. As regulations tend to lag behind the sophistication of banks (especially foreign-owned ones), it is very difficult for central banks and regulators in EMEs with a large presence of foreign banks to prevent the emergence of a credit boom, or, once the boom is under way, to bring it under control on their own, ie without the help of foreign bank regulators (discussed below).

Foreign-owned banking systems might also be more exposed to the ***risk of a sharp slowdown or reversal in bank-intermediated capital flows***. This risk could be triggered by problems in either the emerging economy host markets or the parent banks' home market.

Problems in the host market. Once the underestimation of credit risk in an EME home market is recognised, banks have to increase their provisioning. In banking systems dominated by foreign-owned banks, the increase in provisioning – and any resulting decrease in credit growth – might turn out to be more pronounced. One reason is that foreign financial institutions, based on past performance, typically set high targets for return on equity (ROE) in emerging markets, usually about 20–25%, thus offsetting the relatively low ROE usually earned by parent institutions in their home markets (Table 3). This strategy exploits foreign banks' competitive advantage arising from their strong reputation, technical and operational capabilities and relatively low funding costs. However, the ambitious ROE targets often assume relatively low provisioning rates, which could reflect an underestimation of credit risk or, equivalently, an overestimation of risk-adjusted ROE. When the extent of that

underestimation is recognised and provisioning has to be increased, management could conclude that their ambitious ROE targets cannot be met, and that lending growth in a given market (or group of EMEs) must be sharply curtailed.

Table 3

Return on equity for banks in major host and home countries, 2005

	Host countries	ROE (%)	Major home countries	ROE (%)
Asia	Indonesia	24.0	Canada	25.4
	Korea	19.1	Netherlands	16.0
	Malaysia	14.1	United Kingdom	17.3
	Philippines	6.8	United States	17.7
	Singapore	11.0		
Latin America	Brazil	27.7	Spain	16.0
	Chile	17.3	United Kingdom	17.3
	Colombia	33.9	United States	17.7
	Mexico	24.4		
Central Europe	Czech Republic	32.1	Austria	14.8
	Hungary	27.0	Belgium	19.2
	Poland	20.6	France	14.4
	Slovakia	13.7	Germany	13.9
	Slovenia	17.0	Italy	14.0
Baltic states	Estonia	19.4	Denmark	18.9
	Latvia	25.1	Sweden	20.7
	Lithuania	16.0	Finland	9.4
South-eastern Europe	Bulgaria	21.4	Austria	14.8
	Croatia	20.2	Greece	15.3
	Romania	14.9	Italy	14.0
	Turkey	17.8		
Other EMEs	Israel	19.4		
	Russia	24.1		
	South Africa	20.1		

For host countries, ROE refers in most cases to domestic consolidation basis; for home countries, to cross-border and cross-sector consolidation basis for domestically incorporated banks. For details, see www.imf.org/external/np/sta/fsi.

Source: IMF, Financial Soundness Indicators database.

This happens frequently when an asset price boom comes to an end. For instance, banks operating in EMEs often face risks from large exposures to the property market. If the quality of mortgage loans deteriorates because house prices begin to decline, internal risk controls at banks could force a sharp reduction in new loans to protect bank capital.

The impact on capital inflows in such an event would depend on the extent to which credit is funded from abroad and the cost of home relative to host market funding. While the extent of

foreign funding of domestic credit is fairly large in many emerging markets, particularly in CEE (Graph 10), it is considerably lower today in the presence of foreign-owned bank subsidiaries than in the past, when reliance on "pure" cross-border credit was much higher, particularly in Latin America.

The cost of medium- and long-term host market funding varies considerably across countries, but is often higher than the cost of funding of subsidiaries from their parents, or the cost of funding in international wholesale markets. For instance, in CEE the cost of funding from parent banks is around Euribor plus 150–200 basis points. Even when interest rates on demand and time deposits in host countries are low, their maturity may be too short to allow the subsidiaries to satisfy the maturity matching requirements of supervisors, or the requirements of their parent banks' risk management systems. In contrast, parent bank treasuries can more easily tailor the maturity of the funding to their subsidiaries' needs. Parent banks may also prefer to fund their subsidiaries because lending margins in host country markets tend to be wider than those in home markets.

Problems in the home market. In view of the turmoil engulfing banks in advanced economies since the summer of 2007, the sustainability of bank-intermediated capital inflows would seem to be a particularly pronounced vulnerability at the current juncture. A classic example is the large-scale withdrawal of Japanese banks from emerging Asia during the 1997–98 crisis. When Japanese banks experienced problems in their home market as a result of declines in equity and real estate prices, they had to shrink their balance sheets to maintain their capital adequacy requirements. The resulting pull-back provided a major impetus to the crisis that was unfolding in emerging Asia at the time.

Although the main parent banks in CEE have so far not experienced major losses on US subprime mortgages or structured products, they obtain a substantial part of their funding in foreign currencies in international wholesale markets. Thus, Swedish banks borrow euros and onlend these funds to their subsidiaries in the Baltic states, while Austrian and Italian banks borrow in Swiss francs and onlend these funds to their subsidiaries in central and southeastern Europe. If these wholesale markets dried up, the main suppliers of external financing to emerging Europe would come under funding pressure.[7]

Finally, banking flows to EMEs could diminish because parent banks face liquidity problems at home and, in a reversal of the normal pattern of flows, turn to their emerging market subsidiaries for funding. There is some anecdotal evidence that parent banks from advanced economies used funding from their subsidiaries in emerging markets such as the Czech Republic, Mexico and Russia to obtain liquidity in August and September 2007.

A third set of financial stability risks associated with the large presence of foreign banks is ***the risk of financial contagion***. Once the recognition or materialisation of credit risk in one country triggers a broader reassessment of risk in the whole region, close financial linkages between home and host country institutions can serve as channels for contagion. The potential for contagion is greater if financial institutions pursue common strategies across the region, as this tends to result in similar types of exposure across countries (see Geršl (2007)).

