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Regional Economic Outlook

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This *Regional Economic Outlook: Asia and Pacific was* prepared by a team coordinated by Jerald Schiff and Paul Gruenwald, under the direction of David Burton of the IMF's Asia and Pacific Department. Kay Chung, Xiangming Fang, Janice Lee, and Fritz Pierre-Louis provided research assistance and Corinne Danklou, Claudia Isern, Yuko Kobayashi, and Livia Tolentino provided production assistance.

Definitions

In this *Regional Economic Outlook: Asia and Pacific*, the following groupings are employed:

- "Emerging Asia" refers to China, India, Hong Kong SAR, Korea, Singapore, Taiwan Province of China, Indonesia, Malaysia, the Philippines, Thailand and Vietnam.
- "Industrial Asia" refers to Japan, Australia, and New Zealand.
- "Asia" refers to emerging Asia plus industrial Asia.
- "Newly industrialized economies" (NIEs) refers to Hong Kong SAR, Korea, Singapore, and Taiwan Province of China.
- "ASEAN-5" refers to Indonesia, Malaysia, the Philippines, Thailand, and Vietnam.

The following abbreviations are used:

- SAAR refers to seasonally adjusted increase at an annual rate.
- y/y refers to a year-on-year increase.
- q/q refers to a quarter-on-quarter increase.

The following conventions are used:

- In tables, a blank cell indicates "not applicable" and ellipsis points (. . .) indicate "not available," and 0 or 0.0 indicates "zero" or "negligible." Minor discrepancies between sums of constituent figures and totals are due to rounding.
- An en dash (–) between years or months (for example, 2005–06 or January–June) indicates the years or months covered, including the beginning and ending years or months; a slash or virgule (/) between years or months (for example, 2005/06) indicates a fiscal or financial year, as does the abbreviation FY (for example, FY2006).
- An em dash (—) indicates the figure is zero or less than half the final digit shown.
- "Billion" means a thousand million; "trillion" means a thousand billion.
- "Basis points" refer to hundredths of 1 percentage point (for example, 25 basis points are equivalent to ¼ of 1 percentage point).

As used in this report, the term "country" does not in all cases refer to a territorial entity that is a state as understood by international law and practice. As used here, the term also covers some territorial entities that are not states but for which statistical data are maintained on a separate and independent basis.

Executive Summary

Economic developments in Asia have been positive so far in 2007 (Chapter I). Growth has been stronger than expected across much of the region, with domestic demand making an increasing contribution in a number of economies. Exports have remained an important driver of activity, notwithstanding a relatively weak performance from electronics. China and India continued to lead the way, with high growth backed by strong investment (although the contribution of net exports to growth in China continues to rise). The pace of activity in the NIEs and ASEAN-5 remained solid, with strong investment in the former and strong consumption in the latter. In industrial Asia, GDP contracted in Japan in the second quarter on lower capital expenditure, but this is likely in part to reflect data problems, while Australia and New Zealand continued to enjoy strong, broad-based growth.

Inflation pressures have remained contained across most of Asia, although food prices have added volatility to the headline numbers in a number of economies. This has been especially true in China, where headline inflation reached a decade-high of 6½ percent in August, although core inflation remains low and second-round effects from the food price spike should be minimal. In contrast, higher oil prices have not been an inflation factor so far.

Effective exchange rates have appreciated only modestly, the region's current account surplus has remained large, and reserve growth has continued apace. While some currencies in the region have risen significantly against the U.S. dollar, effective appreciations have generally been lower. Much of the exchange rate pressure continues to stem from current account surpluses, although outside of China these are moderating as a share of GDP. Intervention in the face of sustained foreign currency inflows has pushed reserves past the $4 trillion mark for the region, with China accounting for the bulk of the increase owing to a surging trade surplus.

Financial systems in Asia appear well placed to handle the effects of the global financial market turbulence that broke out in July. Asia was not at the epicenter of the recent turmoil, and markets and financial institutions in the region have been less affected to date than those in the United States and Europe. This reflects the relatively small direct exposure to U.S. subprime mortgages and, more broadly, to leveraged and complex structured credit products, including by hedge funds. Markets have begun to normalize somewhat at the time of this writing, although much uncertainty remains.

Looking ahead, the baseline scenario remains favorable. It features a moderation of growth during the remainder of 2007 and 2008 assuming an effective policy tightening in China, and to lesser extent in India, and a slowdown in foreign demand. A pattern of slower export and investment growth is expected across much of the region with only some de-linking from the global cycle. As credit markets gradually normalize, the fallout from the global financial turmoil should be manageable.

The risks to the overall outlook for the region are broadly balanced. The possibility of financial market stress feeding into a sharper-than-expected slowdown in exports is offset by

that of continued growth outperformance in China and India. That being said, for the majority of countries in the region the balance of risks is on the downside.

The confluence of strong growth momentum, the ongoing financial market turmoil, and the associated risks present policymakers in the region with a number of challenges:

- Price pressures already in the pipeline will need to be balanced against the downside risks to growth, but many countries in the region would appear to have room to ease policy settings on both the monetary and fiscal fronts, if necessary.
- Uncertainty over the size, volatility, and direction of capital flows looms large. Policymakers should continue to be pragmatic and allow for greater exchange rate flexibility in order to rebalance growth and create two-way risk in the markets.
- Finally, while the episode of financial turmoil may still play out further, a number of lessons for regulators are already apparent. These include the strengthening of reporting requirements to improve transparency; of pricing and provisioning to reduce liquidity and solvency risks; and of disclosure requirements to better inform investors.

The recent bout of financial market turbulence, whose onset coincided broadly with the tenth anniversary of the Asian crisis, naturally raises questions as to what extent countries in the region remain vulnerable. Indeed, a number of prominent commentators have asked whether Asia has "learned the right lessons" from the crisis. Chapter II looks at vulnerability across a number of measures and concludes that Asia has come a long way as a result of financial and corporate sector reforms as well as significant improvements in monetary policy frameworks. While some vulnerabilities remain in individual countries, and slower growth in response to a decline in foreign demand cannot be ruled out, the region is much more resilient today than 10 years ago. That said, challenges remain as economies in the region continue to gain sophistication and integrate into the global economy.

Asian emerging economies continue to accumulate sizable foreign currency reserves. With reserves in most countries now beyond levels that could be considered precautionary, continued exchange market intervention may reflect a desire to influence the level, rate of change, or volatility of the exchange rate. Chapter III investigates this claim and finds only limited evidence of systematic links between sterilized intervention and exchange rates, although there is some modest evidence that intervention reduces exchange rate volatility, consistent with the objectives of some monetary authorities.

Trade interdependence in Asia continues to strengthen, reflecting the ongoing development of sophisticated production networks aimed at exploiting differences in comparative advantage. Chapter IV undertakes a comprehensive analysis of Asia's changing trade patterns and finds that (1) the importance of exports to the region has reached unprecedented levels; (2) the expanded presence of Asia in world trade comes from trade in intermediate goods as a result of vertical specialization, with China as the export platform; (3) emerging Asia has begun to move away from lower-end products to a more diversified export base; and (4) the degree of competition within Asia appears to be intensifying.

I. Overview

Recent Macroeconomic Developments

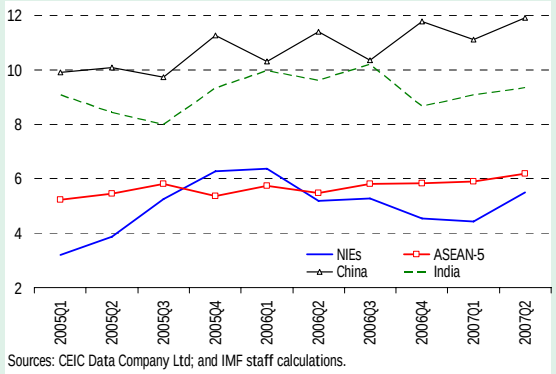
Macroeconomic developments in Asia were broadly positive through mid-2007. Growth was better than expected across most of the region, with domestic demand making an increasing contribution in a number of economies, and strong momentum continuing into the third quarter. That said, exports continued to be an important driver of growth despite a relatively weak performance from the electronics sector. Inflation pressures remained largely contained, although food price developments have added volatility to the headline numbers. Effective exchange rates strengthened modestly, the region's current account surpluses remained large, and reserve growth continued apace.

Growth

Growth across much of the region continued to rise in the first half of 2007, exceeding expectations. This was especially the case in emerging Asia. While China and India continued to lead the pack with growth rates over the period of 11½ percent and 9¼ percent (y/y) respectively, the pace of overall activity trended modestly higher in the newly industrialized economies (NIEs) and ASEAN-5 as well. In industrial Asia, Australia and New Zealand reported strong, broad-based growth; however, output in Japan contracted in the second quarter, reflecting lower capital expenditure.

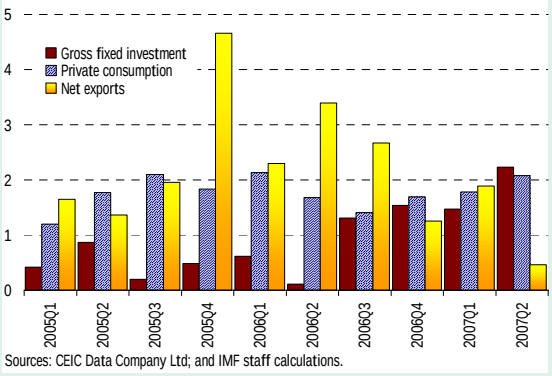
The growth performance in emerging Asia reflected an increasing contribution from domestic demand. This was particularly true in the NIEs, where both consumption and investment have been robust, as Hong Kong SAR and Singapore continue to experience strong growth in the financial services sector, with construction and manufacturing quite buoyant in the latter's economy as well. Growth in

Figure 1.1. Emerging Asia: GDP Growth
(Year-on-year percent change)



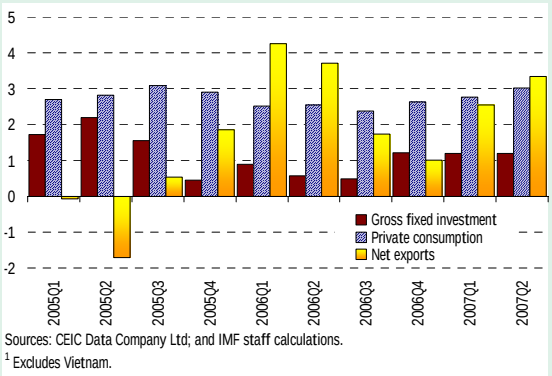
Sources: CEIC Data Company Ltd; and IMF staff calculations.

Figure 1.2. NIEs: Contributions to GDP Growth
(Year-on-year change in percent of previous year's GDP)



Sources: CEIC Data Company Ltd; and IMF staff calculations.

Figure 1.3. ASEAN-5: Contributions to GDP Growth[1]
(Year-on-year change in percent of previous year's GDP)



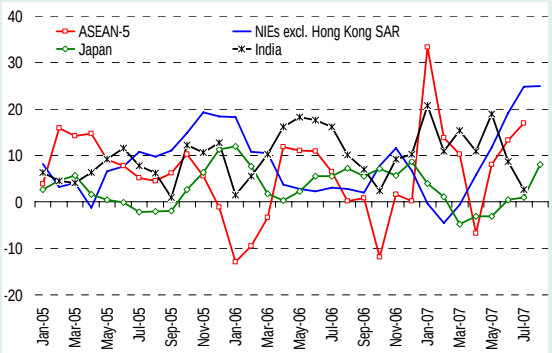
Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] Excludes Vietnam.

Note: The main authors of this chapter are Paul Gruenwald, Nita Thacker, David Cowen, Ranil Salgado, and Olaf Unteroberdoerster.

the ASEAN-5 featured a large and rising contribution from net exports, although consumption has remained strong with the exception of Thailand, where political developments continue to weigh on confidence. After a soft patch earlier this year, exports have picked up recently but the recovery in electronics has lagged (Box 1.1).

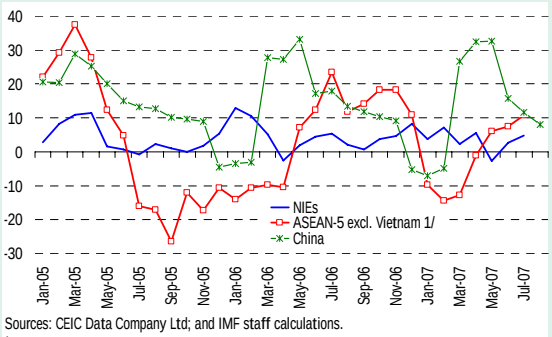
Higher-than-expected growth in China and India continued to be investment-led. In China, growth picked up from an already high base despite the authorities' efforts to slow the pace of overinvestment. Meanwhile, the contribution to growth from net exports, while still below investment, is rising while consumption continues to expand at a healthy pace (although the consumption-to-GDP ratio continues to trend down).

Figure 1.4. Asia: Industrial Production
(3-month percent change of 3-month moving average, SAAR)



Sources: CEIC Data Company Ltd; and IMF staff calculations.

Figure 1.5. Emerging Asia: Retail Sales Volume
(3-month percent change of 3-month moving average, SAAR)

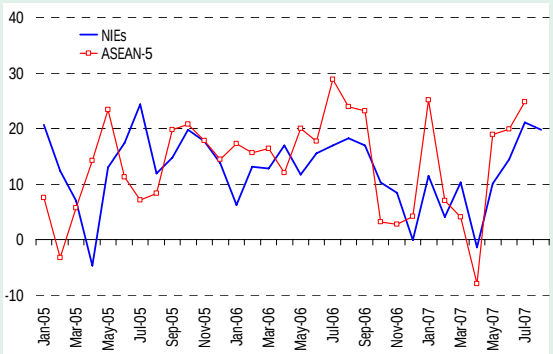


Sources: CEIC Data Company Ltd; and IMF staff calculations.

[1] Proxies used for Malaysia (manufacturing sales), Philippines (car sales), and Thailand (composite consumption).

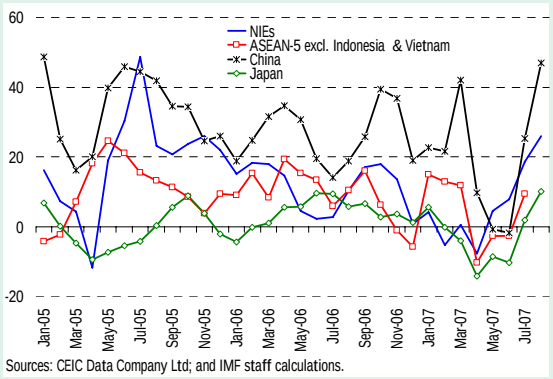
India's growth appears to be on a solid footing and confidence remains high. This buoyancy has benefited from strong investment and productivity gains, which have translated to higher potential growth. Consumption and net exports remain strong, but their contribution to growth has eased recently.

Figure 1.6. Emerging Asia: Exports of Goods
(3-month percent change of 3-month moving average, SAAR)



Sources: CEIC Data Company Ltd; and IMF staff calculations.

Figure 1.7. Asia: Electronics Exports
(3-month percent change of 3-month moving average, SAAR)



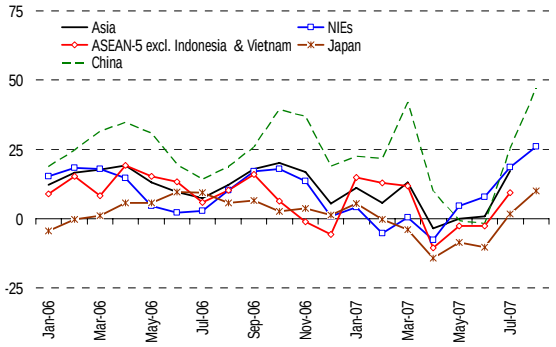
Sources: CEIC Data Company Ltd; and IMF staff calculations.

Domestic activity across much of Asia has remained robust so far in the third quarter and exports have continued to recover. The most recent data suggest that investment looks healthy with industrial production generally robust. Business confidence remains buoyant and capacity utilization continues to rise gradually. That said, the picture regarding consumption is less clear, as broadly favorable trends in retail sales (which remain weak in

Box 1.1. Asian Electronics Exports: Recent Trends and the Outlook

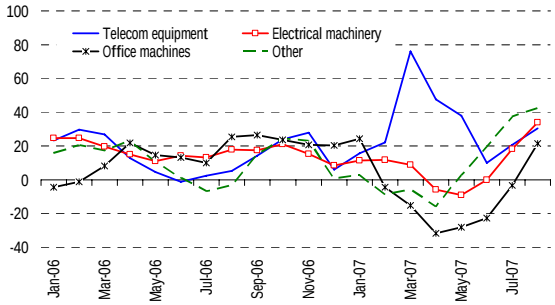
Asian electronics exports slowed markedly in the first half of 2007, but signs of a strong turnaround have emerged as European demand has picked up significantly and prices, which had been declining steeply, have stabilized. In terms of exporting countries, this pattern was most notable in China, with (sequential) growth rebounding sharply. Signs of a turnaround in the momentum of electronics exports appear to be across the board in Asia, although the outlook is mixed, and depends on developments in the global economy, particularly the United States.

Asia: Electronics Exports
(3-month percent change of 3-month moving average, SAAR)



Sources: CEIC Data Company Ltd; and IMF staff calculations.

Selected Asia: Exports of Electronics by Commodity[1]
(3-month percent change of 3-month moving average, SAAR)

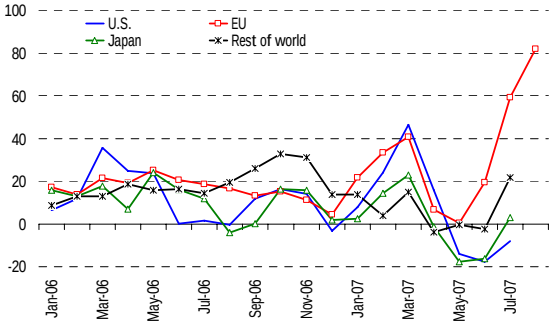


Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] "Selected Asia" consists of Japan, Korea, Singapore, Hong Kong SAR, Taiwan POC, and China.

In terms of goods exported, current trends are positive. There has been a sharp recovery across all goods in recent months after a weak first half. Growth in telecom equipment exports had decelerated sharply in the second quarter, while other categories showed varying degrees of improvement.[1] The sharp sequential slowdown in telecoms in part reflected data reclassifications in Japan (relating to LCD parts for mobile phones, which had the effect of raising the growth rate of the "other" category), resulting in slower growth in the first quarter. Since mid-year, exports of electrical machinery (particularly from Taiwan Province of China) and office machine shipments have turned around noticeably.

The resurgence of European demand for Asian electronics is noteworthy. While all major trading partners showed a sequential decline in demand for electronics exports from Asia earlier this year, only Europe has bounced back with annualized growth of nearly 80 percent. The export destination data indicate a slowdown in Japanese demand for Asian electronics exports through mid-year, and the decline in exports to the United States seems broadly consistent with the drop in consumption growth there in the second quarter. In addition, electronics exports may have fallen owing to U.S. dollar and yen weakness vis-à-vis Asian currencies over the period. Also noteworthy is the modest turnaround in shipments to the rest of the world, which includes significant exports from China for reprocessing in Hong Kong SAR (not in the sample).

Selected Asia: Electronics Exports to Major Partners[1]
(3-month percent change of 3-month moving average, SAAR)



Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] "Selected Asia" consists of Japan, Korea, and China.

Note: The main author of this box is Sumiko Ogawa.

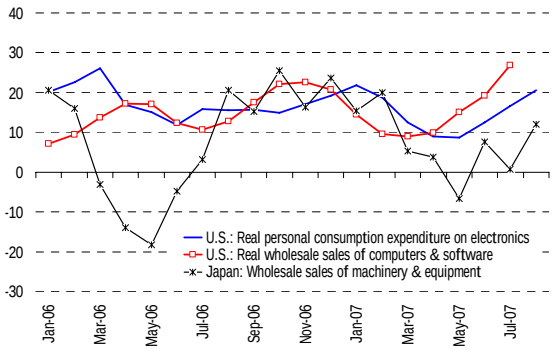
[1] Of the total, telecoms comprise 25 percent, electrical machinery 40 percent, and office machinery 20 percent.

Box 1.1 *(concluded)*

Indicators for the sector suggest a mixed picture ahead. The sequential slowdown in Japanese machinery and equipment sales reversed course in May, although the overall pace of growth remains modest, and orders data for the third quarter suggest demand may be softening. In the United States, indicators of retail and wholesale electronics demand bottomed in the second quarter, although the U.S. purchasing managers index has turned down sharply. Both the German and Singaporean purchasing managers indices have softened as well. The continued deceleration of the U.S. semiconductor equipment book-to-bill ratio reflects the surge in capital investment last year.