The potential for contagion partly reflects the centralisation of risk and treasury operations in foreign-owned financial groups. Most large international banks operating in emerging markets typically monitor risk on a group-wide basis and take strategic decisions in the head office. They delegate day-to-day operational decisions to local management in their

[7] Alternative sources of bank funding in CEE are currently scarce: domestically owned banks have limited capacity to raise funds externally, and even those that do (eg Russian banks) have seen their funding reduced since August 2007. Locally, the growth of the deposit base has lagged behind credit growth in most CEE countries for several years now, which was why CEE banks started to seek external funding in the first place.

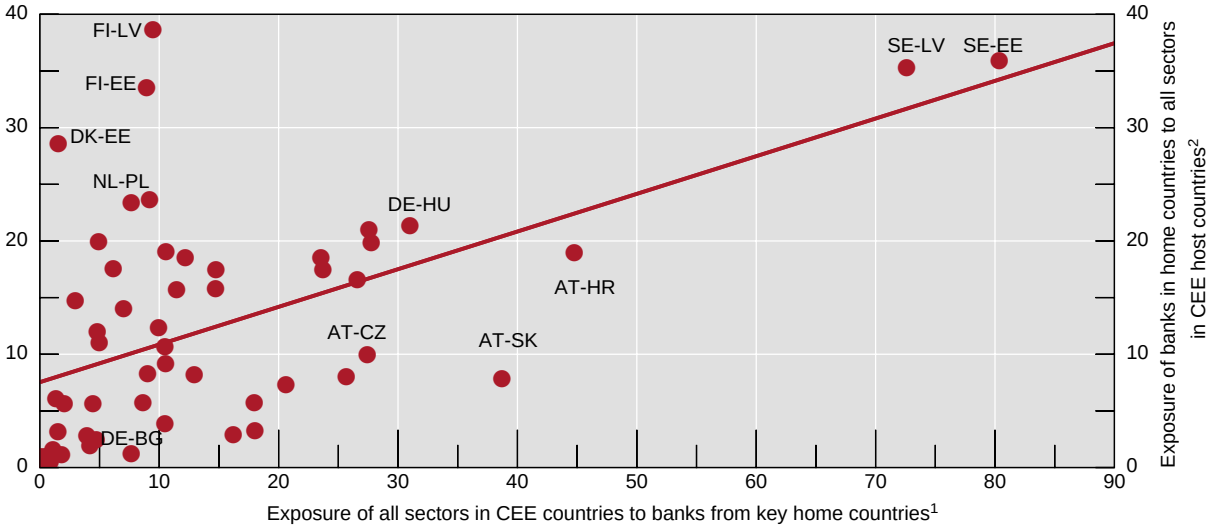
subsidiaries and branches to varying degrees, depending on the bank and country. While this centralisation helps ensure efficient allocation of capital and may improve the quality of risk management, it also increases the likelihood that the parent company might reduce exposures in one country in response to losses at home or elsewhere in the region. This effect would be mitigated to the extent that banks have well diversified sources of funding.

Another factor increasing the probability of contagion risk is the large asymmetry in the importance of bilateral credit exposures to host countries and to parent institutions. Compared to the host country's exposure to a particular parent bank, the parent institution's exposure to a host country is typically a much smaller fraction of its regional – not to mention worldwide – loan portfolio. Changes in lending policies that are modest from the perspective of the parent institution can thus have a major macroeconomic and financial stability impact on the host country.

For instance, Austrian banks' exposure to individual CEE countries never exceeds 13% of their total regional exposure in the aggregate, but for individual countries it can represent well over half of total domestic borrowing (Graph 13). This asymmetry exposes small host countries to a potentially large decrease in credit supply, even in the case of a relatively moderate slowdown of credit growth by parent institutions.

Graph 13

Relative sizes of selected home and host country exposures, June 2007



Each point describes the bilateral exposure of all banks from a home country to all sectors in a CEE host country. For instance, the point AT-CZ indicates that the exposure of all sectors in the Czech Republic to Austrian banks represents 27% of total borrowing from foreign banks by all sectors in the Czech Republic (horizontal axis), while the Austrian banks' exposure to all sectors in the Czech Republic represents 10% of Austrian banks' total exposure to CEE (vertical axis). The line represents estimated regression with an intercept of 7.5, coefficient of 0.33 and R^2 of 0.28.

[1] As a percentage of CEE countries' total borrowing from foreign banks. [2] As a percentage of home country's total lending to the CEE region.

Source: BIS consolidated banking statistics.

At the same time, Graph 13 shows that banks from Nordic countries in particular have fairly concentrated exposures in the Baltic region. Disturbances in any single host country could therefore affect both the home country banks and, through possible contagion, other neighbouring host countries.[8]

Cross-border flows to EME foreign exchange and money markets

Transactions with non-residents in foreign exchange and money markets are difficult to track at aggregate EME or regional levels, so this section illustrates the risks that could arise from such flows in a few selected country examples.

Korean banks, in particular the foreign-owned ones, have been actively engaged in covered interest parity arbitrage in the past two years.[9] Given the apparently persistent deviation in covered interest parity, local branches of foreign banks in Korea have borrowed dollars short-term, sold these dollars for won to domestic banks on the swap market, and then bought domestic bonds, thus generating profits without incurring significant risk. This contributed to the rapid increase in short-term external debt and to the fivefold increase, to 16 trillion won (about $17 billion), in net buying of Korean treasury bonds and central bank monetary stabilisation bonds by local branches of foreign banks in 2006 (IMF (2007b)).

The hedging activity by Korean shipbuilders and by asset management companies making overseas portfolio investments with residents' funds has significantly contributed to the surge in capital inflows. With Korea home to seven of the world's 10 largest shipbuilding companies, it is benefiting greatly from a surge in global trade, oil prices and energy demand. Korean shipbuilders only began to hedge their foreign exchange exposure in 2004, and have recently increased their hedging ratio to around 60% in anticipation of continued won appreciation. Asset management companies meanwhile increased their hedging ratio to around 80% in 2007.