External Demand for Electronics

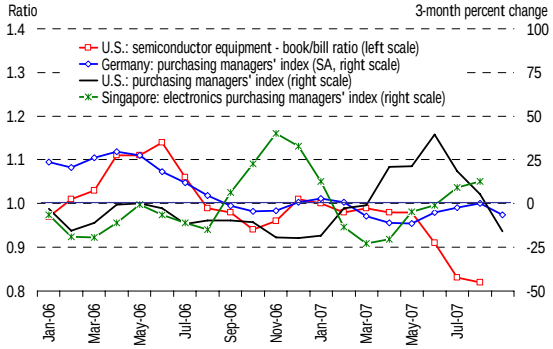
(3-month percent change of 3-month moving average, SAAR)



Sources: Haver Analytics; and IMF staff calculations.

Electronics: Forward-Looking Indicators

(3-month moving average)

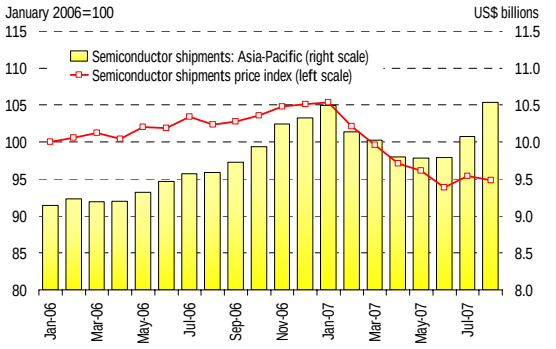


Sources: CEIC Data Company Ltd; Haver Analytics; and IMF staff calculations.

The prices for semiconductors—a key electronics component—have stabilized and there are signs that prices for memory chips may have bottomed. A 20 percent surge in capital investment by memory chip makers last year, driven by solid profits, led to an oversupply of memory chips, while demand for personal computers with more powerful chips following the launch of Microsoft's Windows Vista operating system has been below expectations. While overall demand for memory chips is expected to remain high, excess supply conditions are expected to continue through 2008. As a result, industry analysts note that downward pressure on prices is expected to remain.

Asia-Pacific Semiconductor Shipments and Prices

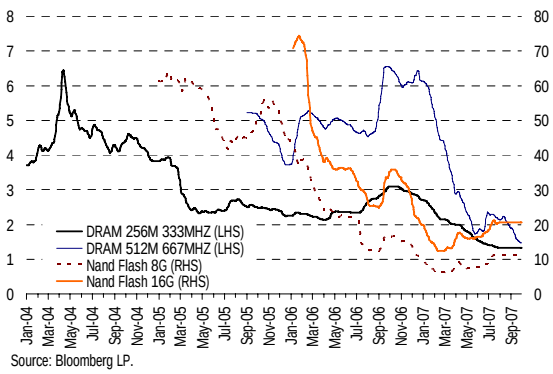
(Seasonally adjusted, 3-month moving average)



Sources: Haver Analytics; Semiconductor Industry Association; and IMF staff calculations.

DRAM and Flash Memory Prices

(In U.S. dollars, 5-day moving average)



Source: Bloomberg LP.

the NIEs) are clouded by mixed readings on consumer confidence. Export growth has continued to pick up in recent months, with electronics exports accelerating.

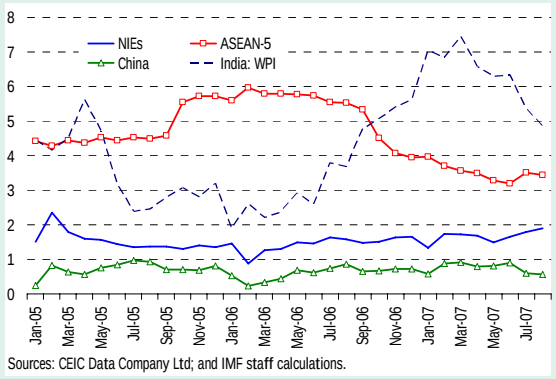
Inflation

Inflation pressures remain broadly stable in emerging Asia. Core inflation across most economies remains well behaved, although headline inflation has risen to 4.7 percent at end-July, up from 3½ percent at end-2006 mostly owing to food price pressures in China (see below). In India, wholesale price index (WPI) inflation has come down by almost 3 percentage points as the authorities have tightened policy settings, raising reserve requirements by 200 basis points so far this year. Vietnam is an outlier on the upside as inflation continues to be exacerbated by demand pressures stemming from a loose fiscal stance and rapid money and credit growth despite a doubling of reserve requirements.

Food prices have contributed to more volatile headline inflation numbers in some economies. China saw food price inflation reach 18 percent in August, with headline inflation accelerating to 6.5 percent, a 10-year high. However, nearly all of this is attributable to pork and egg prices reflecting supply factors, which are not expected to have second-round effects. In an effort to preempt inflationary expectations, the authorities have raised both reserve requirements and lending rates. Food prices have also risen in India, Indonesia, Taiwan Province of China, and Vietnam owing to weather-related events. Developments in the global commodity markets—wheat, corn and dairy—have played a role in food prices in Asia as well. Oil has not been a factor in Asian inflation so far in 2007 as international prices eased in the first half of this year and the recent pick-up has yet to feed into domestic prices, in part reflecting administrative controls in some countries.

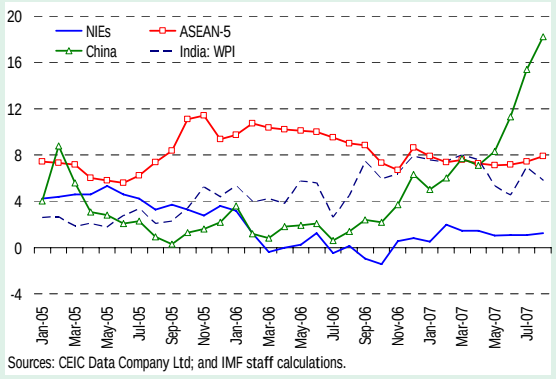
Producer and other input prices have also been well behaved. Indeed, the wedge with consumer prices turned negative in the second quarter for the first time in recent years. The continued trend decline in producer prices reflected muted wage

Figure 1.8. Emerging Asia: Core CPI
(12-month percent change)



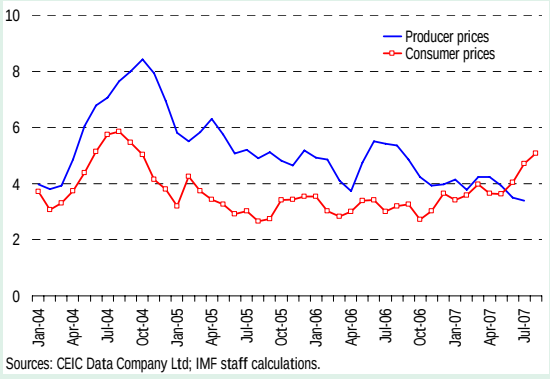
Sources: CEIC Data Company Ltd; and IMF staff calculations.

Figure 1.9. Emerging Asia: Food CPI
(12-month percent change)



Sources: CEIC Data Company Ltd; and IMF staff calculations.

Figure 1.10. Emerging Asia: Consumer and Producer Prices
(12-month percent change)



Sources: CEIC Data Company Ltd; IMF staff calculations.

pressures—with real wages continuing to decline in a number of economies in emerging Asia—as well as lower import costs owing in part to more appreciated exchange rates in some economies. This decline has taken place across all groupings in emerging Asia, although less so in the NIEs.

External Sector

Most countries in the region continue to experience large current account surpluses. With exports generally surprising on the upside, and the decline in oil prices helping to reduce oil import bills, the region's current account surplus reached an estimated 5 percent of GDP in the first half of 2007.

Table 1.1. Asia: Current Account Balances
(In percent of GDP)

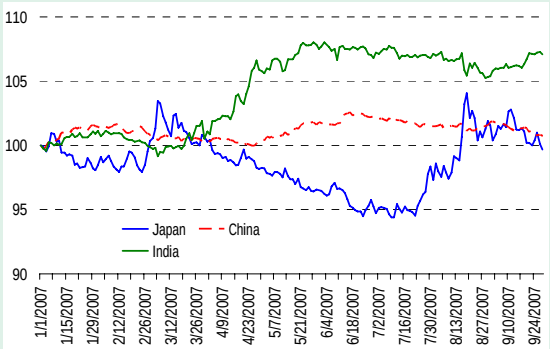
	2005	2006	2007	2008	2007	2008
			REO April 2007		Latest proj.	
Industrial Asia	**2.2**	**2.3**	**2.1**	**1.9**	**2.5**	**2.3**
Japan	3.6	3.9	3.9	3.6	4.5	4.3
Australia	-5.7	-5.4	-5.6	-5.5	-5.7	-5.6
New Zealand	-8.6	-8.7	-8.4	-7.6	-8.5	-8.6
Emerging Asia	**4.8**	**6.0**	**6.1**	**6.2**	**7.0**	**6.9**
NIEs	***5.5***	***5.6***	***5.3***	***5.1***	***5.4***	***4.9***
Hong Kong SAR	11.4	10.8	9.6	9.3	11.2	9.5
Korea	1.9	0.7	0.3	0.0	0.1	-0.4
Singapore	24.5	27.5	27.1	26.6	27.0	25.4
Taiwan POC	4.5	6.8	7.1	7.1	6.8	7.1
China	7.2	9.0	10.0	10.5	11.7	12.2
India	-1.1	-1.2	-2.4	-2.3	-2.1	-2.6
ASEAN-5	***1.7***	***4.7***	***3.8***	***3.2***	***4.1***	***3.2***
Indonesia	0.1	2.7	1.8	1.3	1.6	1.2
Malaysia	14.6	16.3	15.3	14.3	14.4	13.3
Philippines	2.0	5.0	2.1	1.9	3.8	2.6
Thailand	-4.5	1.1	1.5	0.9	3.7	2.2
Vietnam	-1.0	-0.5	-1.2	-1.5	-3.2	-3.2
Emerging Asia excl. China	**3.0**	**3.7**	**2.8**	**2.5**	**2.9**	**2.2**
Asia	**3.4**	**4.3**	**4.3**	**4.4**	**5.0**	**5.0**

Source: IMF, WEO database.

China again accounted for most of the region's higher outturn, with its surplus reaching 11 percent of GDP reflecting a burgeoning trade surplus, mainly with the United States and Europe.[1] Japan reported a larger-than-expected surplus on higher investment income, while India contributed as well with a lower-than-projected deficit.

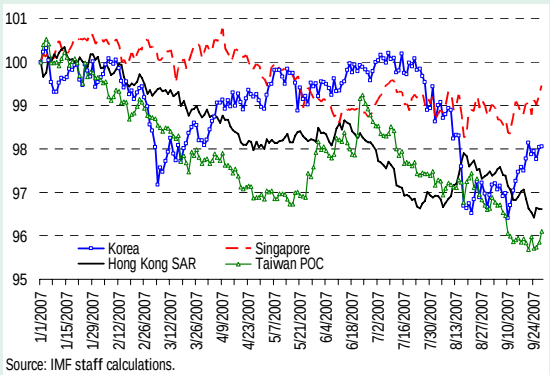
Exchange rate developments were dominated by ongoing current account surpluses and continued capital inflows to the region in the first half of 2007. The ASEAN-5 currencies, the Indian rupee, and the Australian and New Zealand dollars appreciated significantly against the U.S. dollar, but somewhat less in nominal effective terms. The Chinese renminbi also appreciated in the first half of 2007, by 2½ percent against the U.S. dollar, and by 2 percent in nominal effective terms (and by 5 percent in real effective terms owing to relatively high inflation). While part of these cross-country differences reflects foreign exchange flows, intervention by some central banks in the region also played a role.

Figure 1.11. Selected Asia: Nominal Effective Exchange Rates
(January 1, 2007=100)



Source: IMF staff calculations.

Figure 1.12. NIEs: Nominal Effective Exchange Rates
(January 1, 2007=100)

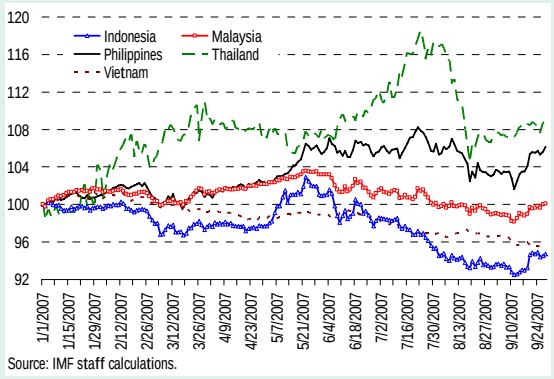


Source: IMF staff calculations.

[1] China continues to run a sizable trade deficit, on the order of 8 percent of GDP, with the rest of Asia (excluding Hong Kong SAR).

Swings in capital flows since mid-July have altered the pattern of exchange rate developments in the region. Most noticeably, there was an unwinding of carry trade positions as evidenced by a sharp rise in the Japanese yen and an even sharper drop in some of the "target" currencies—e.g., the Australian and New Zealand dollars—particularly between the onset of the turbulence and mid-August.[2] Portfolio outflows related to a reduction in risk appetite featured as well. Since then these trends have reversed, although volatility across the various asset classes remains high. Recent capital and financial market developments are discussed more fully in the next section.

Figure 1.13. ASEAN-5: Nominal Effective Exchange Rates
(January 1, 2007=100)



Source: IMF staff calculations.

Reserves continued to grow strongly in the region, again led by China, as countries continued to intervene in the face of trend appreciation pressures. Emerging Asia's official reserves as a whole reached $3 trillion at end-August, up from $2½ trillion at end-2006, despite a modest drawdown of reserves in the wake of the financial market turmoil. Compared with last year, the rate of reserve accumulation in China has roughly doubled so far this year, reflecting for the most part large trade surpluses. The rate of reserve accumulation in the ASEAN-5 has also accelerated in 2007, driven by both current and capital account developments. In India, reserve growth reflected both stronger FDI and portfolio inflows fed by optimism on the growth outlook, while in Korea inflows reflected short-term borrowing by commercial banks to square their books against forward purchases from exporters.[3] Chapter III looks at the extent to which central bank intervention in the foreign currency markets has been effective in emerging Asia.

Table 1.2. Asia: Official Reserves
(In billions of U.S. dollars, end-period)

	2004	2005	2006	2007 Latest
Industrial Asia	**888**	**899**	**964**	**1,007**
Japan	845	847	895	932
Australia	37	43	55	58
New Zealand	7	9	14	17
Emerging Asia	**1,776**	**2,035**	**2,479**	**2,997**
NIEs	***677***	***704***	***775***	***801***
Hong Kong SAR	124	124	133	137
Korea	199	210	239	255
Singapore	113	116	136	148
Taiwan POC	242	253	266	261
China	619	826	1,073	1,391
India	131	137	177	227
ASEAN-5	***174***	***184***	***227***	***289***
Indonesia	36	35	43	51
Malaysia	67	70	83	111
Philippines	15	18	23	30
Thailand	50	52	67	74
Vietnam	6	9	11	21
Asia	**2,664**	**2,934**	**3,443**	**4,004**

Source: CEIC Data Company Ltd.

With reserves in many Asian economies well above the levels needed for liquidity purposes, a number of central banks have launched or are considering launching sovereign wealth funds. The objective of these entities is to increase returns on foreign currency holdings, although in some cases (e.g., Korea) they have a secondary objective to help develop local capital markets. Box 1.3 looks at the current state of play regarding sovereign wealth funds in Asia.

[2] On August 17, the U.S. Federal Reserve lowered the discount rate by 50 basis points to 5.75 percent and extended the term of the discount window to 30 days. It also announced that it would accept investment-quality commercial paper as collateral.

[3] This and other recent developments in the "other investment" category of the balance of payments across a number of Asian economies appear in Box 1.2.

Box 1.2. "Other Investment" Flows in Asia: Why the Large Changes?

A number of Asian economies have experienced substantial changes in nonportfolio, non-FDI capital flows in recent years. While "other investment" flows are usually viewed as a rather uninteresting category of the external financial account, they have in fact accounted for much of the recent action in financial flows in Asia.[1] To wit, the average absolute change in net other investment between 2003 and 2006 across Asia equaled 4.4 percent of GDP, and restricting the analysis to the six economies with the largest changes[2]—Japan, Korea, Malaysia, New Zealand, the Philippines, and Taiwan Province of China—the average absolute change amounted to 6.5 of GDP (see figure). To put these changes in perspective, the average absolute current account change across Asia over this period equaled 2.6 percent of GDP, and for the six featured economies was 3 percent of GDP.

It is tempting to ascribe these large swings in other investment flows to the rise in carry trades across the region, but this is only part of the story. A priori, the direction of changes in other investment balances seem to match the carry trade explanation: large declines in net other investment in Japan and Taiwan Province of China, two economies characterized by lower-than-average domestic interest rates, and large positive swings in countries like Korea or New Zealand thought to be target destinations. While the complex nature of carry trades and other structured financial flows makes it impossible to determine their exact contribution to the balance of payments, best estimates are that carry trades have explained some of the change in net other investment in the region but by no means all of it. Other country-specific factors may have also played an important role: [3]

- *Japan*. Besides carry trade–related flows, lending from domestic to foreign banks for yen-yen transactions, notably those arbitraging the relative steepness of Japan's yield curve, is thought to have accounted for some of the 11 percent of GDP decline in net other investment in Japan between 2003 and 2006. Bank lending associated with rising direct investment abroad as well as the decision by some Japanese banks and other corporations to repay external debts in the face of rising interest rates in the United States also played a part in this decline.
- *Korea*. Inflows related to domestic banks' on-shore lending in foreign currency, the bulk of which is in U.S. dollars but with some in yen (carry–trade related) as well, are estimated to have accounted for about one-fourth of the jump in net other investment, while about one-half was due to domestic banks borrowing abroad to square the large increase in their long forward U.S. dollar book. This latter increase, in turn, was due to a combination of surging export orders by Korean shipbuilders and their growing desire to hedge future foreign receipts against won appreciation. Finally, the sharp rise in hedging overwhelmed relatively thin forward markets in Korea and triggered sizable deviations from covered interest parity, thereby leading to additional banking inflows seeking to benefit from these pure arbitrage opportunities.
- *Malaysia*. A decision to repay public external debt partly explains the large decline in net other investment. In addition, some of the portfolio diversification taking place in the country as a result of a liberalization of controls on outflows is thought to have been recorded under other investment, as banks have increased their placement of assets abroad.
- *Philippines*. The decline in net other investment is in part due to lower recourse to external borrowing given large remittance inflows. In the case of the Philippines, indications are that carry trade flows have been small.

Note: The main author of this box is Jacques Miniane.

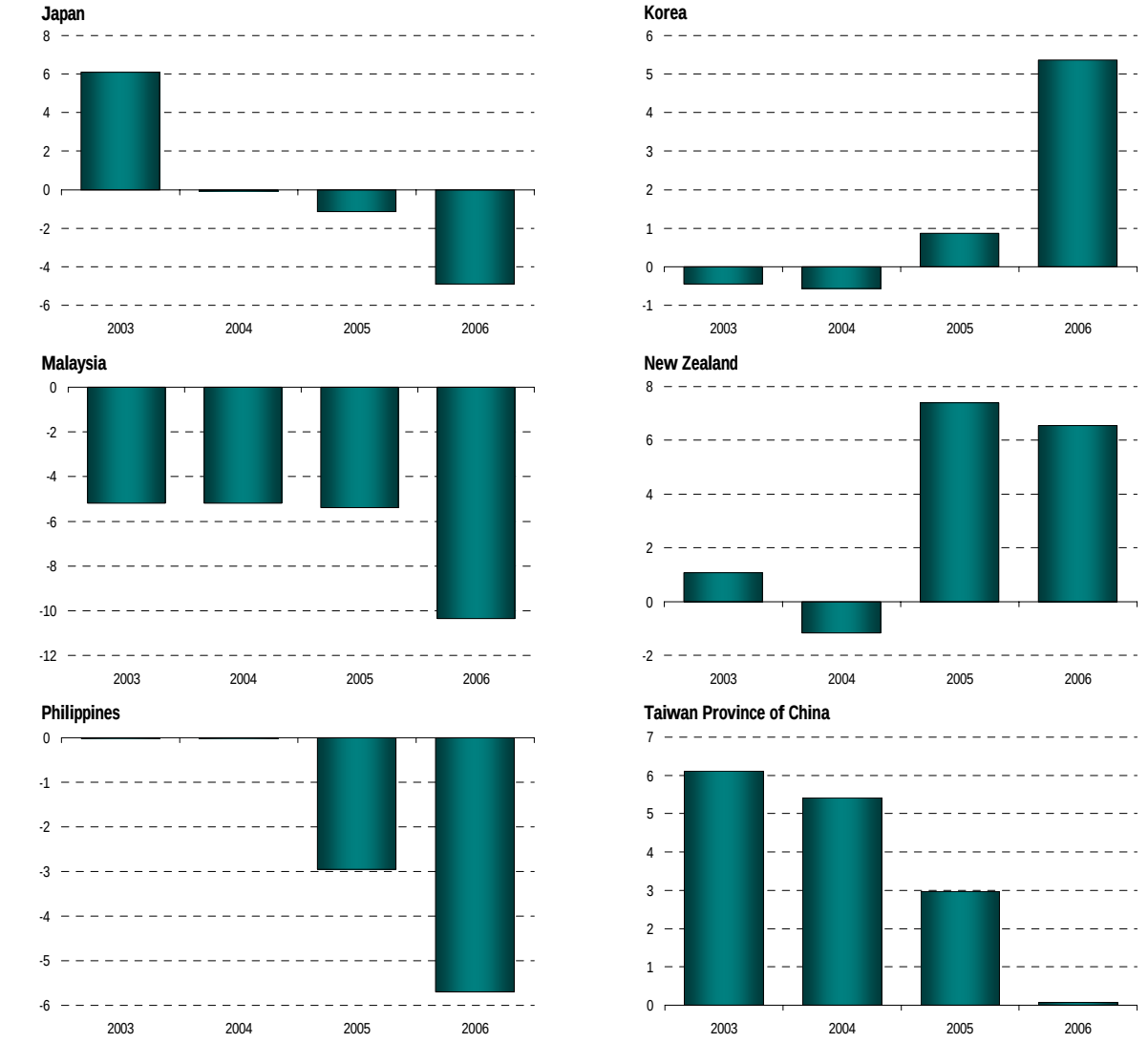
[1] "Other investment, net" is defined here as the financial account balance minus net FDI and portfolio flows, not including errors and omissions. In most countries the main categories under "other investment" are banking flows and trade credits. We exclude derivatives flows to ensure cross-country consistency, as some countries record them under "portfolio investment," others under "other investment," and others not at all.