Typically, exporters and asset management companies sell expected dollar receipts forward, for the most part to domestic banks, but also to foreign bank branches in Korea. Banks raise dollars through buy and sell swap transactions with foreign bank branches or head offices, and then sell these dollars on the local spot market to match their own currency exposure, thereby creating a capital inflow. Such transactions do not have lasting effects on financial stability, however: once exporters have achieved their desired hedging ratios, further hedging activity and associated capital inflows are bound to slow. In the short term, however, they may have adverse effects such as appreciation of the Korean currency and lowering domestic bond yields.

Foreign investors, foreign-owned banks and the domestic corporate sector in ***Hungary*** have also generated large capital flows associated with exchange rate arbitrage. Foreign investors are active on both the spot and swap markets; they take forward positions using a combination of these two markets (as liquidity in the swap market is much greater than that in the forward market) and actively use derivative instruments. They are capable of taking on large foreign exchange exposure in a short period of time. For instance, in early 2003 foreign investors bought more than €5 billion worth of forints in two days, speculating that the exchange rate would be officially revalued. In July–August 2007, they sold €5.5 billion worth of Hungarian currency as liquidity evaporated in advanced economies.

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[8] Recent stress tests of the Austrian banking sector's resilience to shocks suggest that credit risk is adequately provided by existing risk provisions in all scenarios examined (Austrian National Bank (2007b)). The stress test for indirect credit risk of foreign currency loans yields a reduction of the consolidated capital ratio by 0.17 percentage points for the Swiss franc and 0.02 percentage points for the Japanese yen loans.

[9] According to covered interest parity, the interest rate difference between two countries should equal the difference between the forward and the spot exchange rate between the two currencies.

Hungarian (as well as many other CEE) banks have been actively offering foreign currency loans to households and small and medium-sized enterprises, thus significantly changing the currency denomination of transactions on the foreign exchange market. For instance, structural changes in Hungary's foreign trade or investment flows cannot explain the increase in Swiss franc-denominated transactions from 2% of total spot market turnover in 2001, to 13% in mid-2007, with a similar change occurring on the swap market.[10] In addition, Hungarian exporters have regularly taken on large foreign exchange exposures. Typically, they would open long forint forward positions when the forint weakened, and close those positions when the currency appreciated.

In ***Thailand***, foreign-owned banks have historically accounted for the dominant share of foreign exchange transactions. Though most firms in the real sector carry out their spot and hedging transactions with Thai banks, the size of these transactions is overwhelmed by foreign exchange flows intermediated by foreign-owned banks. These flows include derivative products such as structured notes and non-deliverable interest rate swaps. Given the absence of a foreign exchange futures market, these products allow foreign investors to take positions on the direction of change in Thai interest rates. The growing size of the non-deliverable interest rate swap market has also affected the prices of bonds, which are used to cover investors' positions. Another concern has been the increase in concentration risk, which could develop into liquidity risk, given that foreign institutions frequently take similar positions to profit from their views on the exchange rate or the interest rate.

In ***Chile***, capital outflows have been to a large extent driven by portfolio diversification on the part of pension funds, which have been allowed to increase gradually their exposure to foreign assets. This has helped develop the market for hedging instruments, as pension funds face separate limits on their exposure to exchange rate risk and foreign market risk, and are required by law to hedge their foreign exchange risk in the local capital market. Pension funds for the most part sell their long forward positions in foreign exchange to the local banking system. As banks aim to keep their foreign exchange exposure close to zero, they sell the pension funds' long forward positions to Chilean corporations with future foreign exchange commitments. One concern, however, is that hedging instruments are for the most part intermediated by foreign-owned banks. Although they represent less than 4% of the total assets and less than 10% of the total capital of the Chilean banking sector, foreign banks play a large role in the intermediation of capital flows and the provision of hedging instruments (Desormeaux et al (2008)). For instance, the derivative position held by foreign banks represents more than 70% of the system's total (over $5 billion as of mid-2007).

3. Policy responses

Responses to the macroeconomic challenges of capital inflows

The emerging market countries have responded to the macroeconomic challenges of the recent wave of capital inflows in a variety of ways, depending on the monetary policy framework and the specific policy objectives of the authorities. Given that most countries maintained some form of exchange rate and/or monetary target, the policy response to the inflows aimed in general at addressing the impossible trinity dilemma. As the countries liberalised the capital account while integrating with global capital markets, attempts to achieve simultaneously (explicit or implicit) inflation and exchange rate targets put a strain on

[10] See Király et al (2008). The latest product that has emerged on the retail market is the yen-denominated mortgage-backed consumption loan. It accounts for around 10% of new loans, and is being promoted mostly by the largest, predominantly domestically owned, commercial bank.

the existing mix of monetary and exchange rate policies. Combined with predictable exchange rates, the high interest rates needed to reduce inflation attracted capital inflows, putting appreciation pressures on the currencies and exchange rate targets. Faced with these trade-offs, the policymakers had to choose between affecting the inflows themselves or coping with their implications. In many cases, a mix of both approaches was followed.

One policy response recently adopted by a number of countries has been to ***allow greater exchange rate flexibility***. Over the past few years, there has been substantial exchange rate appreciation of the currencies in Brazil, Korea, Thailand and much of central Europe. Greater exchange rate flexibility can help resolve the tension between various policy targets by letting the appreciation absorb the impact of the inflows. In some countries (eg Poland, South Africa and Turkey), more flexible rates have also discouraged short-term speculative inflows by making sure that market participants face two-way exchange rate risks. However, in some other countries (including the Czech Republic, Indonesia and Slovakia), currency appreciation seems to have been associated with additional capital inflows, presumably on the expectation that the exchange rate would continue to appreciate.

The adverse implications of exchange rate appreciation for external competitiveness have made many emerging market authorities reluctant to allow a significant strengthening of domestic currency. Some emerging market countries have also maintained fixed or quasi-fixed exchange rate regimes, allowing little short-term movement in the exchange rate. To support these policies, several central banks intervened on a major scale for several years. The consequence has been a substantial increase in foreign exchange reserves in a number of countries over the period from 2000 to 2007 (Table 4).