[2] Not including Hong Kong SAR, which is considered a regional money center.

[3] Here we focus on the six countries with the largest absolute changes in other investment balances over 2003–06, except for New Zealand where most of the large increase is thought to have resulted from carry trades.

Box 1.2 *(concluded)*

Selected Asia: Other Investment, Net
(In percent of GDP)



Source: CEIC Data Company Ltd.

- *Taiwan Province of China*. Most of the fall in net other investment resulted from a large decline in the external liabilities of the central bank.[4]

Recent large movements in "other investment" pose a number of policy challenges. In countries like Korea and New Zealand, the recent spike in "other investment, net" has translated into a significant increase in short-term external debt. While some of this debt may be in domestic currency, hedged, or accompanied by a concomitant increase in foreign exchange assets—such as in the case of hedging-related inflows in Korea—this may not always be the case, perhaps reflecting a growing degree of cross-border risk-taking among banks in the region. Similarly, many of these "other investment" flows appear to be highly interest rate–sensitive, and may point to increasing difficulties in conducting autonomous monetary policy in the face of large and volatile capital flows in the region.

[4] These include nonreserve securities sold under repurchase agreements and accrued interest paid. Note that recording monetary authorities' nonreserve transactions above the line is consistent with the IMF's *Balance of Payments Manual*, fifth edition.

Box 1.3. Sovereign Wealth Funds

Sovereign wealth funds have attracted considerable interest in Asia and elsewhere. While the assets constituting sovereign wealth funds can in principle come from any public source, they tend to be generated in three ways: (1) the proceeds from natural resource exports, mainly, but not limited to, oil; (2) accumulated fiscal surpluses; and, most recently, (3) foreign exchange reserves, typically beyond what is deemed necessary for liquidity purposes or financial contingencies. Total assets in sovereign wealth funds (globally) are estimated to have grown from about $500 billion in 1990 to $2.5 trillion as of May 2007, and are expected to reach $10 trillion by 2012.

Sovereign Wealth Funds in Asia
(In billions of U.S. dollars)

Country	Assets	Amount	Source of Funds
Australia	Future Fund	0.049	Fiscal surplus
China	China Investment Corporation	up to 200	Current account surplus
Hong Kong SAR	Exchange Fund (Investment Portfolio)	120	Fiscal surplus
Korea	Korea Investment Corporation	20	Current account surplus
Singapore	General Investment Corporation	100	Multiple[1]
Singapore	Temasek	100	Multiple[2]

Sources: Country authorities; and IMF staff estimates.

[1] Fiscal and current account surplus and proceeds from sale of government bonds to CPF.

[2] Initial transfer of holdings, retained earnings, and borrowing.

Sovereign Wealth Funds in Asia

A number of countries in Asia have already established such funds, with China being the most recent.

Singapore. The Government Investment Corporation (GIC), whose sole shareholder is the ministry of finance, was established in 1981 to invest Singapore's fiscal reserves in assets outside Singapore. It is also responsible for investing excess foreign exchange reserves and proceeds from the sale of government bonds to the Central Provident Fund (CPF). The GIC invests across many asset classes and makes decisions on where and how to invest, with its board providing the guidelines on the broad benchmark consistent with the overall objective of enhancing the international purchasing power of the reserves. The government is also the sole owner of Temasek, which was set up in 1974 as a private holding company. Temasek invests in various industries, both in Singapore and abroad.

Hong Kong SAR. The investment portfolio of the Exchange Fund—those assets not serving as backing for the monetary base as required by the currency board arrangement—includes the accumulated fiscal surpluses of the government and the former Land Fund, plus the interest thereupon. These assets have been actively managed by the Hong Kong Monetary Authority since 1998 following a rules-based strategy with high degree of transparency. The emphasis is on preserving capital and controlling the risks arising from the investment process. The Exchange Fund Advisory Committee sets the benchmarks, which provide targets and guidelines to ensure that the investment strategy matches the purpose of the fund.

Note: The main author of this box is Nita Thacker.

Box 1.3 *(concluded)*

Korea. The Korea Investment Corporation (KIC)—which invests on behalf of the Bank of Korea and the Korean government—was established in 2005. At $20 billion, it is relatively small, but the government plans to double its investment. The KIC is somewhat different from the other recent sovereign wealth funds in emerging Asia because the Bank of Korea retains the option to recall these assets in case of an emergency and the diversification is limited to relatively liquid instruments. Aside from enhancing returns, an important secondary objective of the KIC is to help develop Korea as a major regional financial hub and asset management center.

Australia. The Australian Government Future Fund, established in May 2006, is funded from budgetary surpluses. The fund was started with an initial transfer of A$18 billion. The purpose of the fund is to meet the government's future liabilities for the payment of pensions to retired public servants, expected to amount to A$140 billion by 2020. It is overseen by an independent Board of Guardians selected on the basis of their expertise in investment management and corporate governance.

China. The China Investment Corporation (CIC) was established earlier this year to manage the investment of excess foreign reserves. Total funds under management are expected to reach $200 billion from the current $1.4 trillion of official reserves, with additions to be based on the pace of future reserve accumulation. The first investment, a 9 percent nonvoting stake for $3 billion in a New York–based private-equity firm, was completed in June.

Some Issues Regarding Sovereign Wealth Funds

- *Size*. Sovereign wealth funds are likely to grow over time, perhaps quickly. This seems particularly relevant for those sovereign wealth funds funded by reserve accumulation. This size, combined with the public nature of these funds, suggests that the level of scrutiny they face will be correspondingly larger than for private entities. That said, portfolio management is assumed to be relatively passive, suggesting that sovereign wealth funds may "punch below their weight" in terms of turnover (in contrast to, say, hedge funds).
- *Market impact*. While experience to date suggests that sovereign wealth funds managers have been generally conservative in terms of the risk-return tradeoff they are willing to carry on their portfolio, they have been allowed a higher risk tolerance than official reserve asset managers with the aim of bolstering returns. One can therefore expect these entities, over time, to invest in a wider class of assets and to move down the credit curve. To the extent that these markets are thinner markets than those for safer assets, the presence of sovereign wealth funds will be more prominent. As a counterfactual, demand for safer assets would be correspondingly lower than in the absence of sovereign wealth funds.
- *Transparency and governance*. Few sovereign wealth funds, with the exception of those in Australia, Hong Kong SAR, Norway, and New Zealand, provide details about their operations and the type of investments they make, although some funds are professionally managed. As the size of sovereign wealth funds increases and the range of assets they purchase broadens, development of operational best practices, focused on governance, transparency, and accountability, could help to disseminate information about their risk mismanagement practices and how closely they follow their mandates, help to ensure financial stability, and counter any potential pressures for financial protectionism.

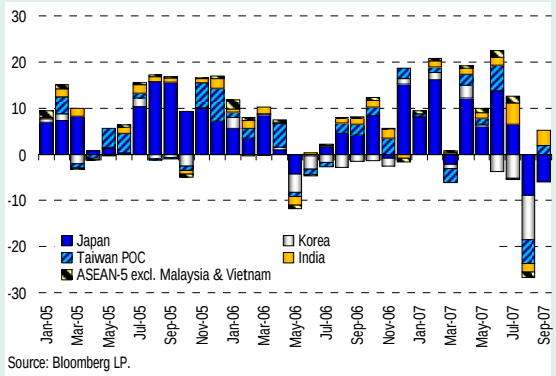
Recent Financial Market Developments

Asia was not at the epicenter of the global financial market turbulence that broke out in July. As a result, markets and financial institutions in the region have been less affected to date—although they were not entirely immune from difficulties—than those in the United States and Europe. This reflects the relatively small direct exposure to U.S. subprime mortgages and, more broadly, to leveraged and complex structured credit products, including by hedge funds.

The Recent Turbulence

Asian financial markets continue to be broadly guided by global developments (for details, see the October 2007 *Global Financial Stability Report*). Following a run-up to record highs across most equity markets in mid-2007, a sharp sell-off ensued in late July in response to concerns over rising defaults in U.S. subprime mortgages and their implications for U.S. growth. With global leverage and risk appetite reduced, Asian equity markets declined in the range of 10–20 percent by mid-August. Investors from outside the region, who had begun to exit equities mid-year, led the selling, with monthly net equity flows across all major markets highly negative in August 2007. Markets have since recovered much or all of this loss. Equity prices in China have continued to soar, affected little by the sell-off, given limited foreign ownership owing to capital controls and buoyed by interest in new initial public offerings (IPOs) that have been coming to the market and given investor views on future earnings prospects in China.

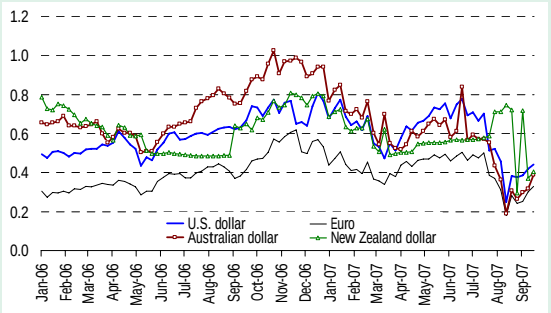
Figure 1.14. Emerging Asia: Net Equity Inflows
(In billions of U.S. dollars)



Source: Bloomberg LP.

As noted above, since the onset of the turbulence in July, Asian currencies faced downward pressure, including related to a substantial unwinding of yen carry trades. The pick-up in implied market volatility reduced the attractiveness of these trades, with risk-adjusted returns falling to levels not seen since early 2006.[4] A number of central banks in the region intervened (buying the local currency) to smooth exchange rate volatility and ensure orderly markets. In Australia, the failure of a large financial conduit to roll over asset-backed commercial paper (ABCP) in the United States added to downward currency pressures in mid-August, while the New Zealand

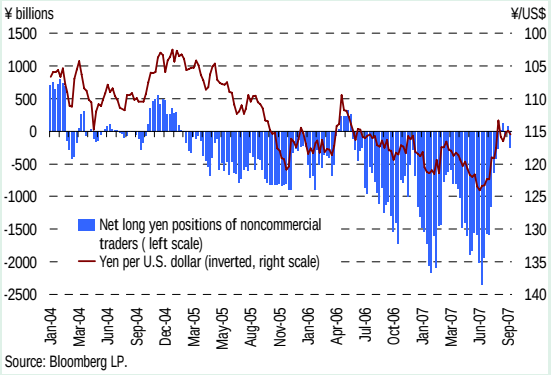
Figure 1.15. Sharpe Ratios[1]



Source: Bloomberg LP.

[1] The Sharpe ratio (defined as 1-month interest rate differential divided by implied volatility in bilateral exchange rate) is a measure of the risk-adjusted return on yen carry trade.

Figure 1.16. Yen Trading Positions

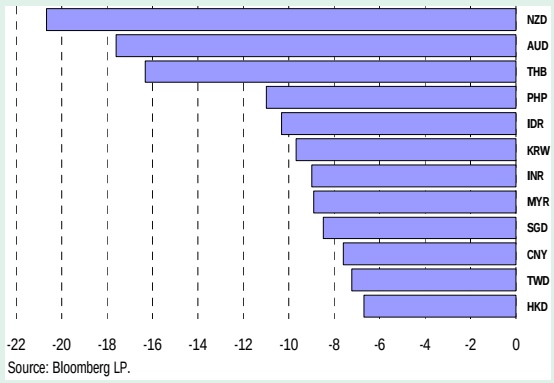


Source: Bloomberg LP.

[4] The net short yen positions of noncommercial traders at the Chicago Mercantile Exchange and Japanese foreign exchange margin traders were substantially reduced, and foreign security purchases by investment trusts and foreign short-term lending by target country banks fell.

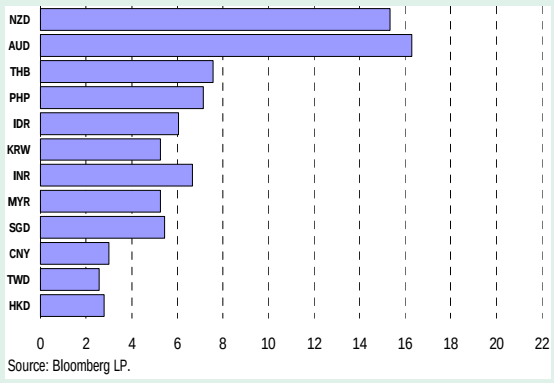
dollar was pushed lower as only an estimated one-fifth of Uridashi bonds maturing were rolled over.[5] Since then, both currencies have appreciated significantly as risk appetite has returned and carry trade positions have been reestablished.

Figure 1.17. Yen Carry Trade Return (Short JPY, Long Listed Currency)
(July 19, 2007–August 17, 2007; in percent)



Source: Bloomberg LP.

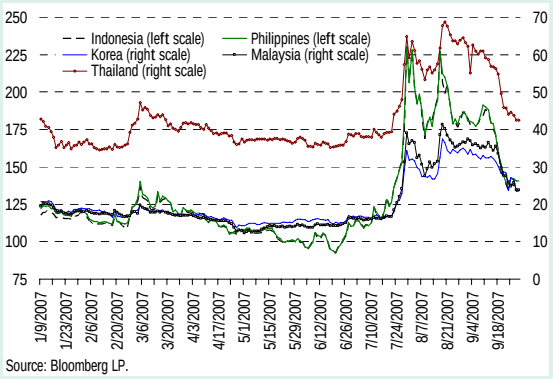
Figure 1.18. Yen Carry Trade Return (Short JPY, Long Listed Currency)
(August 17, 2007–September 28, 2007; in percent)



Source: Bloomberg LP.

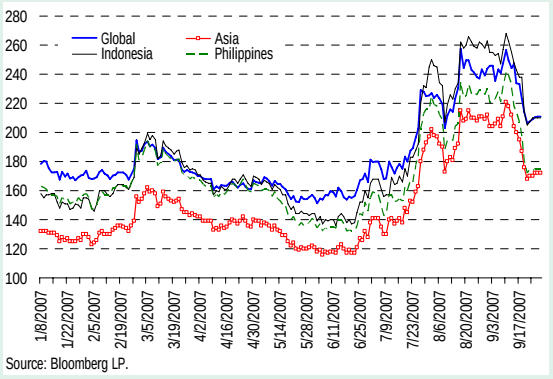
Money and credit market conditions have tightened considerably since the start of the recent market turmoil, especially at the short end, after doing so only modestly in first half of 2007. However, trading has remained generally orderly. After a spike in mid-August, local interbank rates have normalized, although they remain higher than pre-August levels in some cases.[6] Against this background, a number of central banks announced their readiness to provide liquidity if needed in response to the turmoil, although so far in the region only those in Japan and Australia have made substantial liquidity injections. Yield curves have generally flattened on expectations of some growth moderation. External debt spreads widened in Asia in line with global trends (rising temporarily by as much as 80 basic points), and credit default

Figure 1.19. Credit Default Swaps: 5-Year Sovereign Spreads
(Basis points)



Source: Bloomberg LP.

Figure 1.20. EMBI Global Sovereign Spreads
(Basis points)



Source: Bloomberg LP.

[5] For New Zealand, the total stock of Uridashi bonds maturing in 2007 is equivalent to 11 percent of GDP.

[6] Banks in Taiwan Province of China and Hong Kong SAR, usually providers of U.S. dollar liquidity, also reportedly became more cautious in their lending, in particular for high-yield names and tenures over one week.

spreads on sovereign bonds also increased in tandem, reflecting liquidity conditions as well as heightened uncertainty. However, both have come down recently, although they remain somewhat elevated compared with early July.

Regarding longer-term financing, local and foreign currency yields have fallen for Asian sovereigns recently as investors sought safer returns. The major exceptions are Indonesia, the Philippines, and Thailand, although in each case, external funding needs have already been met for 2007. Corporate yields crept up—both in local and overseas issues, generally reflecting greater global risk aversion—but have since recovered ground. In the case of India, restrictions on external commercial borrowing (ECB) by corporations issued in early August coupled with modestly higher spreads in overseas markets are expected to force more firms to tap the local rupee market.[7] Overseas bond issuance by some Korean firms was postponed. However, in a sign that concerns about the fallout are receding somewhat, foreign capital inflows to Asia have resumed and an Indian bank was able to issue new debt in late September, albeit at a somewhat higher spread than in the first half of the year.

Reported Exposures in Asia

Information provided to date by financial institutions in the region points to limited direct exposure to the U.S. subprime market and structured debt products. This limited exposure reflects a combination of factors, namely, Asian financial institutions are relatively unsophisticated compared with their counterparts in the developed countries and therefore less likely to purchase these products; prudential regulations have steered investments toward high-grade instruments; and relatively high domestic yields in some countries in the region have lessened the need to "search for yield" by investing elsewhere. However, these data are mostly self-reported and, given the complexity of some of the financial instruments involved, classification of exposures may not always be straightforward. Moreover, the situation remains fluid as the downgrading of credit tranches by rating agencies is ongoing.

Regarding exposure to U.S. subprime debt, available information shows that banks in India, Indonesia, Malaysia, and Thailand have virtually no direct exposure. Banks in China, Hong Kong SAR, Japan, Korea, and Singapore have reported some exposure but this is small compared with the size of their balance sheets and appears manageable given strong earnings.[8] In Australia, a number of banks were required to provide liquidity to bail out conduits that could not fund themselves in the asset-backed commercial paper market, while in New Zealand five small consumer finance companies went into receivership. Insurance companies in Taiwan Province of China and some regional banks in Japan reported losses, but in both cases the magnitude was small and not considered systemic. A similar story holds for holdings of structured debt products by financial entities in the region.[9]

Turning to hedge funds, Asian-focused funds generally fared well in the recent turbulence. This reflects less complex trading strategies (primarily long-short equity) and some move toward cash positions as a precautionary measure, including to address possible redemption pressures as value-at-risk has increased. Moreover, leverage levels reported by Hong Kong SAR–based hedge funds

[7] Under the new policy, proceeds from ECB in excess of $20 million can be used only for foreign currency expenditure. Further, prior approval by the Reserve Bank of India is required even for ECB up to $20 million before these can be used for rupee expenditure.

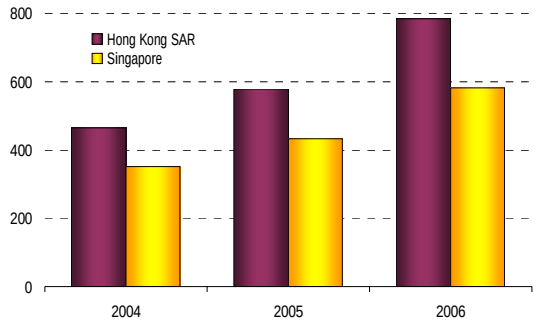
[8] See Fitch Ratings (2007). However, the amounts of reported exposure by various institutions continue to be updated, and have generally exceeded initially reported estimates.

[9] A recent survey by CLSA (CLSA, 2007) found that 10 financial companies in Asia had exposure to CDOs and other ABSs exceeding 5 percent of shareholder funds, eight of which are banks and the remaining two insurance companies. Only two of the banks reported holdings greater than 2 percent of assets and for most of the remainder, exposure was under 1 percent of assets. With regard to the two insurance companies, exposure is again small, ranging from 0.7–2.2 percent of assets.

Box 1.4. Growth in the Asset Management Industry in Hong Kong SAR and Singapore

The asset management industries of Hong Kong SAR and Singapore are still small globally, but have enjoyed rapid double-digit growth recently. At end-2006, Hong Kong SAR and Singaporean firms managed an estimated $780 billion (414 percent of GDP) and $580 billion (424 percent of GDP), respectively.[1] Their combined market share of the global fund management industry in 2006, some $62 trillion, was about 2 percent. While this appears small, the United Kingdom's share, with London as the world's leading fund management center, was about 12 percent. However, growth in the fund management industry in both Singapore and Hong Kong SAR has clearly outpaced the global industry as a whole, increasing since 2003 by 92 percent and 101 percent (including valuation effects), respectively.

Growth in Overall Industry in Hong Kong SAR and Singapore
(In billions of U.S. dollars)



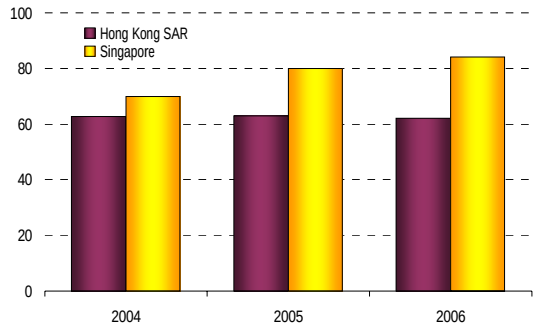
Sources: Securities and Futures Commission, Hong Kong SAR; and Monetary Authority of Singapore.

For both Hong Kong SAR and Singapore, supply-side factors appear to be the major drivers of this growth. The combination of a high concentration of financial institutions, well-functioning legal and regulatory systems, and skilled, flexible labor forces, along with the most open economic systems in Asia and favorable tax regimes, including tax exemptions for offshore funds, puts these two economies consistently at the top of various competitiveness indicators.[2]

On the demand side, Hong Kong SAR and Singapore are benefiting directly from the steady development in Asia of an institutional investor base. Pension reforms aimed at moving away from state-sponsored plans and allowing pension providers to better manage risk are feeding some of this growth. In addition, both cities have benefited from trends toward greater portfolio diversification and yield-seeking opportunities by global institutional investors. In 2006, for example, the growth in institutional funds accounted for well over half of the total growth in assets managed in Hong Kong SAR.

The predominantly outward orientation of asset managers is also enhancing the roles of Hong Kong SAR and Singapore as international financial centers in Asia. At end-2006, funds from abroad accounted for about 84 percent of total funds in Singapore, and 64 percent in Hong Kong SAR. At the same time, the proportion of investments allocated abroad is about three-fourths for each center. In this context, Hong Kong SAR and Singapore are playing a growing role in regional financial integration, with the share of investments in the Asia-Pacific region reaching 80 and 57 percent, respectively, at end-2006.

Funds Sourced from Overseas
(Share in percent)



Sources: Securities and Futures Commission, Hong Kong SAR; and Monetary Authority of Singapore.

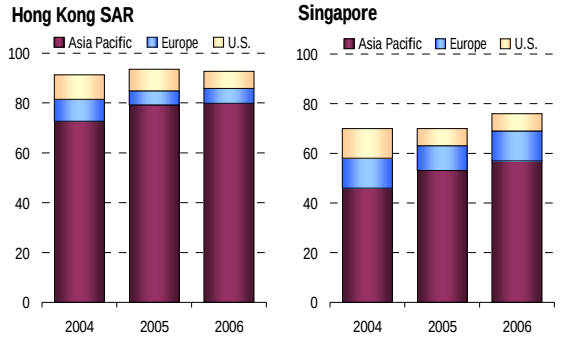
Note: The main authors of this box are Olaf Unteroberdoerster and David Cowen.

[1] Includes advisory businesses and other private banking activities.

[2] For a detailed overview and analysis of competitiveness rankings and their relevance for financial centers, see Securities and Futures Commission (2006a).

Box 1.4 *(concluded)*

Geographic Spread of Funds
(Share in percent)



Sources: Securities and Futures Commission, Hong Kong SAR; and Monetary Authority of Singapore.

Within the two financial centers, the distribution of assets under management (AUM) by asset class reflects their relative strength in various markets. While equities account for the bulk of investments in both Hong Kong SAR and Singapore, they play a more dominant role in the former, at 65 percent versus 47 percent of total AUM at end-2005. Growth in Hong Kong SAR's equity market is increasingly linked to mainland China. Initial public offering (IPO) fundraising by mainland companies in Hong Kong SAR doubled to some $38 billion in 2006, raising the share of mainland companies in total market capitalization to 48 percent. On the other hand, bonds play a bigger role in Singapore, with one of the region's deepest bond markets (fixed-income instruments account for some 40 percent of AUM at end-2005). Here, Singapore's comparative advantage over Hong Kong SAR mostly reflects the dearth of public sector bonds in the latter, whereas private debt markets have comparable size.

For Hong Kong SAR, further integration with mainland China is expected to remain a major driver of asset growth. Under the latest round of the mainland and Hong Kong SAR Closer Economic Partnership Agreement, mainland fund managers, with approval of the China Securities and Regulatory Commission, will be allowed to establish wholly owned subsidiaries or joint ventures in Hong Kong SAR to serve mainland clients. Moreover, the Qualified Domestic Institutional Investor scheme is being expanded to allow mainland mutual funds and securities houses to invest in overseas stock markets (in addition to fixed income products previously). Finally, in mid-August, the Chinese authorities announced a pilot project under which local retail investors can directly invest in non-mainland securities. The first Chinese renminbi-based bond issuance in Hong Kong SAR in late June offers another avenue of growth, although prospects are limited for now owing to relatively unattractive yields.

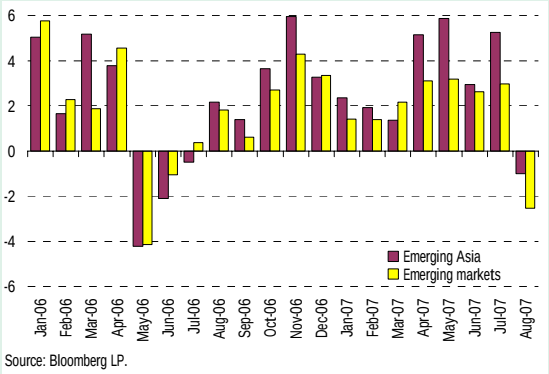
For both Hong Kong SAR and Singapore, hedge fund operations have become important for asset management growth, albeit from a small base. Each now hosts more hedge fund managers than Japan, with their combined AUM also at the top for East Asia. As of end-2006, hedge funds in each accounted for 4–5 percent of total asset managers' AUM—roughly tripling in size since 2004. A number of these hedge funds managers are Asia-focused, reinforcing financial integration within the region.[3] Going forward, some industry observers see better hedge fund growth prospects for Singapore, owing to its lower tax rate, cheaper rents, and a regulatory environment viewed as relatively advantageous to new managers.[4]

[3] See also Box 1.4 in the IMF's October 2007 *Global Financial Stability Report*.

[4] In Singapore, hedge fund managers with no more than 30 qualified investors do not need a capital markets services license. As a result, hedge funds take as little as a week to set up operations.

are considered low—40 percent of funds are not leveraged—and industry groups report that levels decreased further recently (Securities and Futures Commission, 2006b). On market structure, it is noteworthy that despite rapid growth in recent years, hedge funds in the region have mostly been operating from Hong Kong SAR and Singapore—two well-regarded financial centers—with the industry at the regional level still relatively small compared with the United States and the United Kingdom (Box 1.4, p. 15).

Figure 1.21. Hedge Funds: Total Return
(In percent)



Source: Bloomberg LP.

The Outlook and Risks

The baseline scenario for Asia features a modest reduction in growth in 2008 in response to policy tightening in the major emerging markets in the region and a slowdown in foreign demand. Assuming that credit markets gradually normalize, the fallout from the global financial turmoil should be manageable for emerging Asia owing to strong economic fundamentals and healthy corporate and banking sector balance sheets. This would leave trade as the main transmission mechanism to Asia from slower U.S. and euro area growth. The risks to this outlook are broadly balanced as the increased likelihood of financial market stress feeding into a sharper-than-expected slowdown in exports for most countries in Asia is offset by the possibility of continued growth outperformance in China and India.

The baseline macroeconomic scenario for Asia remains broadly favorable. Growth is foreseen to moderate during the remainder of this year and next on the assumption of an effective policy tightening in China (and to a lesser extent in India) as well as in response to a slowdown to external demand.[10] Given the current strong momentum, growth for the region is projected to reach 8 percent in 2007 (broadly unchanged from 2006), declining to 7¼ percent in 2008. This decline is roughly twice the magnitude foreseen in the previous *Regional Economic Outlook: Asia and Pacific* (henceforth, REO), albeit from a higher initial growth rate. Growth in emerging Asia should fall by a full percentage point.

The bulk of the region's growth slowdown would be attributable to the assumed moderation in China, which accounts for over 40 percent of Asia's GDP.[11] On the assumption that policies are effective in slowing the pace of investment, growth would fall by 1½ percentage points as the composition of activity gradually rebalances. A pattern of slower investment and exports and relatively buoyant consumption holds for much of the region. Exceptions are Indonesia and Thailand (which are projected to have a strong pick-up in investment for country-specific reasons) as well as Australia and New Zealand (where exports should rise on lower exchange rates and domestic demand slow). Growth is projected to fall by ½ percentage point in India and the NIEs and decline only fractionally in the ASEAN-5 group. Industrial Asia should see growth ease by ¼ percentage point.

The baseline financial market scenario assumes that normal credit market conditions are gradually restored, although somewhat higher spreads on riskier credits will persist. A gradual return of risk appetite would imply a return of capital flows to the region. Under these assumptions, the recent market turbulence is unlikely to pose systemic risks to Asian financial systems. This assessment reflects a number

[10] In the October 2007 *World Economic Outlook*, growth in the United States is assumed to slow to 1.9 percent this year and next, while euro area growth should decline in 2008 to 2.1 percent from 2.5 percent this year.

[11] On purchasing power parity basis using 2007 data. Japan and India together account for an additional 40 percent of the region's GDP.

of factors that should help to limit the adverse impact from financial contagion on the region. These include robust banking and corporate sector balance sheets (which have improved substantially since the crisis—see Chapter II for a broader analysis of "lessons learned") and the limited role of Asia-focused hedge funds in the global deleveraging process. With local ABCP markets limited to Australia and Japan, and relatively small and domestic financial institutions only beginning to play a role as issuers of structured credit products, the scope for homegrown problems should be contained.

Table 1.3. Asia: Real GDP Growth
(Year-on-year percent change)

	2005	2006	2007	2008	2007	2008
			REO April 2007		Latest Proj.	
Industrial Asia	**2.0**	**2.2**	**2.4**	**2.1**	**2.3**	**2.0**
Japan	1.9	2.2	2.3	1.9	2.0	1.7
Australia	3.0	2.5	2.6	3.3	4.4	3.8
New Zealand	2.7	1.7	2.5	2.6	2.8	2.3
Emerging Asia	**8.6**	**9.3**	**8.5**	**8.1**	**9.4**	**8.5**
NIEs	***4.7***	***5.3***	**4.6**	**4.6**	***4.9***	***4.4***
Hong Kong SAR	7.5	6.9	5.5	5.0	5.7	4.7
Korea	4.2	5.0	4.4	4.4	4.8	4.6
Singapore	6.6	7.9	5.5	5.7	7.5	5.8
Taiwan POC	4.1	4.7	4.2	4.3	4.1	3.8
China	10.4	11.1	10.0	9.5	11.5	10.0
India	9.0	9.7	8.4	7.8	8.9	8.4
ASEAN-5	***5.5***	***5.7***	**5.8**	**6.0**	***5.9***	***5.8***
Indonesia	5.7	5.5	6.0	6.3	6.2	6.1
Malaysia	5.0	5.9	5.5	5.8	5.8	5.6
Philippines	4.9	5.4	5.8	5.8	6.3	5.8
Thailand	4.5	5.0	4.5	4.8	4.0	4.5
Vietnam	8.4	8.2	8.0	7.8	8.3	8.2
Asia	**7.2**	**7.9**	**7.2**	**6.9**	**8.0**	**7.2**

Source: IMF, WEO database.

Table 1.4. Asia: Real Export Growth
(Year-on-year percent change; national accounts basis)

	2005	2006	2007	2008	2007	2008
			REO April 2007		Latest Proj.	
Industrial Asia	**6.2**	**8.7**	**4.4**	**5.2**	**6.3**	**4.0**
Japan	7.0	9.6	4.5	5.0	6.7	3.4
Australia	2.4	3.3	3.6	7.0	4.5	7.9
New Zealand	-0.4	1.8	2.3	3.5	3.2	4.1
Emerging Asia	**18.0**	**16.7**	**16.0**	**16.2**	**13.0**	**12.3**
NIEs	***8.7***	***11.3***	***8.0***	***8.4***	***9.6***	***9.0***
Hong Kong SAR	11.2	10.0	6.7	6.3	6.7	6.3
Korea	8.5	12.4	7.9	9.6	12.0	10.5
Singapore	11.3	10.4	7.2	8.4	6.2	8.3
Taiwan POC	7.6	10.3	9.0	7.1	7.3	7.6
China	23.6	23.9	20.4	19.5	16.5	13.3
India	14.7	5.9	14.2	16.3	9.0	13.2
ASEAN-5	***11.0***	***10.8***	***8.3***	***9.5***	***8.9***	***9.3***
Indonesia	16.4	9.2	8.0	9.1	8.7	10.0
Malaysia	7.9	7.4	8.7	7.2	7.8	6.6
Philippines	4.8	11.2	10.9	10.4	9.1	7.3
Thailand	4.3	8.6	5.3	6.8	7.9	6.3
Vietnam	20.5	23.8	10.6	16.9	12.3	19.2
Asia	**15.5**	**15.0**	**13.7**	**14.2**	**11.7**	**10.7**

Source: IMF, WEO database.

Table 1.5. Asia: Investment Growth
(Year-on-year percent change; constant prices)

	2005	2006	2007	2008	2007	2008
			REO April 2007		Latest Proj.	
Industrial Asia	**3.3**	**3.9**	**3.7**	**2.4**	**2.1**	**2.2**
Japan	2.6	3.6	4.1	2.7	0.7	1.9
Australia	7.8	6.3	1.9	1.2	10.1	4.0
New Zealand	3.4	-2.3	-1.0	0.9	3.4	1.4
Emerging Asia	**13.0**	**12.2**	**12.4**	**11.4**	**12.9**	**12.2**
NIEs	***1.8***	***3.6***	***5.3***	***5.5***	***6.2***	***4.8***
Hong Kong SAR	4.6	7.9	10.0	8.3	9.2	8.4
Korea	2.4	3.2	4.2	3.9	5.4	3.2
Singapore	0.1	11.5	6.8	6.7	14.4	5.4
Taiwan POC	0.2	1.0	5.0	7.0	4.5	5.8
China	16.8	15.0	14.3	13.1	15.1	13.6
India	14.3	15.2	13.9	10.7	14.5	13.1
ASEAN-5	***7.0***	***4.1***	***8.4***	***10.2***	***7.4***	***11.0***
Indonesia	10.8	2.9	9.1	12.1	8.5	13.3
Malaysia	5.0	7.9	9.5	8.8	9.3	8.8
Philippines	-6.6	1.4	6.6	9.0	9.3	10.5
Thailand	11.1	4.0	6.8	7.8	1.0	9.0
Vietnam	9.7	8.6	11.1	12.2	11.9	10.8
Asia	**10.9**	**10.5**	**10.7**	**9.7**	**10.8**	**10.3**

Source: IMF, WEO database.

Table 1.6. Asia: Private Consumption Growth
(Year-on-year percent change; constant prices)

	2005	2006	2007	2008	2007	2008
			REO April 2007		Latest Proj.	
Industrial Asia	**1.8**	**1.2**	**1.8**	**2.1**	**2.0**	**2.0**
Japan	1.6	0.9	1.6	1.9	1.7	1.8
Australia	2.9	3.1	3.4	3.0	4.0	3.2
New Zealand	4.8	2.1	2.0	2.1	3.8	1.4
Emerging Asia	**7.5**	**8.1**	**9.1**	**7.9**	**8.2**	**8.2**
NIEs	***3.3***	***3.4***	***3.3***	***3.9***	***3.8***	***3.6***
Hong Kong SAR	3.3	5.2	5.3	4.7	5.5	5.0
Korea	3.6	4.2	3.3	3.5	4.0	3.5
Singapore	3.1	2.5	3.1	3.8	3.6	4.0
Taiwan POC	2.8	1.4	2.7	4.2	2.7	3.2
China	9.6	10.9	12.3	10.3	10.8	11.0
India	6.3	6.3	6.7	5.2	5.8	5.7
ASEAN-5	***5.1***	***4.5***	***5.3***	***5.5***	***5.3***	***5.0***
Indonesia	4.0	3.2	4.7	5.0	4.7	4.7
Malaysia	8.7	7.1	5.7	6.9	7.0	7.0
Philippines	4.8	5.5	5.4	5.5	5.6	5.6
Thailand	4.3	3.1	4.0	4.0	1.3	2.6
Vietnam	7.3	7.5	8.8	8.8	13.2	8.0
Asia	**6.2**	**6.7**	**7.7**	**6.8**	**7.0**	**7.1**

Source: IMF, WEO database.

Given the reduction in the baseline growth forecast, the risks to the outlook are now broadly balanced. That being said, the risks are not uniform across countries. For China and India, the risks are on the upside on balance and relate to the pace of investment and its contribution to growth. For much of the remainder of the region, the risks are on the downside on balance and emanate from the effects of the recent financial market turbulence on demand from foreign markets. The main risks to the outlook for Asia, many of which are interrelated, are the following (in order of importance):

- *Persistent financial market turbulence leads to a much-sharper-than-expected slowdown in both the United States and the euro area, which spills over to Asia.* If global financial markets remain volatile, liquidity and credit channels stressed, and risk aversion persistent, the impact could be felt on a broader range of households as well as banks and corporations in mature markets. The price and wealth effects of this scenario could involve sharply lower consumption and import growth. This, in turn, could have pronounced effects on growth in Asia as it would tend to outweigh any support from domestic demand. Indeed, in light of emerging Asia's deepening integration into the global trading system—as analyzed in Chapter IV—any significant de-linking from foreign demand in a U.S.–euro area slow growth scenario appears unlikely.

- *Domestic demand in the region could prove more resilient than expected, providing an upside risk to growth.* Less-than-fully-successful efforts to slow investment in both China and India could lead to higher-than-projected growth, although this would not necessarily be beneficial. For the rest of emerging Asia, while (net) exports remain an important source of growth, domestic demand has played an increasing role and some governments have stepped up capital expenditure, including as a way to crowd in private investment. Household debt remains low in most countries (Korea is a notable exception) and middle-income consumers are not heavily exposed to financial markets, suggesting some potential upside to consumption spending.

- *Sustained risk aversion could lead to lower or more selective capital flows to Asia, although the effects on the region would be mixed.* Countries requiring foreign savings to finance current account deficits would be negatively affected. So would higher-risk corporates that are unable to self-fund and would need to turn to the capital markets and pay higher interest rates. On the other hand, lower capital flows could ease pressure on currencies to appreciate, providing some relief on the competitiveness front.

- *Financial institutions in Asia encounter balance sheet stress following a mark-to-market repricing of structured products.* While reported exposures appear small, as noted above, the risks may be understated. There is no comprehensive database on the issuance, transactions, and holdings of structured credit products, and reports from investment banks suggest that nonbank financial institutions and some corporate treasuries in Asia have been active buyers of CDOs, ABCPs, and other derivative products. Going forward, it will be critical whether the pricing of less liquid assets resumes and if asset managers face increased margin requirements and/or sizable redemptions. Further sell-offs and price corrections may also be triggered by the (further) downgrading of credit tranches.

- *Geopolitical tensions could create a supply-related oil price spike and inflation pressures.* The pass-through from world oil prices to domestic prices has remained modest in much of emerging Asia, because domestic fuel prices are fixed, they constitute a small component of the final price of domestic fuel, or high corporate profits have allowed firms to absorb these costs. But any sharp increases are likely to be passed on to consumers, especially if corporate profits or budgetary revenues decline. On the other hand, if these risks do not materialize and global growth slows, then oil prices could moderate, providing a potential offsetting stimulus.

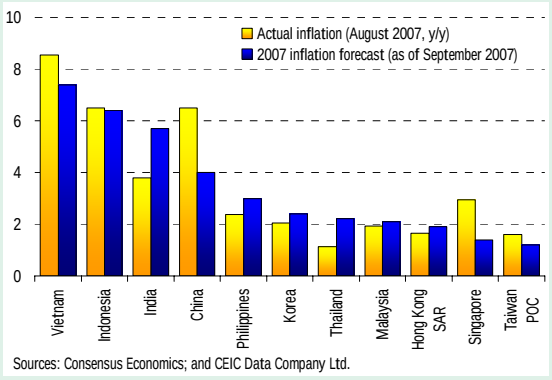
Policy Implications

The confluence of strong growth momentum, the ongoing financial market turmoil, and the associated risks present Asian policymakers with a number of challenges. Price pressures already in the pipeline will need to be balanced against the downside risks to growth, and many countries in the region appear to have room to ease if necessary on both the monetary and fiscal policy fronts. Uncertainty over the size and direction of capital flows and their implications for policymakers loom large as well. Also, while the episode of financial turmoil may still play out further, a number of lessons for policymakers are already apparent.