Table 4

Capital flows and intervention

In billions of US dollars

	Net capital flows			Current account balance			Change in reserves		
	1990–93	1995–96	2000–07	1990–93	1995–96	2000–07	1990–93	1995–96	2000–07
China	35	79	368	20	9	970	4	53	1,374
India	20	16	230	–17	–12	–20	7	0	235
Other Asia[1]	124	125	–79	–53	–64	510	76	47	441
Brazil	25	62	144	0	–42	–8	23	21	145
Other Latin America[2]	134	58	64	–85	–26	70	48	28	118

[1] Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. [2] Argentina, Chile, Colombia, Mexico, Peru and Venezuela.

Sources: IMF; CEIC; national data.

Other things equal, foreign reserve accumulation tends to increase the monetary base and ease monetary conditions. In order to prevent such easing, central banks take steps to limit or "sterilise" the monetary impact of foreign exchange intervention. Many EMEs have done this by issuing debt securities of various maturities (and in some cases, notably in China and India, by raising the reserve requirements on banks). Sterilisation is rarely complete, however, and some easing in money or credit conditions usually still occurs. During early years when they were building reserves, many central banks were deliberately seeking to ease monetary policy, given the environment of low inflation and large excess capacity. Real short-term interest rates fell significantly, particularly in Asia. In effect, such intervention was

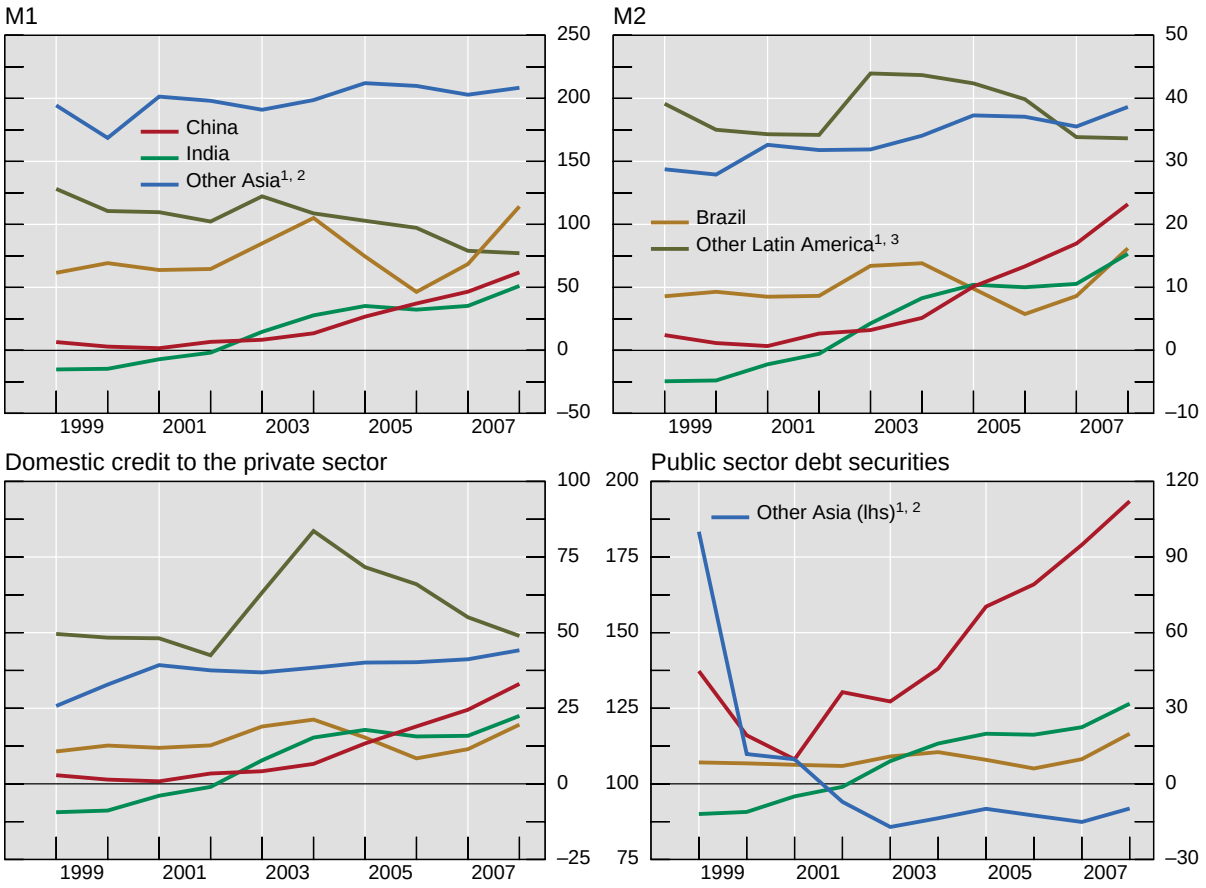
then partly unsterilised, in the sense that central banks tolerated the downward pressure on interest rates and monetary expansion.

But the longer inflows continued, and as inflation risks increased, the degree of sterilisation tended to increase. The scale of required domestic liability creation, measured in relation to several aggregate yardsticks of the financial economy, has grown substantially as a result (Graph 14). Intervention on this scale over many years has had a major impact on the balance sheets of central banks and of the banking sectors. The balance sheets of domestic commercial banks in many EMEs have expanded dramatically; the liquidity of bank balance sheets has increased as bank holdings of government paper have risen, and significant financial sector distortions have been created (see Mohanty and Turner (2005)). These developments have contributed to the substantial growth of bank credit to the private sector, which has begun to expand rapidly in some countries (Table 5).

Graph 14

Foreign reserves minus currency held by the public

As a percentage of:



This updates Graphs 1 and 2 in Mohanty and Turner (2005), which contains further discussion of this calculation.

[1] Simple average of the economies listed. [2] Indonesia, Korea, Malaysia, the Philippines, Singapore, and Thailand. [3] Argentina, Chile, Colombia, Mexico, Peru and Venezuela.

Sources: IMF; national data; BIS.