Monetary and Fiscal Policies

Inflation expectations are contained in much of the region, suggesting room for monetary policy action if needed. If the downside risks to growth materialize, then those countries with low and stable inflation (expectations) will likely have scope to ease policy settings. However, room for maneuver will be limited in those countries where inflation is still on the rise or where a deprecation of the exchange rate (which could accompany significantly slower growth) results in a loosening of monetary conditions.

Figure 1.22. Private Sector Inflation Forecasts
(Annual percentage change)



Sources: Consensus Economics; and CEIC Data Company Ltd.

In the event that the downside risks to growth do not materialize, overheating is likely to remain an issue in some counties. In particular, China needs to raise the real cost of capital through higher interest rates and lower the price of tradable goods through a more appreciated exchange rate in order to rebalance growth and put it on a more sustainable footing. This goal has become all the more pressing as China's trade surplus has continued to grow. Vietnam remains behind the inflation curve and further reserve ratio increases and/or a widening of the band for the dong to allow for faster appreciation are likely to be required.

Through prudent policy during the recent growth cycle, many countries in the region have created "fiscal space" that can be used to combat a growth slowdown. The main channel, as noted in previous REOs, would be to allow the automatic stabilizers to work. In addition, where debt levels are not a constraint, and conditions warrant, consideration can be given to bringing forward public investment expenditures, including as a means to crowd in private sector investment.

Responding to Changes in Capital Flows

Unlike other episodes of financial market turbulence over the past decade, strong

Table 1.7. Asia: Selected Fiscal Indicators
(In percent of GDP)

	General Government Gross Debt				Central Government Fiscal Balance			
	2005	2006	2007 Proj.	2008 Proj.	2005	2006	2007 Proj.	2008 Proj.
Industrial Asia	**163.0**	**164.2**	**165.0**	**165.0**	**-4.5**	**-4.7**	**-4.8**	**-4.8**
Japan	191.4	193.1	194.4	194.9	-5.8	-5.9	-5.8	-5.9
Australia [1]	9.9	8.9	8.8	8.1	1.6	1.3	1.0	1.1
New Zealand [2]	23.5	24.1	24.2	22.7	4.7	2.3	0.8	0.3
Emerging Asia	**38.8**	**36.6**	**34.4**	**32.7**	**-1.6**	**-1.0**	**-1.2**	**-1.1**
NIEs	***28.1***	***29.5***	***29.9***	***29.6***	***1.4***	***1.8***	***1.1***	***1.9***
Hong Kong SAR	1.9	1.7	1.4	1.2	1.0	4.0	1.7	3.0
Korea [3,4]	29.5	32.2	32.8	32.8	1.9	1.8	2.3	2.8
Singapore	...	...	...	...	7.8	6.4	5.5	5.4
Taiwan POC	35.8	35.6	36.1	35.3	-0.7	0.0	-2.0	-1.0
China [5]	17.7	16.6	15.2	14.2	-1.3	-0.6	-0.6	-0.8
India [6]	84.1	80.5	76.3	73.1	-4.2	-3.7	-3.5	-3.3
ASEAN-5	***53.1***	***47.0***	***44.6***	***43.5***	***-1.1***	***-0.8***	***-1.6***	***-1.4***
Indonesia [3]	45.6	38.8	36.4	34.8	-0.3	-1.0	-1.7	-1.9
Malaysia [3]	46.2	45.4	46.0	46.5	-3.8	-3.5	-3.4	-3.4
Philippines [7]	86.0	73.9	66.0	62.1	-3.0	-1.2	-1.7	-0.9
Thailand [7,8]	47.4	41.1	39.8	39.4	0.4	1.2	0.5	0.3
Vietnam [7]	43.9	44.7	46.3	48.0	-1.2	-0.3	-3.4	-2.1
Asia	**66.1**	**63.4**	**60.7**	**58.1**	**-2.2**	**-1.8**	**-1.9**	**-1.8**

Sources: IMF, WEO database, and staff estimates.
[1] Fiscal year ending June. Fiscal balance for Australia includes net surplus from state-owned enterprises.
[2] Fiscal year ending June. Fiscal balance is defined as operating balance net of revaluations and changes in accounting rules, and excluding net NZS Fund asset returns.
[3] Central government only.
[4] Consolidated central government debt including government guaranteed debt for financial sector restructuring.
[5] Net debt.
[6] Fiscal year ending March; privatization receipts excluded from revenues.
[7] Public sector debt.
[8] Fiscal year ending September.

fundamentals in most Asian countries this time around have led to continued capital flows into the region. While there were some outflows following the onset of the turbulence in July both from the unwinding of the carry trade and from bond markets, inflows have returned to the region although their future magnitude and volatility (and possible direction) are uncertain. While lower inflows—or even outflows—for some countries might present difficulties in financing current account deficits or relatively risky domestic corporates, in other cases a modest reduction in exchange market pressures would be a welcome development. Policymakers should continue to be pragmatic and allow for greater exchange rate flexibility in order to create two-way risk in the foreign currency markets and promote a rebalancing of growth where necessary, limiting any intervention to efforts to reduce volatility and ensure that market conditions remain orderly.

Financial Sector Lessons

While the impact of the financial market turbulence has been relatively minor in Asia, there are nonetheless a number of preliminary lessons to be gleaned from recent experience. At the most general level, while Asian financial systems are still bank-dominated and relatively conservative, nonbank financial institutions are increasingly gaining market strength and the complexity of instruments is almost sure to continue to increase. As recent events revealed, central banks and supervisory agencies in Asia and elsewhere had incomplete knowledge of how complex and deep the market for structured debt had become and the cascading nature of risks that were built into the system in the process. The system of guarantees (for example, through conduits and other special investment vehicles) and the risks these posed to bank liquidity were unclear as well. A preliminary list of actions in the regulatory regime could usefully include reporting requirements to ensure greater transparency, pricing and provisioning for risk to reduce liquidity and solvency risks, and improved disclosure requirements to inform investors of the risks involved in such investments. Of course, a complete discussion of lessons learned and the appropriate policy responses will take some time.

II. Ten Years After the Crisis: How Much Stronger Is Asia?

Ten years ago, the forced devaluation of the Thai baht set in motion a devastating external and financial crisis that engulfed much of emerging Asia and spread beyond the region's borders. Through most of Asia, but most notably in Korea, Indonesia, Malaysia, the Philippines, and Thailand, output contracted, a number of financial and nonfinancial businesses went bankrupt, and unemployment and poverty increased significantly. In response to the crisis, most of the affected countries turned to the international community for large-scale financial assistance in the context of economic adjustment programs.

A decade later, the recovery from the crisis has on most accounts been impressive. It took some time to appreciate that this was a new type of crisis, one driven by financial rather than current account imbalances, and for confidence to be restored. Within a couple of years, however, supported by comprehensive structural reforms and nimbler macroeconomic policy frameworks, most of the crisis economies started to grow again, with attendant declines in unemployment and poverty. In the financial sector, nonperforming assets were dealt with, directed lending curtailed, and banking systems recapitalized and privatized. As a consequence, Asia is today, once again, the most dynamic region in the world, accounting for close to half of global growth.

Yet skepticism has emerged in various circles about the sustainability of Asia's post-crisis growth model. Some prominent commentators and academics have questioned whether Asia has learned the right lessons from the crisis, and have warned about the possibility of a new crisis (Box 2.1). One of the main criticisms is that emerging Asia has failed to heed the need for flexible exchange rates, and is instead relying on large but only partially sterilized foreign exchange intervention to keep its currencies "competitive." This growth strategy is argued to be making Asia highly vulnerable to external demand shocks, while feeding into large global imbalances and potentially stoking a protectionist backlash. Moreover, the run-up in liquidity resulting from reserve accumulation is thought to be leading to credit booms and asset market bubbles, putting the region at risk of a new deflationary bust triggered by sharp falls in investment and/or asset prices, declining confidence, and a buildup of nonperforming loans in banking systems. In addition, perceptions that emerging Asia's financial systems remain insular and underdeveloped, and that its economies continue to be dogged by weak governance, are commonly cited fault lines. It is important to note that most of these commentators use the term "crisis" loosely, so that the quantitative scenario they have in mind when referring to a possible "crisis" in Asia is not always clear—in particular, whether what is being envisioned is a 1997-style meltdown, or a sharp, but less dramatic, slowdown along the lines experienced in the aftermath of the dot-com bust in 2001.

This chapter argues that emerging Asia has made much progress in tackling the financial and structural imbalances that led to the 1997 crisis, and that while new vulnerabilities have emerged, they are in most cases manageable since the region is much more resilient than 10 years ago.[12] Indeed, Asia's comfortable external positions and large stocks of external reserves should act as an important buffer in the face of any severe shock.

Note: The main authors of this chapter are Jacques Miniane and Murtaza Syed.

[12] For related IMF views on Asia 10 years after the crisis, see de Rato (2007) and Burton (2007a, 2007b).

Box 2.1. A Selection of Recent Asia Critiques

"Indeed, the currency and financial policies in Asia today are risking planting the seeds of a new and different financial crisis in the region in the medium term . . . or even in the short term if global shocks such as a U.S. hard landing take place . . . So what are the problems with the current Asian economic, currency and financial model? The answer is, in brief, the effective return to fixed exchange rates in spite of the rhetoric of a move to floating rates. First, this new model is leading to excessive monetary and credit growth, asset bubbles in stock markets, housing markets and other financial markets that will eventually lead to a build up of financial vulnerabilities that could trigger a financial crisis different from that of 1997–98 but that could be potentially as severe. Second, excessive reliance on net exports and production of capacity for exports is dangerous for several reasons: it makes Asia now reliant on the U.S. for its growth [and] increases the risks of a protectionist backlash in the U.S. and Europe." Nouriel Roubini (2007), New York University.

"Ten years after the 1997 crisis, Asia is booming again. It is still at significant risk but any new crisis will take a different form. The trigger would be a sharp drop in asset valuations. The obvious place for a problem to originate is China, given the rapid run-up in equity prices there and the highly imperfect nature of the information environment . . . But there are reasons to ask whether such a large increase in the capital stock, mobilized in short order, can de deployed safely. One can imagine a variety of economic, financial and political shocks that could transform investors' positive views of this question. Asset valuations would fall sharply. Investment would fall sharply. China's growth would fall sharply. These events could compound, and in turn be compounded by, problems in the banking and financial system… How common are these problems to other Asian countries? Since Asian stock markets are highly correlated, major asset price drops in China would all but certainly be accompanied by major drops elsewhere in the region . . . Major recessionary implications would follow if the stability of the financial system, and particularly banks, is undermined." Barry Eichengreen (2007), University of California at Berkeley.

"The Asian financial crisis of 10 years ago taught two contrasting lessons: the one the majority of western economists thought the Asians should learn; and the one Asians did learn. The western economists concluded that emerging economies should adopt flexible exchange rates and modern, well-regulated and competitive financial markets. The Asians decided to choose competitive exchange rates, export-led growth and huge accumulations of foreign currency reserves . . . One instrument they have used has been sterilization of the monetary consequences of reserve accumulations, to prevent the normal expansion of money and credit, overheating, inflation and so loss of external competitiveness . . . The post-crisis policy system has proved more durable than many expected. At its heart, however, is China. Though not affected directly by the crisis, it was one of the countries that learnt its lessons in the Asian way. I do not believe these astonishing trends are desirable or sustainable." Martin Wolf (2007), *Financial Times*.

"Asia's economic outlook has improved from a decade ago. However, the economic and financial policies and institutions of the countries in the region remain underdeveloped and untested. Banking and financial systems are better prepared, but far from robust. Banks and their customers are now exposed to sudden exchange rate appreciations rather than depreciations. In some cases, balance sheets remain excessively reliant on government obligations. Despite the improvements in corporate governance, the investment climate remains weak." Edwin Truman (2007), Peterson Institute for International Economics.

"It is therefore important to try to identify sources of new risks to economic stability . . . In the case of Thailand, . . . [the] first issue has to do with *political interference* in financial institutions. The main targets for political interference are the state-owned commercial banks and the specialized public financial institutions." Sussangkarn and Vichyanond (2007), Thailand Development Research Institute.

Box 2.1 *(concluded)*

It should be noted that other prominent academics have held much more positive views about the sustainability of current policies in Asia. For instance:

"Indeed, the academic literature and financial press are now littered with discarded, once-authoritative opinions on how the system would soon end from its own weight . . . When this failed to happen, they produced long lists of reasons of why it might collapse at any moment: saving exporting countries would overheat, [and/or] official sectors in either savings exporting or importing countries would react to the negative effects on their economies. . . The idea that the system we describe is inherently unstable is logically flawed, in our view, and in any case has not been supported by the last seven years' events." Dooley, Garber, and Folkerts-Landau (2007), UC Santa Cruz and Deutsche Bank.

Key Lessons from the Asian Crisis

At the outset, it is important to highlight one wrong conclusion that Asian countries fortunately did not draw from the crisis—namely, that it was safest to withdraw from globalization. Despite the crisis, Asia did not turn its back on the outward-looking orientation that propelled its spectacular rise on the world's economic stage. Asia's share of global export markets has increased significantly since the crisis, as has its integration with international financial markets. Significantly, no country concluded that permanent capital controls were desirable—even Malaysia, the one country that did impose such controls during the crisis has been steadily dismantling them over the last decade. Instead, the reforms undertaken in the region over the past decade have been geared to equip it to benefit more from globalization and to cope with its attendant risks.

More directly, the main lesson of the Asian crisis was that financial imbalances can wreak havoc on an economy, even one with seemingly sound macroeconomic fundamentals. The specifics of the crisis differed from country to country, with banking and real estate imbalances being a more prominent story here, and corporate imbalances, there. However, there was a common theme running across most of the affected economies: these countries had accumulated large unhedged foreign exchange liabilities, as domestic interest rates were higher than international rates and very tightly managed fixed exchange rates had conveyed a false impression of no exchange rate risk. This run-up in foreign currency liabilities was used to support excessively leveraged positions, seen for example in high corporate debt-to-equity ratios across the region. In addition, implicit state guarantees and lax supervision prevented risk from being priced efficiently. Currency devaluations, once they occurred, dramatically eroded leveraged balance sheets loaded with such liabilities, and led to large contractions in domestic demand. In some countries, the devaluation was triggered by international investors' concerns of overappreciated real exchange rates and widening current account deficits; in others, maturity mismatches precipitated the fall when loans were not rolled over. A general lack of transparency about the true level of external debt and usable reserves compounded investors' fears and contributed to the abrupt withdrawal of international capital.

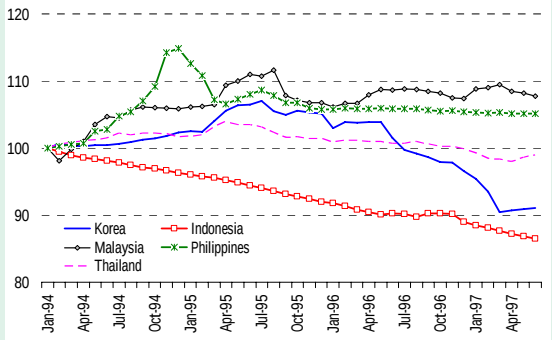
Accordingly, we focus on four dimensions—exchange rate flexibility, deleveraging, shifting away from unhedged foreign currency borrowing, and improvements in transparency and governance—to assess the extent to which Asia has reduced the vulnerabilities that triggered the crisis. Starting with the first, while most Asian economies have intervened heavily in foreign exchange markets and built up large international reserves, many have also allowed for increasing exchange rate flexibility, with

considerable appreciations taking place.[13] Limiting our analysis to the countries most affected by the crisis, Korea and Indonesia's real effective exchange rates have appreciated by some 30 percent since early 2002, Thailand's by more than 20 percent, and the Philippines' by some 15 percent. To put these appreciations in international perspective, only seven non-Asian emerging countries have experienced real effective appreciations larger than 20 percent over the same period. China and Malaysia have been exceptions to this trend, yet since 2005 the renminbi and the ringgit have appreciated gradually against the U.S. dollar. However, as the IMF has repeatedly argued, there is room for further flexibility, which would benefit these countries first and foremost.

On-balance-sheet leverage has also declined substantially since the crisis. Corporate debt-to-equity ratios, for instance, have fallen sharply throughout the region. While corporate deleveraging has been a global phenomenon in recent years, no region in the world has seen declines as pronounced as those in Asia, partly because none suffered as much from the consequences of excessive corporate leverage. Not surprisingly, corporate deleveraging has been accompanied and aided by increases in corporate profitability. An examination of households' leverage is also warranted: after all, crises never repeat themselves, and lower corporate leverage is no guarantee of stability if leverage has been transferred to another sector of the economy. Limited flow of funds data show that, in most countries, household debt has not increased much relative to GDP or to disposable personal income, and increases in household assets have often more than compensated.[14] This being said, stable or rising asset-to-liability ratios may mask important vulnerabilities caused by rapid increases in specific

Figure 2.1. Crisis-Affected Countries: Nominal Exchange Rates, 1994–97

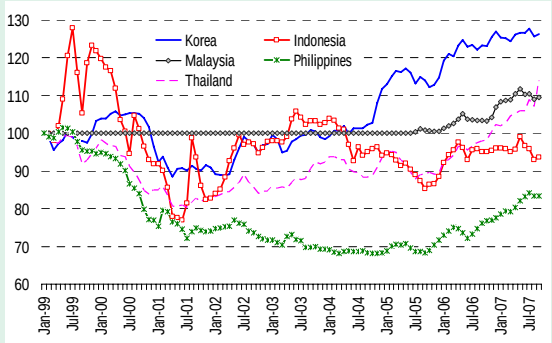
(U.S. dollars per national currency; January 1994=100)



Source: Bloomberg LP.

Figure 2.2. Crisis-Affected Countries: Nominal Exchange Rates, 1999–2007

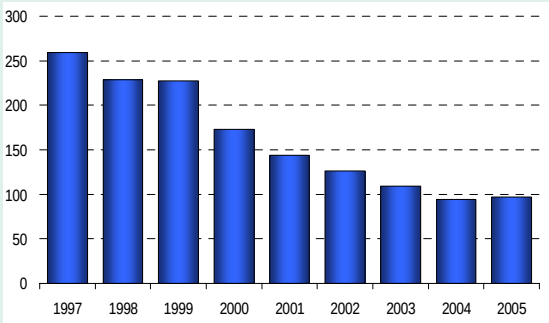
(U.S. dollars per national currency; January 1999=100)



Source: Bloomberg LP.

Figure 2.3. Crisis-Affected Countries: Corporate Debt-Equity Ratio[1]

(In percent)



Source: IMF, Corporate Vulnerability Utility database.

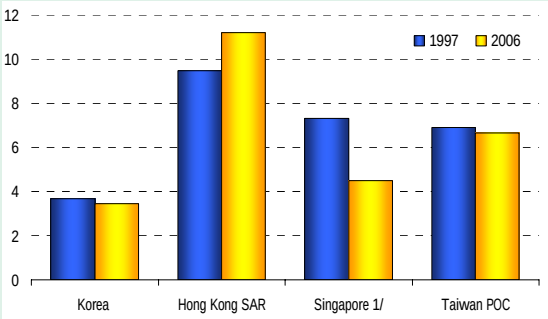
[1] Nonfinancials. Simple average of Indonesia, Korea, Malaysia, Philippines, and Thailand.

[13] There is some evidence that, despite substantial appreciations, real effective exchange rates remain undervalued relative to fundamentals in a few countries.

[14] See DSGAsia (2007) for a detailed discussion. Note that household debt has increased substantially in Korea and Taiwan Province of China.

segments of household debt, as witnessed by the sharp economic slowdowns caused by the credit card crises in Korea and Taiwan Province of China.

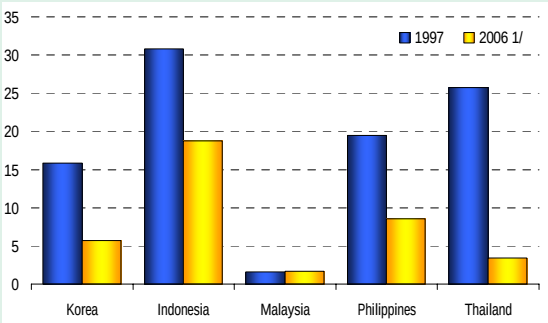
Figure 2.4. Selected Asia: Household Assets-Liabilities Ratio



Source: DSG*Asia* .
[1] Financial assets only.

The share of borrowing done in foreign currency has fallen sharply in the region. This is particularly true in Thailand, where foreign currency loans to firms operating in nontradable sectors, such as real estate, were quite prevalent before the crisis. Moreover, most countries have imposed much tighter foreign exchange exposure limits on banks since the crisis, and derivatives markets have become broader and deeper, allowing for more hedging of the existing stock of foreign exchange liabilities.

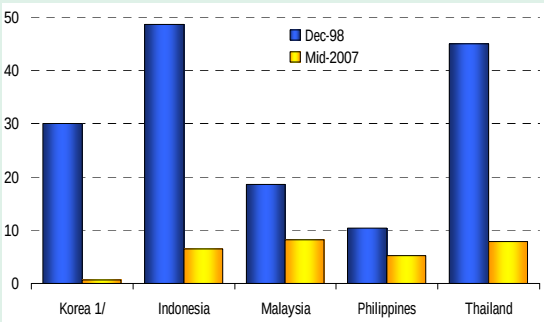
Figure 2.5. Foreign Currency Loans
(In percent of total loans)



Sources: CEIC Data Company Ltd; and IMF country desks.
[1] July 2007 for Malaysia.

Financial sectors have recovered markedly from the consequences of the crisis, but there are lingering weaknesses. Bank recapitalizations and privatizations, changes aimed at curtailing distorted lending, improvements in supervisory and regulatory standards, and the opening of the sector to foreign capital have led to marked declines in nonperforming loans, significant improvements in capital ratios and profitability, and financial innovation more generally. At the same time, nonperforming loan ratios remain relatively elevated in all the crisis countries except Korea, suggesting some scope for further strengthening of banking sectors. Looking forward, it is worth noting that current regulatory and supervisory practices in the region could be strongly tested by the rise in complex, off-balance-sheet financial flows, as appears to be the case now in other regions of the world. Early indications that Asia has a limited direct exposure to U.S. subprime assets (Chapter I) should not lull the region into complacency, as evidence points to substantial increases in both the sophistication and the embedded risk in cross-border financial flows in Asia (Box 1.2).

Figure 2.6. Nonperforming Loans Ratio
(In percent)

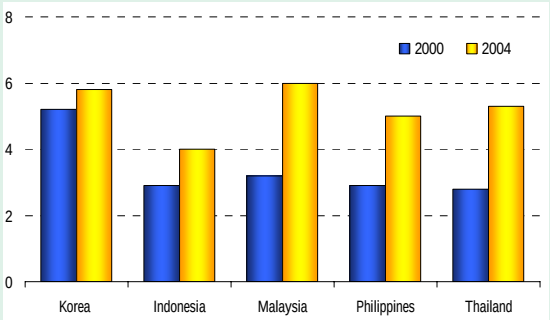


Sources: CEIC Data Company Ltd; the World Bank; and IMF country desks.
[1] World Bank estimate for Korea for 1998.

There have also been some improvements in transparency and governance. Asian authorities now routinely publish more high-frequency information, including about their external debt and reserves. Also, many of the region's central banks have moved to inflation targeting frameworks, so statements about monetary conditions and policy

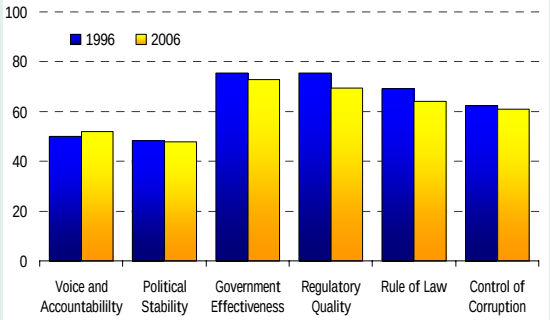
developments are now published regularly. At the same time, Asian countries have undertaken important efforts to improve corporate governance by limiting cross-shareholding, raising accounting standards, and strengthening shareholder rights. However, more remains to be done, particularly in the public sector: along five of six important dimensions—voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption—emerging Asia ranked lower in 2006 than in 1996.

Figure 2.7. Emerging Asia: Corporate Governance Ratings[1]



Source: Asian Corporate Governance Association.
[1] Ratings range from 0 (lowest) to 10 (highest).

Figure 2.8. Emerging Asia: Governance Indicators[1]
(Average, top ranking =100)



Source: World Bank, Governance Indicators database.
[1] Excludes China.

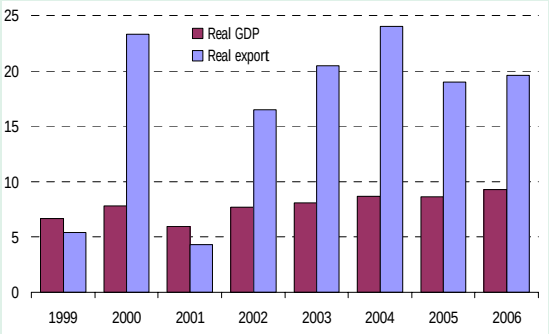
In short, most countries in the region have in the past decade achieved greater exchange rate flexibility, lower leverage with less recourse to unhedged foreign currency borrowing, more resilient financial sectors, and some improvements in transparency and governance standards. In so doing, and coupled with comfortable current account positions, relatively low levels of short-term external debt, and ample reserves, they have removed significant sources of potential vulnerability.

Yet, as noted earlier, some prominent commentators fear that Asia's export-oriented strategy is sowing the seeds of a new type of crisis, one triggered by shocks to external demand or the bursting of credit and asset bubbles propped up by the large accumulation of reserves needed to sustain competitive exchange rates. We examine these concerns below.

The Challenges Ahead

It is true that the region is dependent on external demand. Emerging Asia remains reliant on exports as a source of growth, although to varying degrees. This reflects several factors: large real depreciations coupled with collapsing domestic demand in the immediate aftermath of the crisis (in emerging Asia excluding China, investment rates never completely recovered from pre-crisis levels, for reasons not fully understood; see IMF, 2006); strong productivity gains in tradable sectors that have led the region to gain market share in global export markets; and, in a number of countries, a policy mix that has tended to favor the export sector. Moreover, growing intraregional trade does not necessarily provide a strong buffer against shocks to external demand. This is because in Asia it is by and large dominated by trade in intermediate goods, in a vertically

Figure 2.9. Emerging Asia Excluding India: Real GDP and Real Export Growth
(Year-on-year percent change)

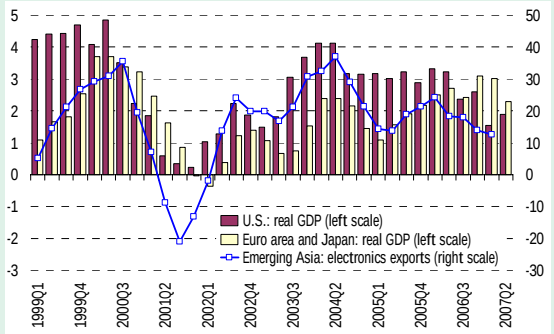


Source: IMF, WEO database.

integrated system of regional supply chains geared toward the rest of the world, notably the United States and the European Union, with China playing a key platform role (see Chapter IV).

Shocks to external demand have in the recent past caused sharp slowdowns in the region, although there are grounds to be guardedly optimistic for Asia if growth in the United States were to falter. In 2001–02, a roughly 4 percentage point decline in U.S. growth led to a 3½ percentage point fall in emerging Asian growth, excluding China. However, several factors contributed to this large effect: growth in Europe and Japan was strongly affected by the dot-com bust, and hence these areas were unable to provide a buffer for Asia; the shock to global demand was concentrated in electronics, a key component of Asian exports; and, finally, domestic demand in the region was barely starting to recover from the Asian crisis. A stronger global economy than in 2001 and healthier domestic demand in Asia should help the region better confront a possible sharp U.S. slowdown this time around, but talks of decoupling remain premature given Asia's strong dependence on exports and the growing importance of international financial linkages, which are particularly relevant now.

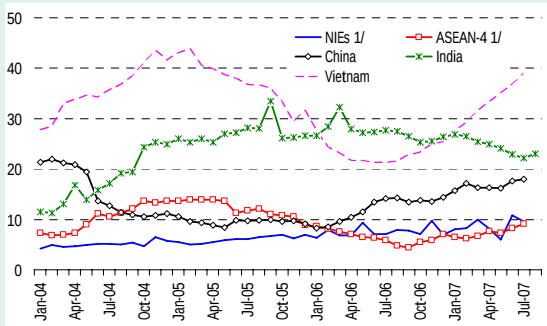
Figure 2.10. Real GDP and Electronics Exports Growth
(Year-on-year percent change)



Sources: CEIC Data Company Ltd; and IMF, WEO database.

The claim that partially sterilized reserve accumulation is fueling large increases in liquidity and credit does not characterize the region as a whole. Only in China and, particularly, India and Vietnam have money and credit aggregates been running substantially faster than nominal GDP, even though there are signs that credit growth in India is cooling. Moreover, in the case of India these trends may have been supported by rapid financial deepening from a relatively low level of development. (In the case of China and Vietnam, in contrast, the strong growth of money and credit aggregates reflects rapid but only partially sterilized reserve accumulation.) In the rest of the region, broad money and credit growth have remained relatively subdued despite rapid growth within specific segments, such as mortgage and small and medium-sized enterprise lending in Korea, or automobile and credit card lending in the Philippines. Concentrated run-ups in lending have in the recent past been enough to cause significant economic slowdowns as witnessed by the previously noted credit card crises in Korea and Taiwan Province of China, and call for tight supervision.

Figure 2.11. Credit to Private Sector
(Year-on-year percent change)



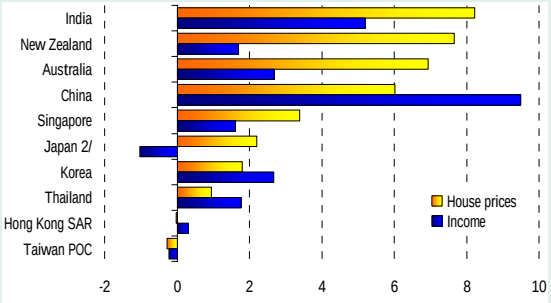
Sources: CEIC Data Company Ltd; and IMF, *International Financial Statistics* .
[1] Simple average.

The evidence that housing markets in the region are in the midst of a bubble is also mixed. IMF (2007a) finds that, by and large, housing prices in Asia have not risen much relative to overall prices, rents, or incomes. Only Australia, India, and New Zealand have shown particularly rapid house price appreciations at the national level, although in Australia real prices have fallen in recent years in

some key cities, and in India housing markets are reportedly cooling.[15] In some other countries there have been pockets of rapidly rising housing prices, including Beijing and Shanghai in China—where the pace of appreciation has slowed—as well as high-end housing in Seoul, Hong Kong SAR, and, more recently, Singapore. As IMF (2007a) argues, there may be valid structural reasons for these localized booms, although it is impossible to dismiss the claim that some of the price appreciation has been driven by speculative dynamics. And in some cases, the localized boom accounts for a significant share of the national housing stock.

Figure 2.12. Real House Prices and Real Income, 1999–2007[1]

(Average annual percentage growth)



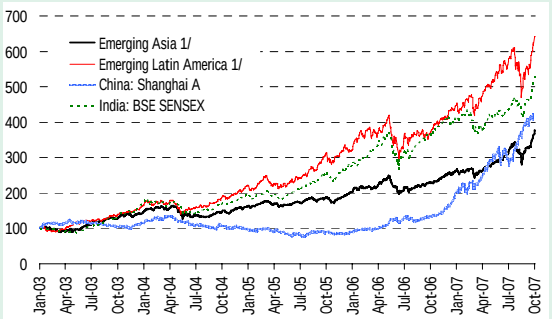
Sources: CEIC Data Company Ltd.; Haver Analytics Inc.; HDFC India; and IMF staff calculations.

[1] June 2007 or latest available data.

[2] Japan house prices proxied by Tokyo Metropolitan Area.

Figure 2.13. Stock Market Indices

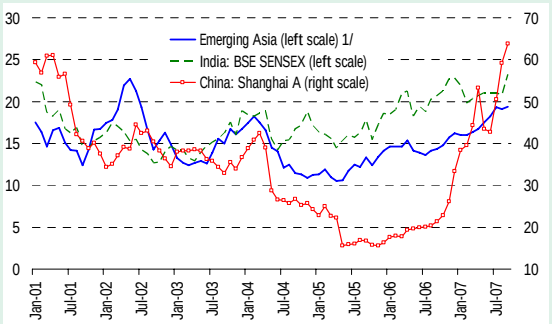
(January 2, 2003=100)



Source: Bloomberg LP.

[1] MSCI U.S. dollar basis.

Figure 2.14. Price-Earnings Ratio



Sources: CEIC Data Company Ltd; and Datastream.

[1] Based on MSCI country index.

Stock markets in Asia have seen substantial appreciations, reflecting the boom in global liquidity. Emerging Asia indices have tripled since the start of the global bull market in 2003, but the run-up substantially trails those in other emerging markets. While the price-earnings ratios do not appear grossly out of line with historical averages, they are higher than in other emerging markets and many mature markets. This is particularly true in China, where current price-earnings ratios can only be rationalized under very optimistic beliefs about future corporate profitability. Given still-limited share ownership in the country, the macroeconomic impact of a stock market correction through wealth effects would, a priori, be contained, but confidence effects could be larger.

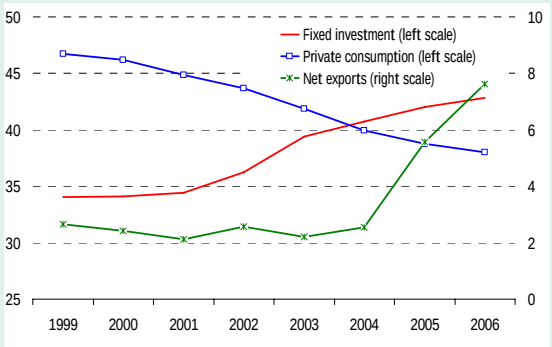
Overall, therefore, evidence of significant credit and asset booms seems concentrated in a few countries but does not seem to characterize emerging Asia as a whole. Yet even in economies where significant challenges are not evident, the situation will need to be monitored closely by policymakers, and policies geared toward preserving stability. A particular challenge is likely to be coping with continuous capital inflows, including through exchange rate flexibility and steps to further liberalize outflows. In India and, in particular, China, which is the focus of many Asia-skeptics' attention,

[15] Note that, for India, the national index in IMF (2007a) was constructed as the aggregate of the six main cities, and hence it is very hard to distinguish local from national trends.

the evidence of a credit and asset boom seems stronger than elsewhere. However, while the medium-term challenges in these countries are real, the short-term vulnerabilities should not be overstated.

- In China, rapid money, credit, and asset price growth are the financial counterparts to an unbalanced growth path. The consumption-to-GDP ratio is one of the lowest in the world at such levels of income and has been falling rapidly, while investment has been growing at an unprecedented pace aided by artificially low costs of capital, land, and energy, as well as an undervalued exchange rate. It is in China's interest, therefore, to progressively rebalance the economy away from inefficient investment in tradables and toward consumption and efficient investment. Yet while these imbalances, if unchecked, will carry with them a rising probability of a large correction, the short-term risk of such an outcome appears limited: the external and fiscal positions are very strong, and foreign exchange reserves, now at $1.4 trillion, are the highest in the world. Moreover, much progress has been made in recent years in improving the health of the banking sector, and hence its ability to absorb losses.

Figure 2.15. China: GDP Components
(In percent of GDP)



Source: IMF, WEO database.

- In India, credit and asset price growth remain rapid despite some cooling in recent months, but these developments should be set in the context of balanced macroeconomic growth benefiting a broad range of sectors and components of demand, perhaps reflecting widespread productivity improvements. Moreover, the current account deficit remains small for a country growing at close to 9 percent a year, and the deficit remains readily financed by private flows—indeed, overfinancing of the deficit in recent years has led to a large accumulation of foreign exchange reserves.

Conclusions

On balance, Asia has learned many of the key lessons from the crisis, and, while vulnerabilities exist within countries, the region is far more resilient to shocks today. By and large, Asia has come a long way over the past decade, as a result of major financial and corporate sector reform and significant improvements in macroeconomic policy frameworks. More flexible exchange rate regimes have cushioned external shocks and an impressive war chest of official reserves has been built up; short-term external debt has been reduced significantly; inflation targeting has provided a monetary anchor in many cases; and fiscal policies have taken on a longer-term perspective to safeguard debt sustainability. At the same time, the level of risk awareness among policymakers and private sector agents across Asia has also increased markedly. These improvements militate against systemic risks to the region's economies, although a slowdown cannot be ruled out, particularly under current global conditions. In the near term, therefore, Asia's economies appear to be on a less precarious footing than sometimes imagined. This, however, should not mask important challenges facing the region. Asia remains too dependent on exports as an engine of growth, and a concomitant rebalancing appears more needed than ever, not least through higher exchange rate flexibility. Financial sectors, while in stronger shape than in the past, will need to be developed further if the region is to cope successfully with increasingly complex and volatile capital flows. Policymakers in the region are acutely aware of these challenges and the need to guard against complacency, as crises seldom repeat themselves but rather tend to emerge from previously underappreciated sources of vulnerability.

III. Sterilized Intervention in Emerging Asia: Is It Effective?

Has sterilized intervention in emerging Asia been effective in influencing the level, change, or volatility of exchange rates? The question arises because it is hard to rationalize the rapid buildup of foreign exchange reserves in the region as solely aimed at ensuring sufficient reserves (Tables 3.1 and 3.2). Certainly, some of the reserve accumulation has been precautionary in nature, and in some countries intervention reflects the operation of a fixed exchange-rate regime. But for countries that operate flexible regimes, reserve accumulation may reflect a desire to influence the level, change in, or volatility of the exchange rate. Indeed, since mid-2005 intervention has occurred in the context of upward pressure on currencies,

Table 3.1. Cumulative Foreign Exchange Flows and Reserve Accumulation[1]
(In millions of U.S. dollars)

	2000–07	2000–02	2003–04	2005–07
Indonesia				
Current account and FDI	40,962	15,332	7,559	18,071
Net capital inflows	-17,275	-9,233	-1,209	-6,834
Reserve accumulation	20,171	4,521	4,749	10,901
India				
Current account and FDI	30,903	14,969	16,622	-687
Net capital inflows	112,729	17,661	32,538	62,530
Reserve accumulation	163,622	35,553	60,068	68,001
Korea				
Current account and FDI	93,283	30,845	44,819	17,619
Net capital inflows	71,710	17,860	20,202	33,648
Reserve accumulation	164,902	47,358	77,654	39,890
Philippines				
Current account and FDI	14,230	-321	2,213	12,338
Net capital inflows	-6,452	60	-1,396	-5,116
Reserve accumulation	17,103	464	1,254	15,384
Thailand				
Current account and FDI	44,643	26,912	10,620	7,111
Net capital inflows	-32,585	-24,764	-10,939	3,119
Reserve accumulation	41,889	6,402	15,993	19,494

Source: IMF staff estimates.
[1] The reserve accumulation is from the central bank balance sheet (it is not derived from the BOP data). The data exclude net errors and omissions and current transfers. Net capital inflows exclude FDI.

Table 3.2. Reserve Adequacy Ratios
(As of end-2006)

	India	Indonesia	Korea	Philippines	Thailand
Gross reserves					
In months of imports of goods and services	8.2	4.8	7.7	4.4	6.0
As ratio of short-term external debt[1]	9.4	1.5	2.1	1.6	2.0

Source: IMF staff estimates.
[1] Residual maturity.

suggestive of a "leaning against the wind" approach. This chapter concentrates on five managed-floating countries that have conducted intervention—India, Indonesia, Korea, the Philippines, and Thailand—over the period 2000–07.

An important goal of this chapter is to ascertain the impact of intervention on exchange rates. While the theoretical literature on its effects has advanced, and central bankers indicate that they view intervention as an effective policy tool (Neely, 2007), inferring its effects remains complicated. This study, like many in the literature, faces data limitations and methodological challenges. In particular, it is hampered by the use of monthly reserves data as a proxy for intervention and standard problems such as the simultaneity of exchange rates and intervention. Furthermore, the lack of a counterfactual also makes assessing the effectiveness of intervention difficult.

Recognizing such difficulties, this chapter finds limited evidence of systematic links between exchange rates and intervention. The data show that the authorities have intervened on both sides of the market. Early in the sample period, some authorities were "leaning against the wind" by selling foreign

Note: The main authors of this chapter are Hali Edison, Roberto Guimarães-Filho, Charles Kramer, and Jacques Miniane.

exchange, while later in the sample they bought foreign exchange during periods of protracted appreciation pressures on their currencies. Overall, the empirical results speak loudest on volatility, suggesting that intervention may be associated with lower exchange rate volatility.

What Is Sterilized Intervention?

Foreign exchange intervention is the purchase or sale of foreign exchange by a monetary authority, either sterilized or unsterilized. *Unsterilized intervention* involves the purchase of foreign currency with domestic currency, which changes the monetary liabilities of the monetary authorities, and thus the monetary stance. *Sterilized intervention* includes both this exchange of currencies and monetary operations (such as open-market sales or purchases of securities) to undo the effects of that exchange on monetary liabilities. Sterilized intervention is thus equivalent to a swap of securities denominated in home currency for those denominated in foreign currency, with a corresponding change in the currency composition of the private sector's securities holdings. The distinction between unsterilized and sterilized intervention is important: changes in the monetary stance would naturally affect the exchange rate, so it would not be surprising to find that unsterilized intervention is effective. By contrast, sterilized intervention acts through subtler channels (as discussed later), which may not always work.