Table 5

Domestic bank credit to the private sector

In real terms, in per cent per annum

	1990–99[5]	2000–04	2005	2006	2007
Emerging Asia[1]	10.0	11.4	10.1	13.0	12.9
China	13.9	12.5	7.4	11.2	12.0
India	4.5	12.5	20.2	18.5	14.7
Indonesia	1.1	10.0	2.4	6.3	16.7
Korea	11.2	5.6	5.7	13.8	10.7
Latin America[1]	10.3	–0.5	18.1	26.3	21.0
Argentina	7.7	–15.6	19.7	26.0	27.4
Brazil	14.6	3.8	21.0	26.6	25.0
Mexico	5.6	–0.6	13.7	26.2	13.6
Central and eastern Europe[1]	2.7	14.4	27.6	25.4	24.4
Central Europe[2]	6.6	4.0	17.7	18.2	19.7
Baltic states[3]	10.4	27.6	46.5	39.4	23.4
Southeastern Europe[4]	–7.8	17.6	25.7	23.8	30.9
Other emerging[1]	4.3	17.1	26.1	30.2	24.7
Russia	3.7	26.0	21.9	36.1	34.9
Saudi Arabia	7.0	14.3	37.2	6.1	14.0
South Africa	4.2	6.5	15.8	18.8	11.6
Turkey	3.8	5.6	33.7	40.6	17.3

[1] Weighted average of the economies shown based on 2000 GDP and PPP exchange rates. For CEE, simple average of countries listed. [2] The Czech Republic, Hungary, Poland, Slovakia and Slovenia. [3] Estonia, Latvia and Lithuania. [4] Bulgaria, Croatia, Serbia and Romania. [5] For CEE, changes from 1994–99 except for Romania and Serbia (1997–99).

Source: IMF, *International Financial Statistics*.

Countries with more flexible exchange rates, often complemented by inflation targeting regimes, have in some cases ***reduced interest rates*** in an effort to discourage capital inflows (see Niedermayer and Barta (2008)). In practice, this policy option has been limited by concerns about undermining the inflation target. Another constraint has been the adverse implication of low interest rates for credit growth – the resulting credit expansion could not only fuel inflation pressures, but also lead to other financial imbalances.

Fiscal tightening has not been actively used in response to capital inflows in countries with more flexible exchange rates: in fact, real government expenditure growth accelerated over the past few years, especially in Latin America and central and eastern Europe (IMF (2007a)). However, in countries operating fixed exchange rate regimes (including currency board arrangements), fiscal tightening has of necessity been the main policy tool to mitigate the macroeconomic consequences of large capital inflows. Several commodity-exporting countries have also relied on fiscal consolidation to curb appreciation pressures and capital inflows. For example, in Chile public spending increases have followed a fiscal rule which targets a structural fiscal surplus and requires that all surplus funds (which can be substantial when copper prices are high) be invested abroad. Similarly, several oil-exporting countries have relied on oil stabilisation funds to cope with rising oil revenues.

Available evidence indicates that public expenditure restraint during periods of strong inflows has contributed to both lower real exchange rate appreciation and higher long-term growth (Ötker-Robe et al (2007)). One should note, however, that tighter fiscal policy may produce two opposing effects on the exchange rate. On the one hand, as aggregate demand slows in response to fiscal consolidation, interest rates could fall, which would discourage capital inflows. On the other hand, in countries where the fundamentals are not particularly strong, fiscal tightening might reduce country risk premia, thus strengthening the currency and attracting further capital inflows.

Finally, most emerging market countries ***relaxed controls on capital inflows as well as outflows***. For example, China, India and Russia further liberalised their rules on residents' investment in foreign securities in 2006 and 2007. The recent surge in China's private sector investments in foreign debt securities discussed in Section 1 appears to be partly related to this move. CEE countries have relaxed capital controls the most, with larger Asian emerging economies remaining relatively restrictive, and Latin America maintaining capital controls at more or less unchanged levels since the mid-1990s (IMF (2007a)).

Responses to the financial stability challenges of capital flows

After the Asian financial crisis of 1997–98, national authorities and international financial institutions distilled a number of lessons for banks and supervisors in home and host countries (see eg Basel Committee on Banking Supervision (2001)). The resulting improvements in banking supervision and prudential regulation have since helped strengthen the capacity of most emerging market economies to address some key structural weaknesses. These included poor lending standards, inadequate risk management systems, weak capital bases, ineffective bank governance, poor supervisory and reporting frameworks, and ineffective licensing, competition and bankruptcy arrangements. This process of improvement has been gradual in Asia, but rather more rapid in central and eastern Europe as a result of harmonisation with EU legislation during EU accession.

Most countries also took steps to promote the development of their financial markets and increased the range of market-based instruments to deal with the inflows. In addition, many countries used a variety of public debt management measures to cope with the implications of the inflows for the liquidity in the financial system.[11]

Reflecting these structural reforms, most emerging market banking systems today exhibit fairly robust financial soundness indicators.[12] However, responding to the challenges of the recent wave of capital inflows has required new policy approaches, which in some cases have yet to be fully implemented.

The potential for ***underestimation of a build-up in credit risk*** has been addressed through policies that strengthen oversight of banks' management of credit risk. In Asia and central Europe, for instance, a number of specific supervisory and prudential measures have helped improve banks' capacity to evaluate credit risk.[13]

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[11] These measures included shifting from foreign to domestic borrowing sources, buying back outstanding Brady discount bonds, using the inflows to "over-borrow" and move to medium and long-term domestic borrowing, and using part of the privatisation receipts to repay international financial organisations.

[12] Notable exceptions are some large emerging market countries, where inefficient – though not necessarily unsound – state-owned institutions still dominate the commercial banking landscape.

[13] Details of these measures can be found in Ötker-Robe et al (2007) and Borio and Shim (2007), as well as in financial stability reports and banking supervision reports of CEE central banks published during 2005–07; see also the financial stability reports of the Austrian National Bank and Sveriges Riksbank.

- Closer monitoring and enforcement of provisioning and loan evaluation needs, aimed at ensuring that banks hold sufficient regulatory capital consistent with the underlying risks (including in CEE indirect credit risk from foreign currency lending to unhedged borrowers). Adequate provisioning for expected losses is also expected to contribute to more accurate (and presumably lower) parent bank ROE projections, discouraging overambitious credit expansion plans.
- Improving the quality of creditor information in response to signs of an unsustainable build-up in credit risk. Specific measures include requiring corporate borrowers to provide accurate financial reports; extending the credit registry to cover households as well as corporations; and tightening various limits on debt-to-income and/or debt service-to-income ratios for households, eg by requiring banks to use household debt and income data that are more reliable (eg based on personal income tax returns). Better data on borrowers' and guarantors' debt, debt repayment and income facilitate a more realistic assessment of credit risk, while the improvement in parent bank risk measurement helps reduce the scope for subsidiaries to underprovision in order to report higher ROE.

The potential for ***volatility in bank-intermediated capital inflows*** has been addressed in the first place through regulatory *measures to diversify funding sources* and to foster a shift from foreign (or foreign exchange) financing to local (or domestic currency) financing of credit growth. Such measures have been justified by the failure of foreign bank groups to fully internalise the risks associated with reliance on cross-border funding of foreign currency loans in host countries. As noted above, this failure reflects the fact that foreign banks' exposure to these countries represents a small share of their overall exposure.

In addition, measures aimed at *reducing the segmentation in financial institutions' balance sheets* are being considered in some countries. One proposal is to relax tight limits on maturity and currency mismatches and adopt instead a capital charge for market and other risks that arise from such mismatches. Tight limits on maturity and currency mismatches are sometimes seen as unnecessary because they force banks to be highly liquid by holding substantial excess reserves and deposits abroad, despite their access to liquidity from their parents. This may lead banks to rely on foreign funding of credit, which may unintentionally contribute to external vulnerabilities. Replacing these limits with capital charges provides banks with a buffer against the risks of maturity and currency mismatches, and an incentive to limit them. It also gives foreign banks more flexibility to rely on local funding.

Going in the same direction is a proposal to allow banks to treat a proportion of sight and savings deposits that are statistically very stable as "core deposits". Through such "mapping" banks obtain an alternative source of funding medium- and long-term loans, which can be cheaper than the cost of foreign funding. The recent failure of the UK bank Northern Rock provides, however, a cautionary lesson on the difficulty of calibrating such regulations.

In addition to these measures, several countries in Latin America and CEE have retained the possibility of imposing new ***capital controls*** under their foreign exchange laws, although they have not done so in practice. The countries in general fear that such measures would be considered a significant step back in their economic development and liberalisation process, and would be largely circumvented. The Israeli authorities, for instance, considered Chilean-type capital controls on various occasions, but eventually ruled them out in order to avoid policy reversals that could damage their credibility (Eckstein and Ramot-Nyska (2008)). Similarly, the authorities in Turkey have resisted the use of capital or credit controls given their EU aspirations and the realisation that controls would be easily circumvented in the presence of a significant offshore market for the lira (Yörükoğlu and Çufadar (2008)).These fears have been partly justified by the negative experience of Thailand, which in March 2008 lifted the controls on capital inflows it had introduced in 2006.

Supervisory issues

The importance of cross-border banking flows has also required closer ***cooperation between home and host country supervisors***. Supervisory authorities have long been aware of the regulatory challenges associated with banks' foreign establishments (see Chopra (2007) and Turner (2008)). In 1975, the Basel Committee on Banking Supervision set out for the first time a series of principles and standards to establish effective prudential supervision of cross-border banking activities, which are commonly referred to as the Basel Concordat. These principles were subsequently updated and elaborated on several occasions (see Song (2004)). A key objective of these principles is to ensure that no activity of internationally active banks escapes effective supervision and that coordinated remedial action can be taken when necessary. Nevertheless, on several issues a consensus on the best approach is yet to be achieved, and even where there is consensus implementation can be complex. For example, the Concordat has not sought to establish an international framework for the cross-border coordination of intervention to respond to bank distress.

The fundamental problem is the mismatch between the international scope of banking institutions and the national scope of frameworks for banking supervision and crisis management. A particular dimension of this problem is the conflict between macroeconomic and financial stability concerns in small countries hosting large global banks, and microeconomic concerns for safety and soundness of parent banks in their home countries. For instance, host authorities may be concerned about boom-bust cycles in domestic asset prices, or about more general demand and external balance pressures resulting from rapid credit growth, and may find it difficult to address these concerns with the policy tools available. Host country authorities may also be uncertain how well foreign banks are managing risks in local markets, especially if these markets are very competitive, which is often the case in the initial phase of financial liberalisation. In other words, the authorities that bear most of the financial instability risks may not be the ones in the best position to mitigate them. These problems are complicated by the institutional responsibilities that have evolved in many countries, with the central bank primarily responsible for financial stability and macroeconomic policies, while a financial supervisory authority is concerned with the safety and soundness of financial institutions.

Not surprisingly, progress in resolving these conflicts has been slow. On the EME domestic side, judging by reports of the Financial Stability Assessment Programme of the IMF and the World Bank, much has been done to upgrade the knowledge and skills of the supervisory authorities. This includes their capacity to acquire and analyse information on the use of complex financial products by foreign and domestic banks.

A more difficult challenge has been to develop mechanisms to monitor effectively the operations of large international and regional banks that operate across different jurisdictions. The basis for memoranda of understanding (MoUs) between banking supervisory authorities in different countries was elaborated by the Basel Committee in a 2001 document on *Essential elements of a statement of cooperation between banking supervisors*, and updated in a 2006 document on *Home-host information sharing for effective Basel II implementation*. The MoUs have helped establish a large number of bilateral relationships, but are not legally binding. And although they seem to be working well to strengthen cooperation, they have not yet been tested in a distress situation. In particular, Bollard (2004) pointed out that MoUs created too much uncertainty to be useful in a crisis. Moreover, they could in the end prove to be of little practical help because of barriers to the exchange of information that arise due to political, legal or tax-related issues.

Accordingly, some countries – most notably New Zealand – have required systemically important banks to be incorporated in the country. This policy has three main objectives (see Bollard (2004)). First, it provides a higher degree of certainty over the balance sheet of the bank, enabling more efficient resolution in the event of distress or failure. Second, local incorporation enables the imposition of minimum capital requirements and risk limits, and

provides some separation between the subsidiary and parent, thus reducing intragroup contagion risk. Furthermore, it makes it more difficult, legally and practically, for assets to be removed from the local operation to the parent bank (which is not the case for a branch). Third, local incorporation establishes a basis for sound bank governance in the host country, including a board of directors with responsibility to act in the interests of the local bank.