The distinction between sterilized and unsterilized intervention is also important in relation to the monetary framework. For example, four of the five countries studied here—Indonesia, Korea, the Philippines, and Thailand—have adopted inflation-targeting frameworks, which may constrain intervention. For instance, if an inflation-targeting country wished to resist exchange rate pressures, it could adjust its monetary policy stance through intervention. But protracted one-sided intervention could, in principle, raise inconsistencies with inflation targeting. For example, unsterilized intervention could create a surge of domestic liquidity that led to an undue loosening in the domestic monetary stance, or could keep the exchange rate from adjusting to a level consistent with achieving the inflation target. It is thus not surprising that the countries in the sample generally sterilize (as discussed below).

Motives for Intervention, Channels for Effectiveness, and Evidence from the Literature

Typically, intervention aims at the following:

- *Influencing the level of the exchange rate*. The authorities may be concerned that the exchange rate has moved away from its equilibrium level, unduly affecting competitiveness (note that none of the five countries examined targets a specific exchange rate level).
- *Dampening exchange rate changes*. The authorities may also intervene to slow the speed of exchange rate changes. For example, this "leaning against the wind" may buy the export sector time to adjust to an appreciating exchange rate trend.
- *Smoothing exchange rate volatility*. The authorities may intervene to prevent exchange markets from becoming disorderly. In particular, excessive volatility may impede the orderly functioning of the market, leading to a widening of bid-ask spreads and loss of liquidity.
- *Accumulating reserves*. The authorities may intervene to build an inventory of foreign currency assets. Following the financial crises of the 1990s, many countries, including those in this study, embarked on intervention partly as a self-insurance policy aimed at reducing external vulnerabilities and sovereign risk.

Sterilized intervention can work through two main channels:[16]

[16] Edison (1993) is an early survey of the intervention literature; Sarno and Taylor (2001) provide a more recent survey

- *Portfolio balance channel*. Sterilized intervention may affect the exchange rate if it changes the risk premium, which arises when home and foreign bonds are imperfect substitutes.[17] That is, the risk premium may change to induce the private sector to adjust its holdings of foreign and domestic bonds. If so, the exchange rate would move to equalize risk-adjusted returns on domestic and foreign currency assets.[18]

- *Signaling channel*. Sterilized intervention may have effects through the signaling channel if it changes expected future values of the exchange rate or its fundamentals. In particular, this channel would imply a systematic relationship between intervention and future policies.

Prior research on the effectiveness of these channels focuses mainly on advanced countries, and finds weak evidence that sterilized intervention affects exchange rates.[19] The empirical literature uncovers effects that are statistically significant but economically small.[20] Some research finds effectiveness when the exchange rate is away from fundamentals, but such effects are very short lived and at times tend to increase volatility. In addition, for the major currencies, evidence that sterilized intervention *dampens* volatility is weak.[21]

The literature on the effectiveness of intervention in emerging markets is still in its infancy, owing in part to limited availability of data. Existing studies generally find weak evidence of effectiveness.[22] In contrast, a study on India finds that intervention dampens volatility (but does not affect the level of the rupee). A recent cross-country study, using a sample of emerging markets and small advanced countries, finds that resisting nominal exchange rate appreciation through sterilized intervention is likely to be ineffective when capital flows are persistent (IMF, 2007b).

In principle, intervention could be more effective in emerging market countries than in advanced countries:

- *Emerging markets assets may be less perfect substitutes internationally than advanced country assets*. Indeed, Chinn and Ito (2007) show that countries in our sample are less financially open to international transactions than advanced economies. In addition, emerging market currencies may be riskier than major currencies, especially during periods of financial market volatility, and investors typically demand a risk premium for holding emerging market bonds.

- *In emerging markets, intervention is larger relative to foreign exchange turnover*.[23] Despite its rapid growth in recent years, foreign exchange turnover is still relatively small compared with advanced economies. For example, average *daily* turnover

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of theory and empirical evidence. Truman (2004) concludes "Intervention has definite limits as a policy instrument. Its effectiveness is uncertain and imprecise, and therefore it is at best blunt or a blunted instrument."

[17] The risk premium is the differential between home and foreign interest rates, adjusted for the expected depreciation of the foreign currency.

[18] The well-known empirical violations of uncovered interest parity, surveyed in Engel (1996) and, more recently, Chinn (2006), are consistent with the assumptions underpinning the portfolio balance channel.

[19] Typically, the literature focuses on the effects of intervention on the nominal bilateral exchange rate vis-à-vis the U.S. dollar, since most countries intervene against the dollar.

[20] Edison (1993) surveys the literature from the 1980s through early 1990s. Dominguez and Frankel (1993) found some evidence in favor of the portfolio and signaling channels while Obstfeld (1990) found that portfolio balance effects are statistically significant but small. For Japan, Ito (2002) found that large and infrequent intervention had quantitatively small but statistically significant effects on the dollar-yen nominal exchange rate.

[21] Dominguez (2006) and Edison, Cashin, and Liang (2006) have found that intervention increases exchange rate volatility, in contrast with claims by central banks that intervention does not increase (or is not associated with an increase in) volatility (Neely, 2007)

[22] Guimarães and Karacadag (2004), using daily data for Mexico and Turkey, find that intervention tends to increase exchange rate volatility. Disyatat and Galati (2005) find weak evidence that intervention is effective in the Czech Republic. On India, see Pattanaik and Sahoo (2003).

[23] See Neely (2007) and Fatum and Hutchinson (2006) for evidence supporting this view.

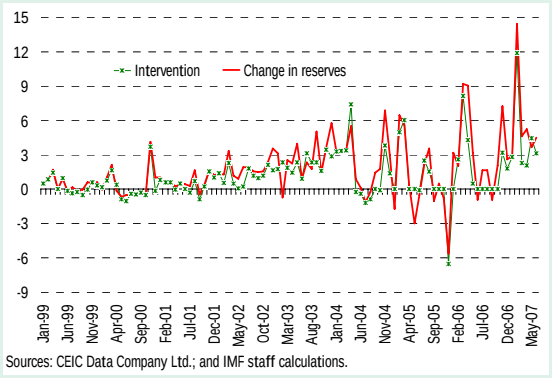
represented about 5¼ percent of GDP in Japan and the United States (taken together) in 2007, while it averaged only 2½ percent of GDP in the five countries examined here (Table 3.3).

Table 3.3. Foreign Exchange Turnover
(Daily average net of inter-dealer double-counting; in millions of U.S. dollars)

	India	Indonesia	Japan	Korea	Malaysia	Philippines	Thailand	United States
2001	3,416	3,857	146,780	9,597	1,248	1,061	1,896	253,654
2004	6,642	2,301	198,870	19,808	1,612	671	2,869	461,291
2007	34,085	2,809	238,425	33,396	3,417	2,320	6,171	663,611
				(In percent of reserves)				
2001	7.4	14.2	37.1	9.3	4.2	7.9	5.9	440.1
2004	5.2	6.6	23.8	10.0	2.4	5.1	5.9	607.8
2007	20.0	6.8	27.1	14.0	4.2	11.6	9.5	1,209.8
				(In percent of GDP)				
2001	0.7	2.4	3.6	2.0	1.4	1.5	1.6	2.5
2004	1.0	0.9	4.3	2.9	1.4	0.8	1.8	3.9
2007	3.5	0.7	5.5	3.5	2.1	1.7	2.8	4.8

Sources: Bank for International Settlements; and IMF staff estimates.

Figure 3.1. India: Intervention and Change in Reserves
(In billions of U.S. dollars)



Sources: CEIC Data Company Ltd.; and IMF staff calculations.

Has Intervention Been Effective in Emerging Asia?

Data Issues

Measuring intervention is a key hurdle for properly assessing its effectiveness. Our sample of countries lack high-frequency publicly available data on intervention, requiring the use of a proxy series. Given this constraint, this study proxies intervention with monthly changes in gross reserves. Actual intervention and the change in gross reserves differ owing to valuation changes and income flows from reserves, but for the countries studied here, the proxy tracks intervention reasonably well. (For the case of India, see Figure 3.1.) In particular, for countries in this study, the correlation between changes in gross reserves and actual intervention data generally ranges around 0.8–0.9 (for countries in the sample, intervention data are confidential, except for India, which publishes monthly data). The main drawback of the data is their monthly frequency, which makes it difficult to disentangle the simultaneity of the exchange rate and intervention, and impossible to detect short-lived effects.[24]

The proxy data show common patterns for intervention across countries, albeit with the magnitude varying substantially. Figure 3.2 shows that countries in the region have leaned more heavily toward purchases of foreign currency than sales, particularly India and Korea. Similarly, countries appear to have stepped up intervention recently, particularly India, Indonesia, Thailand, and the Philippines. However, the size of intervention relative to foreign exchange turnover has varied substantially across the sample countries. For instance, over the period 2005–07 absolute monthly intervention averaged 11 percent of *daily* foreign exchange market turnover in India, 50 percent in Indonesia, 5 percent in Korea, 38 percent in the Philippines, and 22 percent in Thailand.[25]

Intervention in the region has often followed a "leaning against the wind" pattern. As Figure 3.2 shows, countries have often stepped up foreign exchange purchases during periods of protracted

[24] Ideally, intervention should also be adjusted for passive intervention, for example, when the monetary authorities accumulate reserves for the purpose of treasury operations and not to affect the exchange rate. However, such adjustments are not possible in our sample given lack of data.

[25] Daily turnover data are for 2007, kindly provided by the BIS. Note that it is common in the literature to measure monthly intervention relative to *daily* turnover.

appreciation pressures on their currencies. For example, this occurred in India between June 2002 and April 2004 and between August 2006 and June 2007. It also took place in Korea between April 2002 and June 2007 and in the Philippines between September 2005 and June 2007.[26] Such "leaning against the wind" complicates inferences on the effectiveness of intervention since the simultaneous observation of foreign exchange purchases and domestic currency appreciation cannot be interpreted as evidence that intervention was ineffective. For instance, in the absence of intervention the exchange rate might have followed a more appreciated path.

Countries in the sample appear to have increasingly intervened through forwards and swaps (Box 3.1). India and Indonesia have reportedly intervened in spot markets only, but the Philippines and Thailand have increasingly used forwards and swaps for both outright intervention and sterilization (Figure 3.2).[27] Since there is no a priori reason to believe that forward or swap intervention would have a qualitatively different effect on the exchange rate than spot intervention, excluding such operations would underestimate actual intervention. Accordingly, an expanded measure of intervention was computed as the change in gross reserves plus the change in the net forward position (including the forward leg of swaps).

In our sample, intervention has been mainly sterilized. To assess the degree of sterilization, the contribution of net domestic assets to reserve money growth is regressed on the contribution of net foreign assets to reserve money growth.[28] Under full sterilization, the coefficient would be –1, indicating that when the monetary authority purchases foreign currency assets, it sells an equivalent amount of net domestic assets to neutralize the effect on reserve money.[29] This appears to be the case: the null hypothesis of full sterilization cannot be rejected in most cases, and even when it can, the coefficient is close to –1 (Table 3.4). This is unsurprising: with the exception of India, all countries in our sample follow inflation targeting, which implies—in the absence of changes in monetary policy stance—routine sterilization of the effects of intervention. In effect, then, the data for reserve changes can be treated as measuring sterilized intervention.

Table 3.4. Sterilization Coefficient[1,2]

	2000–07	2000–02	2003–04	2005–07
India	-0.79	-0.72 *	-1.00 *	-0.72
Indonesia	-0.82 *	-0.85 *	-0.79 *	-0.77 *
Korea	-1.00 *	-0.93 *	-1.02 *	-1.06 *
Philippines	-0.85 *	-0.72	-0.92 *	-1.15 *
Thailand	-0.87	-0.91 *	-0.69	-0.90 *

Source: IMF staff calculations.

[1] The sterilization coefficient is the coefficient from a regression on the contribution of net domestic assets to reserve money growth on the contribution of net foreign assets to reserve money growth. Net domestic assets in the regression are defined as reserve money minus net foreign assets.

[2] An asterisk denotes that the null hypothesis of full sterilization (a coefficient equal to or smaller than -1) cannot be rejected at the 95 percent confidence level.

Testing Effectiveness

As a first step to gauge the effectiveness of intervention, this chapter employs simple correlation analysis. Most of the results are based on contemporaneous correlations between intervention and the level, the change, and the volatility of the exchange rate. The exchange rate used is the bilateral rate against the U.S. dollar, as this is the key exchange rate that authorities focus on when

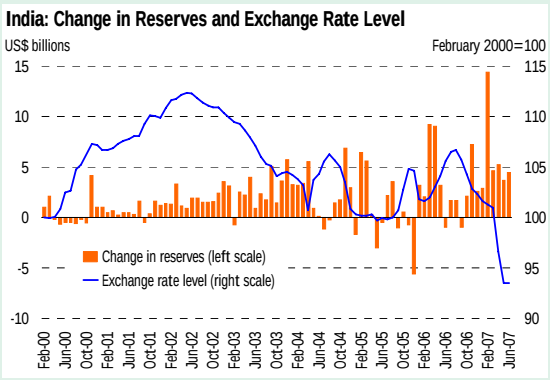
[26] Note that June 2007 marks the end of our sample period, not necessarily the end of these "leaning against the wind" episodes.

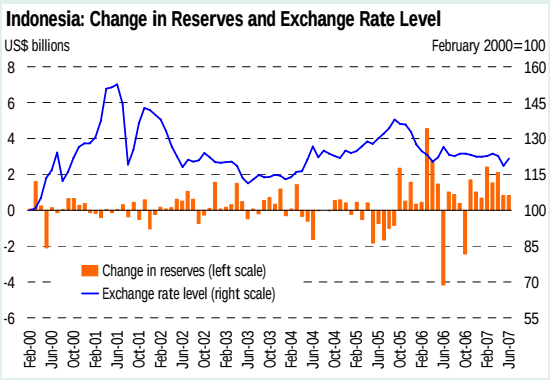
[27] Data for Korea start in January 2005; most of its activity in forwards and swaps since then has reflected a slow unwinding of a long forward position, which was mostly built over 2003 and 2004.

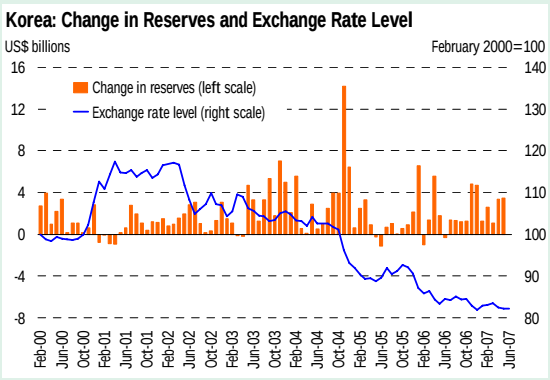
[28] This is an imperfect estimate of sterilization, since reserve money may be changing owing to (for example) shifts in money demand. Also, open market operations of domestic assets are not the only way to sterilize intervention; for example, swaps can be used as well. Further, note that net domestic assets are defined here as reserve money minus net foreign assets, which includes the central bank's net worth.

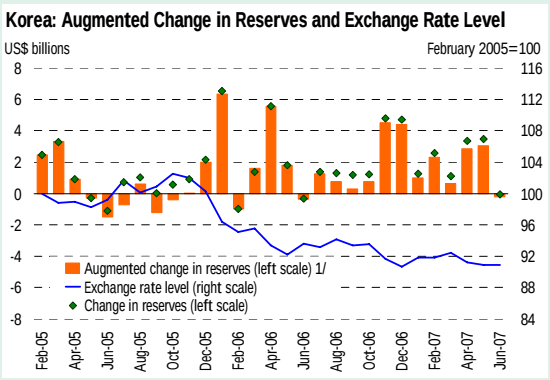
[29] If (narrow) money demand is constant or stable in the very short term, the regressions correctly test for sterilization even for countries that target a short-term interest rate.

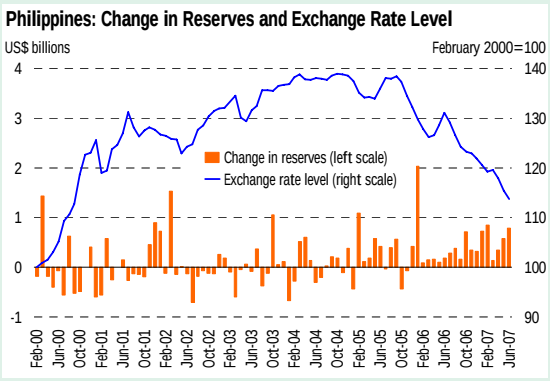
Figure 3.2. Selected Asia: Foreign Exchange Intervention

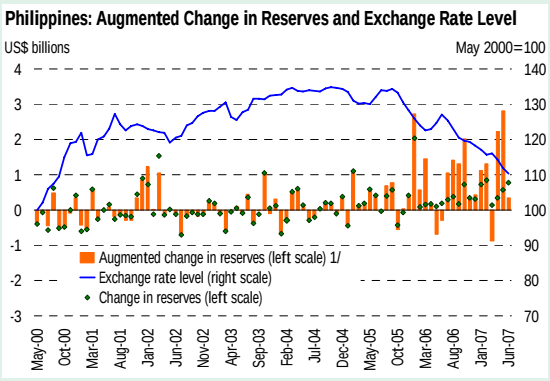


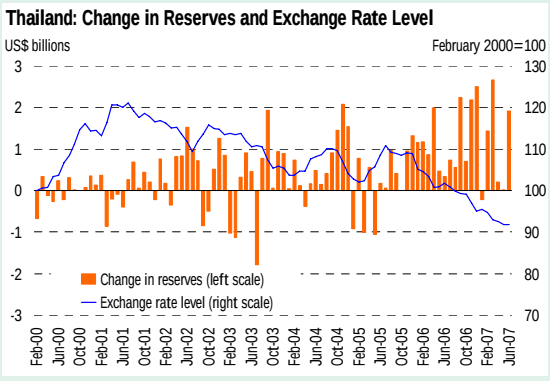


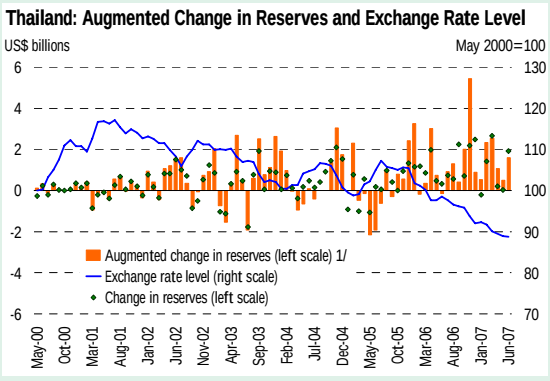












Sources: CEIC Data Company Ltd.; IMF, *International Financial Statistics*, and staff calculations; see also: http://www.imf.org/external/np/sta/ir/kor/eng/curkor.htm#cnotes, http://www.imf.org/external/np/sta/ir/phl/eng/curphl.htm, and http://www.imf.org/external/np/sta/ir/tha/eng/curtha.htm.

[1] Equal to changes in gross reserves plus changes in the net forward reserve position.

Box 3.1. The Mechanics of Intervention

The balance sheet of the monetary authority helps illustrate the important distinction between sterilized and unsterilized intervention. Like any other balance sheet, it is organized according to the principles of double-entry bookkeeping. The acquisition of an asset by the monetary authority appears on the asset side of the ledger. Similarly, any addition to the authorities' obligations appears on the liabilities side.

An *unsterilized intervention* consists of a purchase (or sale) of foreign exchange from the private sector (commercial banks), with a purchase increasing the monetary authority's net foreign assets holdings (upward-pointing arrow). At the same time, the monetary authority credits the reserve accounts of commercial banks, corresponding to an automatic increase in the monetary base. This action is consistent with a traditional open market operation, in which the monetary authority affects the money supply and interest rates through a change in its holdings of foreign assets (unsterilized intervention). If the monetary authority *sterilizes* this intervention, it would sell domestic bonds to commercial banks (downward-pointing red arrow), mopping up the liquidity associated with the initial operation. The result of these operations is that the monetary base remains constant while the composition of the monetary authority's assets changes (higher NFA, lower NDA). Similarly, the composition of private sector holdings of foreign and domestic assets also changes, which may affect the exchange rate through the portfolio balance channel.

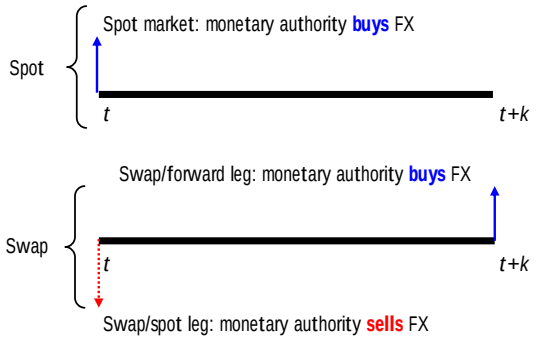
Central Bank Stylized Balance Sheet

Assets	Liabilities
Net foreign assets ↑	Monetary base ↑↓
Foreign currency	Currency in circulation
Foreign bonds	Reserve accounts of commercial banks
Gold	
Net domestic assets ↓	Net worth
Domestic bonds	Accumulated surpluses and net interest and capital gains
Loans to commercial banks	

Source: IMF staff.