Cooperation between supervisors at the moment seems to go farthest in central and southeastern Europe and the Nordic-Baltic region. As noted above, by lending in foreign currencies, either directly or through their subsidiaries in emerging market countries, foreign banks avoid a direct mismatch on their balance sheets. But such borrowing does create a credit risk when directed to borrowers without foreign currency assets or earnings. Recognising this risk, home country banks from Austria and Nordic countries and their supervisors have started to monitor whether such exposures are being taken into account. One approach has been regular cooperation at the working level, irrespective of MoUs, to foster the exchange of information and analysis between home and host supervisors (see Austrian National Bank (2007a) and Wajid et al (2007)).

In addition, joint inspections of host country banks are reportedly being increasingly organised. Separately, home country supervisors have developed special tools for analysing the exposures of their banking groups (Würz (2006)). Another approach, still under consideration, would be the calibration of prudential tools at the disposal of the home supervisors. This approach would entail, inter alia, the incorporation of macroeconomic risks in the assessment of the appropriateness of regulatory cushions corresponding to exposures in host country credit markets.

The most difficult issue relates to resolution and associated questions, such as: What would happen if a foreign-owned subsidiary or branch that was systemically important locally ran into problems? Is there adequate clarity on key issues and responsibilities to ensure that the central bank and supervisory authorities in the host country deal transparently with the evaporation of liquidity and disruptions to the payment system in such a case? Work on these issues has only just begun (see Goodhart and Schoenmaker (2006), Ingves (2006), Srejber (2006)), and it will be important to involve in it all major stakeholders from both home and host countries.

In this context, the incentive effects flowing from crisis resolution arrangements play a key role. As pointed out by Rosengren (2006), during times of acute problems, politicians often seek to use financial institutions to mitigate the impact of the crisis on depositors, borrowers or investors. This results in the host supervisor having different incentives from the parent, and often from the home supervisor. The primary concern of the home supervisor is to prevent a situation where problems from the subsidiary bring into question the solvency of the entire firm. In the host country, the concern is not only to find ways to mitigate immediate liquidity and solvency problems at the troubled subsidiary, but also to maintain overall lending and capital inflows to the country. From the perspective of financial integration, it is interesting to note that these incentive problems seem to be recognised most clearly in countries which are at the same time important home and host to financial institutions, as is currently the case in Austria, Benelux, Hong Kong SAR, Scandinavia, Singapore and, more recently, Italy.

Appendix

Table A1

Gross private capital *inflows* to emerging market economies

In billions of US dollars

	Annual averages		2005	2006	2007
	1990–97	2002–06			
Emerging market economies[1]					
Total inflows	210	456	599	824	1,347
Direct investment	81	220	270	332	400
Portfolio investment	70	94	127	164	432
Equity	24	54	71	95	193
Debt	47	40	57	69	239
Other investment	60	142	202	328	515
Banks	27	67	77	176	231
Other sectors	33	75	124	152	284
Memo: Current account balance	*–58*	*252*	*349*	*453*	*507*
Change in reserves[2]	*–54*	*–382*	*–470*	*–603*	*–1,040*
Official inflows	*–20*	*–24*	*–28*	*–45*	*…*
Asia[3]					
Total inflows	102	221	270	375	681
Direct investment	46	106	130	145	154
Portfolio investment	20	55	66	90	350
Equity	10	38	46	60	…
Debt	11	17	20	30	…
Other investment	36	61	74	140	177
Banks	16	30	21	88	…
Other sectors	20	31	53	51	…
Memo: Current account balance	*–13*	*170*	*202*	*319*	*445*
Change in reserves[2]	*–34*	*–247*	*–264*	*–353*	*–641*
Official inflows	*4*	*–5*	*–5*	*–2*	*…*
Latin America[4]					
Total inflows	77	54	82	102	194
Direct investment	25	53	63	60	86
Portfolio investment	40	5	20	16	50
Equity	12	6	12	11	…
Debt	28	–1	8	5	…
Other investment	12	–4	–1	26	58
Banks	6	–4	–4	–5	…
Other sectors	7	0	3	31	…
Memo: Current account balance	*–32*	*23*	*39*	*49*	*24*
Change in reserves[2]	*–13*	*–24*	*–27*	*–44*	*–126*
Official inflows	*–16*	*–4*	*–6*	*–5*	*…*
Central and eastern Europe[5]					
Total inflows	19	116	153	211	214
Direct investment	7	46	57	94	85
Portfolio investment	4	24	36	27	0
Equity	1	3	5	3	…
Debt	3	22	31	24	…
Other investment	8	46	60	91	130
Banks	3	23	34	43	…
Other sectors	5	22	27	48	…
Memo: Current account balance	*–6*	*–51*	*–57*	*–88*	*–119*
Change in reserves[2]	*–7*	*–21*	*–45*	*–23*	*–37*
Official inflows	*–4*	*–2*	*–5*	*–3*	*…*

"Other sectors" is comprised of non-financial corporations (private, public and quasi-corporations), insurance companies, pension funds, other non-depository financial intermediaries, private non-profit institutions and households.

[1] Comprises the regions below plus Russia, Saudi Arabia and South Africa. [2] A minus sign indicates an increase. [3] China, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. [4] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [5] Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Turkey.

Source: IMF, *International Financial Statistics*.

Table A2

Gross private capital *outflows* from emerging market economies

In billions of US dollars

	Annual averages		2005	2006	2007
	1990–97	2002–06			
Emerging market economies[1]					
Total outflows	76	327	435	681	830
Direct investment	16	68	71	157	182
Portfolio investment	17	118	159	283	400
Equity	8	25	28	48	69
Debt	9	93	131	235	331
Other investment	40	143	212	251	248
Banks	20	44	73	116	124
Other sectors	17	99	140	135	124
Memo: Official outflows	*0*	*–3*	*–6*	*2*	…
Asia					
Total outflows	51	139	177	316	502
Direct investment	10	26	30	54	77
Portfolio investment	9	57	58	166	335
Equity	6	15	17	31	…
Debt	3	42	42	135	…
Other investment	29	58	97	105	90
Banks	13	21	44	47	…
Other sectors	13	38	53	59	…
Memo: Official outflows	*1*	*1*	*0*	*2*	…
Latin America					
Total outflows	17	46	53	102	105
Direct investment	3	18	18	42	20
Portfolio investment	5	9	9	21	16
Equity	1	5	6	6	…
Debt	4	4	4	15	…
Other investment	8	19	25	39	68
Banks	4	2	9	11	…
Other sectors	4	17	16	28	…
Memo: Official outflows	*0*	*3*	*6*	*0*	…
Central and eastern Europe					
Total outflows	5	37	36	86	54
Direct investment	0	10	9	31	15
Portfolio investment	1	11	13	21	12
Equity	0	4	5	9	…
Debt	1	8	9	12	…
Other investment	4	16	14	34	28
Banks	3	8	7	19	…
Other sectors	1	8	7	15	…
Memo: Official outflows	*–1*	*–1*	*–1*	*–1*	…

"Other sectors" is comprised of non-financial corporations (private, public and quasi-corporations), insurance companies, pension funds, other non-depository financial intermediaries, private non-profit institutions and households.

[1] Comprises the regions below plus Russia, Saudi Arabia and South Africa. [2] A minus sign indicates an increase. [3] China, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. [4] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [5] Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Turkey.

Source: IMF, *International Financial Statistics*.

Table A3

Net inflows of private capital to emerging market economies[1]

In billions of US dollars

	Annual averages		2005	2006	2007
	1990–97	2002–06			
Emerging market economies[1]					
Total flows	146	198	252	232	605
Direct investment	74	206	260	250	310
Portfolio investment	42	–48	–19	–104	49
Other investment	31	25	13	86	249
Memo: Current account balance	*–75*	*375*	*517*	*698*	*738*
Change in reserves[2]	*–64*	*–483*	*–595*	*–753*	*–1,236*
Official flows	*12*	*–86*	*–110*	*–160*	*–149*
Asia					
Total flows	58	72	91	48	194
Direct investment	36	80	104	97	91
Portfolio investment	14	–39	–9	–111	18
Other investment	10	33	–4	61	85
Memo: Current account balance	*–10*	*213*	*235*	*360*	*486*
Change in reserves[2]	*–36*	*–279*	*–288*	*–372*	*–669*
Official flows	*3*	*–14*	*–21*	*–23*	*–38*
Latin America					
Total flows	50	19	37	10	100
Direct investment	23	42	51	28	77
Portfolio investment	31	–5	5	–14	32
Other investment	–4	–18	–20	–4	–9
Memo: Current account balance	*–37*	*18*	*35*	*45*	*16*
Change in reserves[2]	*–14*	*–27*	*–33*	*–50*	*–133*
Official flows	*3*	*–7*	*–31*	*–19*	*1*
Central and eastern Europe					
Total flows	12	84	118	120	171
Direct investment	7	39	52	65	73
Portfolio investment	4	12	22	10	–7
Other investment	1	31	45	46	104
Memo: Current account balance	*–7*	*–54*	*–61*	*–91*	*–122*
Change in reserves[2]	*–6*	*–23*	*–46*	*–23*	*–43*
Official flows	*1*	*–7*	*–8*	*–5*	*–3*

[1] This table has broader country coverage than Appendix Tables A1 and A2. In particular, it also includes Africa, the Commonwealth of Independent States and the Middle East. [2] A minus sign indicates an increase.

Source: IMF, *World Economic Outlook*.

Table A4

Sovereign wealth funds of emerging market economies

Country	Fund name	Assets managed[1] USD billions	Inception year	Source of funds
United Arab Emirates	Abu Dhabi Investment Council	650	1976	Oil
Singapore	Government Investment Corporation	350	1981	Other
China	China Investment Corporation	200	2003	Other
Kuwait	Future Generation Fund	174	1976	Oil
Singapore	Temasek Holdings[2]	168	1974	Other
Hong Kong SAR	Investment Portfolio (HKMA)	140	1998	Other
Russia	Reserve Fund	130	2008/2004	Oil
Qatar	Qatar Investment Authority	60	2005	Oil
Libya	Libyan Arab Foreign Investment Co	50	1981	Oil
Algeria	Fonds de Régulation des Recettes	43	2000	Oil, gas
Kuwait	General Reserve Fund	39	1960	Oil
Russia	National Wealth Fund	33	2008/2004	Oil
Brunei	Brunei Investment Authority	30	1983	Oil
Kazakhstan	National Oil Fund[2]	25	2000	Oil, gas
Korea	Korea Investment Corporation	20	2005	Other
Dubai	Investment Corporation of Dubai	19	2006	Other
Venezuela	National Development Fund/FIEM	18	2006/1998	Oil
Malaysia	Khazanah Nasional BHD	18	1993	Other
Chile	Economic and Social Stabilisation Fund/Pension Reserve Fund	17	2006/1985	Copper
Iran	Oil Stabilisation Fund	13	1999	Oil
Nigeria	Excess Crude Account	11	2004	Oil
Botswana	Pula Fund	7	1966	Diamonds
Oman	State General Reserve Fund	6	1980	Oil
Saudi Arabia	Public Investment Fund	5	2008	Oil
Mexico	Oil Income Stabilisation Fund	3	2000	Oil
Bahrain	Mumtalakat Holding Company	3	2006	Oil
Azerbaijan	State Oil Fund	2	1999	Oil
Timor Leste	Petroleum Fund	2	2005	Oil
Total[3, 4]		**≈2,250**		

[1] Estimates based on official sources and references cited in Mihaljek (2008); end-2007 or the most recent date available (up to May 2008). [2] A portion of holdings is in domestic assets or is intended for domestic investment. [3] The total uses the midpoint of the range of estimates for the United Arab Emirates.

Sources: IMF; Deutsche Bank; Morgan Stanley; Standard Chartered; SWF Institute; national data; author's estimates.

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