Sterilized intervention may be conducted through *swap and forward* operations. For instance, in an outright forward intervention, the monetary authority purchases or sells foreign exchange in the forward market. Initially, this transaction is equivalent to sterilized intervention: it has no immediate impact on the monetary authority's monetary liabilities, as it is settled at a future date. However, when the transaction is settled, it affects the monetary authority's balance sheet (as in the case of unsterilized intervention), unless there is another offsetting transaction (e.g., if the forward contract is rolled over). Swaps can also be used to sterilize intervention. For example, if the monetary authority purchases foreign exchange in the spot market, it can immediately mop up the effects on liquidity by selling foreign exchange (first leg of the spot-forward swap) and simultaneously reverse the first leg of the swap with a forward purchase of foreign exchange (second leg of the swap). This swap intervention also gives rise to a net forward position, which if left unsterilized would have a delayed impact on reserves and the monetary base. However, as in the case of the outright forward, the monetary authority has the option of rolling over its swaps to leave the monetary base unchanged.

Spot-Swap Sterilized Intervention



Source: IMF staff.

intervening.[30] Because the exchange rate is expressed in units of domestic currency per U.S. dollar, a positive correlation between intervention and the level of the exchange rate would indicate that higher intervention is associated with a more depreciated domestic currency, providing evidence of effectiveness.[31] Similarly, a positive correlation between intervention and the change in the exchange rate would indicate that higher intervention is associated with a weaker appreciation (or stronger depreciation), which also provides evidence that intervention may slow the speed of appreciation. Finally, one would also expect to find a negative correlation between intervention and volatility if intervention dampens exchange rate volatility.

These simple correlations were buttressed with regression and vector auto-regression (VAR) analysis. Some of the regressions partially account for the simultaneity of intervention at the monthly frequency and are consistent with "leaning against the wind" and the protracted nature of intervention in our sample. In addition, the VAR analysis attempts to uncover lagged effects of intervention on the level or volatility of the exchange rate, as well as to differentiate between anticipated and unanticipated intervention. Because the regressions did not uncover significant information beyond what our correlation analysis shows, we concentrate here on the correlations (see Box 3.2 for more details on the regression and VAR analysis).

Results

Level of the exchange rate. The correlation between intervention (measured by the change in gross reserves) and the level of the exchange rate is weak (Table 3.5). For most countries and subperiods, the sign of the correlation indicates that foreign currency purchases are associated with an *appreciation* of the domestic currency, the opposite of what one would expect, although the correlation coefficients are generally insignificant. Such correlations could simply indicate that the authorities "lean against the wind," purchasing foreign exchange when the domestic currency appreciates. However, computing correlations between intervention today and the level of the exchange rate with a lag, or attempting to control for the endogeneity of intervention in regressions, yields no further evidence of effectiveness (Box 3.2).[32]

Table 3.5. Change in Reserves and Level of the Exchange Rate[1,2]

Contemporaneous	2000–07	2000–02	2003–04	2005–07
India	-0.21 *	0.46 *	-0.35	-0.22
Indonesia	-0.15	-0.21	-0.24	-0.30
Korea	-0.15	-0.33	-0.59 *	-0.36
Philippines	-0.03	0.00	0.06	-0.27
Thailand	-0.33 *	0.06	-0.29	-0.34

Source: IMF staff calculations.

[1] The table displays the contemporaneous correlation between changes in gross reserves and the level of the exchange rate against the U.S. dollar.

[2] A negative correlation indicates that foreign reserve acquisitions are associated with an appreciation of the domestic currency, and an asterisk denotes that the correlation is significantly different from zero at the 95 percent confidence level.

Changes in the exchange rate. The correlations between changes in gross reserves and the change in the exchange rate are also negative (Table 3.6), and

Table 3.6. Change in Reserves and Change in the Exchange Rate[1,2]

Contemporaneous	2000–07	2000–02	2003–04	2005–07
India	-0.31 *	-0.48 *	-0.45 *	-0.17
Indonesia	-0.19	-0.09	-0.35	-0.48 *
Korea	-0.47 *	-0.34 *	-0.51 *	-0.64 *
Philippines	-0.31 *	-0.19	-0.25	-0.28
Thailand	-0.49 *	-0.49 *	-0.47 *	0.50 *

Source: IMF staff calculations.

[1] The table displays the contemporaneous correlation between changes in gross reserves and changes in the exchange rate against the U.S. dollar.

[2] An asterisk denotes that the correlation is significantly different from zero at the 95 percent confidence level.

[30] For Korea, calculations were recomputed using the bilateral rate against the yen, but the results were very similar to those using the U.S. dollar. Further work could investigate whether intervention in the region has affected the level or volatility of the real exchange rate.

[31] Note that "leaning against the wind" policies may generate negative correlations.

[32] Using the expanded measure of intervention (including the change in the net forward position) for Korea and the Philippines does not qualitatively affect the results.

Box 3.2. The Effectiveness of Intervention: Additional Tests

In addition to estimating contemporaneous and lagged correlations between intervention and the level, change, and volatility of the exchange rate, simple regressions were also estimated. These regressions should not be seen as structural models of the exchange rate. Two issues need to be kept in mind when interpreting the results: (1) there is substantial academic evidence that floating exchange rates (admittedly not a perfect description of the currencies examined here) cannot be distinguished from a random walk at horizons of two years or less (Engel, Mark, and West, 2007); and (2) given the monthly frequency of the data, there is substantial simultaneity between the exchange rate and intervention.

Two-stage least-squares were applied to adjust for simultaneity. In the first stage, intervention was regressed on the lagged change in the exchange rate and lagged intervention. In the second stage, the exchange rate change is regressed on the predicted value of the intervention from the first-stage regression. The first-stage regression specification is consistent with the leaning against the wind and the protracted nature of intervention in our sample. Specifically,

$$\text{First stage: } I_t = a + b * I_{t-1} + c * \Delta S_{t-1} + u_t$$

$$\text{Second stage: } \Delta S_t = d + e * I_t^{\,p} + v_t,$$

where I denotes intervention, ΔS denotes the change in the exchange rate (expressed in log differences, with a negative change signifying appreciation), a, b, c, d, and e denote parameters to be estimated, and u and v denote regression errors. The second-stage regression was also estimated with the volatility of the exchange rate on the left-hand side.

In most of the first-stage regressions, the instruments worked well in explaining intervention. However, in most cases the coefficient of interest (e) was statistically insignificant at 95 percent confidence, and/or of the wrong sign (negative in the case of the exchange rate change regressions; positive in the case of the volatility regressions), whether using the change in the exchange rate or the volatility of the exchange rate in the second-stage regression. Only in a handful of cases (such as the volatility regression for the Philippines) was the coefficient significant and of the expected sign.

In an additional exercise, vector auto-regressions (VAR) were applied for each country. The specification of the VAR included the exchange rate (in either level terms or first differences), intervention, and interest rate differentials (measured as the difference between the domestic 3-month money market or treasury bill rate and the 3-month U.S. treasury rate). The results indicate that the exchange rate does not respond to intervention shocks. The impulse response functions show that the effect of intervention on the exchange rate is generally statistically insignificant and of the wrong sign. This result is robust to the ordering used to identify the shocks and to the VAR specification. In one case, India, some of the responses of the exchange rate to intervention were of the correct sign (higher intervention leads to a more depreciated exchange rate) but statistically insignificant.

hence provide no evidence that intervention has slowed the speed of appreciation.

Volatility of the exchange rate. There is some modest evidence that intervention affects the volatility of the exchange rate.[33] While the correlations are generally small and statistically insignificant, their sign is mainly negative, suggesting that intervention has been associated with lower volatility (Table 3.7). This result is robust to adjustments for delayed effects of intervention, the endogeneity of intervention, and the measure of volatility.[34]

Table 3.7. Change in Reserves and Volatility of the Exchange Rate[1,2]

Contemporaneous	2000–07	2000–02	2003–04	2005–07
India	0.05	-0.39 *	-0.11	-0.09
Indonesia	-0.18	-0.15	-0.34	-0.20
Korea	-0.09	-0.19	-0.04	-0.01
Philippines	-0.22 *	-0.30	-0.12	0.16
Thailand	-0.07	-0.13	0.05	0.02

Source: IMF staff calculations.

[1] The table displays the contemporaneous correlation between changes in gross reserves and the realized volatility of the exchange rate against the U.S. dollar.

[2] An asterisk denotes that the correlation is significantly different from zero at the 95 percent confidence level.

Conclusions

This chapter finds limited evidence of systematic links between sterilized intervention and exchange rates. The limited evidence for effectiveness may be surprising to some. The low degree of substitutability of emerging market assets and the large size of interventions relative to currency market turnover in emerging markets would suggest that intervention could have a sizable effect on exchange rates. However, there is some modest evidence that intervention dampens volatility, which is consistent with the stated objectives of some monetary authorities.

There are several factors that could weaken the effectiveness of intervention in emerging Asia. First, persistent structural factors may be driving the appreciation of the currency, obscuring any effect of intervention beyond a short period. Second, to the extent that sterilized intervention prevents the domestic interest rate from adjusting (especially downward), it would have limited effects on capital flows driven by interest differentials, thereby failing to alleviate upward pressure on the currency. In addition, intervention aimed at building reserves would not necessarily signal future policy changes and hence might not be expected to exert any effect on the exchange rate.

Finally, the results need to be interpreted with a grain of salt. Data limitations and methodological challenges hamper the assessment of the effectiveness of intervention. While the results in this chapter suggest that there is limited evidence of effectiveness, the fact that the monetary authorities have actively intervened suggests that they believe the intervention has been effective. This is also consistent with the views of central banks in emerging markets (Neely, 2007) and with the findings that intervention may work over a very short time horizon in advanced economies. Better data availability and continued research into the channels and motives for intervention in emerging markets countries could lead to a fuller understanding of the effectiveness of intervention in the region.

[33] Volatility was estimated with daily exchange rate data and then aggregated at the monthly frequency, based on two measures: a fitted GARCH (1,1) process on the daily log difference of the exchange rate, and realized volatility based on the rolling 20-day moving average of the square of the log difference of the exchange rate.

[34] When controlling for the endogeneity of intervention using two-stage least squares, only in the Philippines was intervention associated with lower volatility in a statistically significant way.

IV. The Evolution of Trade in Emerging Asia

Over the past two decades, emerging Asia has experienced rapid trade growth and stronger interdependence among economies in the region. Although this change has a number of dimensions, booming intraregional trade with China has played a central role. This appears to be largely a result of still-ongoing geographical dispersion of production, with assembly operations migrating to low-wage economies, while more developed economies specialize in production of high-value-added components. The resulting increase in vertical intra-industry trade, fostered by foreign direct investment, has created a sophisticated production network in emerging Asia, facilitating the "catch-up" process through technology transfer.

While this process is well known at a general level, a fuller understanding can contribute to better-informed policymaking. For example, to evaluate the potential impact of a U.S. or global growth slowdown on Asia, a clear picture of the factors behind Asia's stronger interdependence in recent years is needed. Similarly, the effect of increased exchange rate flexibility in China on the other economies of emerging Asia, and on the global economy more broadly, would depend on the precise role that China is playing in regional trade processes. While the IMF and a number of analysts have addressed these broad issues[35] and much anecdotal evidence has been presented, a comprehensive analysis of Asia's changing trade patterns has been lacking. This chapter uses the IMF *Direction of Trade Statistics* and the UN COMTRADE database to attempt to help address this gap.[36]

The main findings are as follows:

- *The importance of exports to the region has reached an unprecedented high level*. Thus, the conjecture that Asia can effectively de-link from either the U.S. or the global economy appears to be premature.
- *The expanded presence of emerging Asia in world trade has—as has been widely reported—resulted largely from increased regional trade integration*. However, in contrast to more developed economies' trading blocs, where intraregional trade is concentrated on final goods, emerging Asia's export growth has been driven by trade in intermediate goods in response to vertical specialization. And, as emerging Asia has become a manufacturing center, China has dramatically raised its position as a destination for intraregional exports, acting as the region's exporting platform.
- *Emerging Asia has recently begun to move away from a concentration in lower-end products toward a more diversified export base*. Within Asia, the pattern of manufacture trade by country is broadly in line with levels of economic development, although our analysis does not exclude the possibility of occasional "leapfrogging."
- *The degree of competition appears to be intensifying within Asia*. While the export structure is still largely complementary and there remains a clear division of labor among countries, the picture is evolving. In particular, China appears to be outgrowing its role as a final-stage assembler in recent years and is increasingly competing with other Asian countries.

We turn now to consider each of these developments in detail.

Evolving Asian Trade

Increasing trade by emerging Asia has largely been driven by vertical intra-industry trade, which is ultimately dependent on access to world markets outside the region. Increasing

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Note: The main author of this chapter is Masahiro Hori.

[35] See IMF (2002, 2005) and ADB (2007), for example.

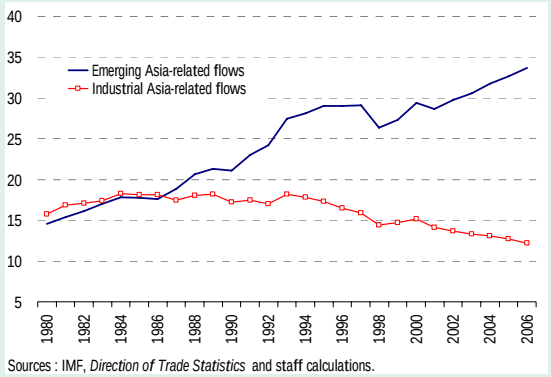
[36] This chapter focuses only on trade in goods. We leave the service trade issue for future research.

intraregional trade implies stronger interdependence among countries in the region as well.

The Rise of Emerging Asia in World Trade

The export-oriented growth strategies of emerging Asian economies have been reflected in high trade growth and a steady increase of their share in world trade. The share of emerging Asia in world trade flows reached 34 percent in 2006, up sharply from 21 percent in 1990 (Figure 4.1). Moreover, the rise in emerging Asian trade accounted for about 40 percent of the total increase in world trade over the period.[37]

Figure 4.1. Asia's Share in World Trade Flows
(In percent)

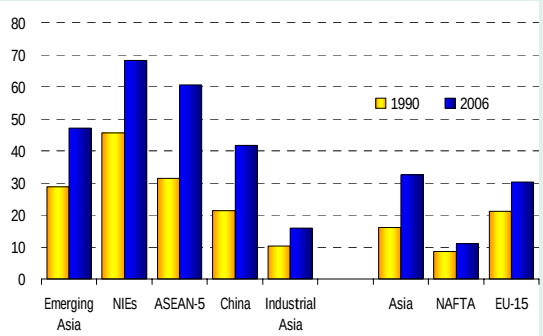


Sources : IMF, *Direction of Trade Statistics* and staff calculations.

Perhaps not surprisingly, emerging Asia is highly dependent on exports. While the share of exports in GDP was already high for emerging Asia in 1990, it increased further over the past decade, reaching almost 50 percent in 2006 (Figure 4.2). This high exposure can be attributed in part to the small open NIEs, especially Hong Kong SAR and Singapore, for which the exports-to-GDP ratios are 109 and 184 percent, respectively. However, high and rising exposures of other economies in emerging Asia, including China, suggest that this trend is key to understanding economic developments in the region.

[37] Of note, the data analyzed in this chapter are on residency basis and do not address the issue of the nationality of firm ownership. Thus, for example, exports from Japanese-owned firms producing in China would appear in the data set as Chinese exports.

Figure 4.2. Exposure to Exports
(Total exports in percent of GDP)

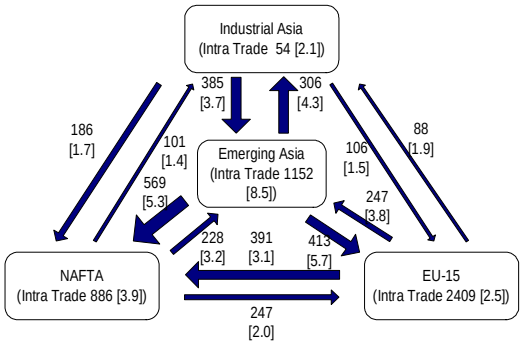


Sources: IMF, *Direction of Trade Statistics* and staff calculations.

Booming Asian Intraregional Trade

A large part of the increase in Asian trade is the result of regional integration. While trade flows outside emerging Asia roughly tripled between 1990 and 2006, *inter-regional* trade involving emerging Asia rose by 5 times, and *intraregional* trade within emerging Asia increased by 8.5 times (Figure 4.3). As a result, trade between the economies in emerging Asia has risen steadily from about 30 percent of total exports by the region in 1990 to more than 40 percent in 2006. The intraregional share of total imports is approaching 50 percent.

Figure 4.3. Trade among Industrial Asia, Emerging Asia, NAFTA, and EU-15[1]
(In billions of U.S. dollars, 2006)



Sources: IMF, *Direction of Trade Statistics* and staff calculations.
[1] Numbers in brackets indicate how many times trade flows increased from 1990-2006.

Booming Asian trade integration is not confined to emerging economies. The share of industrial Asia's exports to emerging Asia has also risen, from 30 percent in 1990 to 47 percent in 2006, mirroring the decline of exports from these economies to NAFTA and the European Union (Table 4.1). Likewise, the share of industrial Asia's imports from emerging Asia also has increased, to 43 percent from 27 percent in 1990 (Table 4.2). As a result, intraregional trade now accounts for more than 50 percent of total trade in Asia, approaching the levels seen in NAFTA and the European Union.

Table 4.1. Direction of Exports, 2006[1]
(In percent of total exports)

Exporting Region		Direction					
		Asia			NAFTA	EU-15	Rest of World
		Total	Emerging Asia	Industrial Asia			
Total		51.9 (9.2)	42.1 (11.7)	9.9 (-2.5)	20.7 (-6.9)	14.2 (-4.1)	13.2 (1.9)
Asia	Emerging Asia	51.6 (4.1)	40.8 (9.8)	10.8 (-5.7)	20.1 (-4.6)	14.6 (-2.2)	13.6 (2.7)
	Industrial Asia	53.1 (16.2)	46.5 (16.9)	6.6 (-0.7)	22.5 (-8.7)	12.8 (-7.4)	11.6 (-0.1)
NAFTA		19.5 (-5.8)	13.5 (1.0)	6.0 (-6.8)	52.5 (11.9)	14.6 (-7.4)	13.4 (1.3)
EU-15		8.2 (0.7)	6.1 (1.7)	2.2 (-1.0)	9.6 (1.2)	59.2 (-6.7)	23.0 (4.8)

Sources : IMF, *Direction of Trade Statistics* and staff calculations.
[1] Numbers in parentheses are changes in shares from 1990 to 2006. Shaded cells indicate intraregional trade flows.

Table 4.2. Source of Imports, 2006[1]
(In percent of total imports)

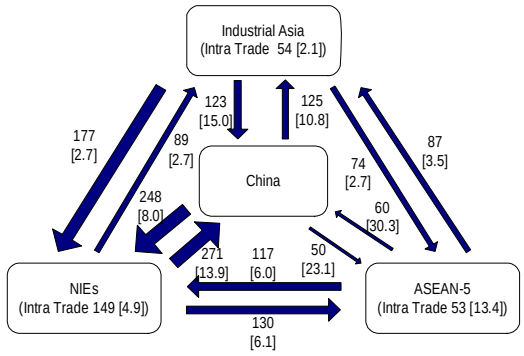
Importing Region		Source					
		Asia			NAFTA	EU-15	Rest of World
		Total	Emerging Asia	Industrial Asia			
Total		59.9 (11.8)	46.0 (16.4)	13.9 (-4.6)	10.4 (-10.0)	10.6 (-5.3)	19.1 (3.5)
Asia	Emerging Asia	62.7 (6.9)	47.0 (15.4)	15.7 (-8.5)	9.3 (-7.1)	10.1 (-4.9)	17.9 (5.1)
	Industrial Asia	50.3 (14.3)	42.7 (16.1)	7.6 (-1.8)	14.1 (-12.6)	12.3 (-5.0)	23.3 (3.2)
NAFTA		30.9 (-1.7)	23.3 (7.0)	7.6 (-8.8)	36.2 (1.8)	16.0 (-2.7)	16.9 (2.6)
EU-15		12.5 (2.9)	9.9 (5.1)	2.5 (-2.1)	5.9 (-2.3)	57.8 (-7.0)	23.8 (6.3)

Sources : IMF, *Direction of Trade Statistics* and staff calculations.
[1] Numbers in parentheses are changes in shares from 1990 to 2006. Shaded cells indicate intraregional trade flows.

The Rise of China in Intraregional Trade

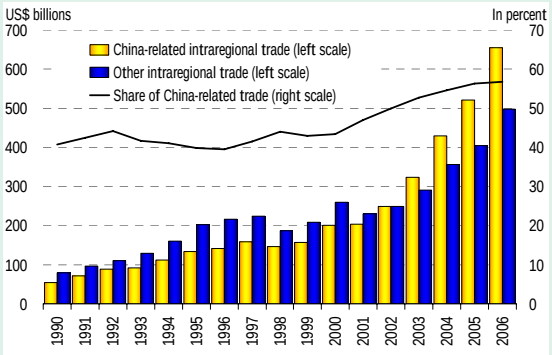
China is playing a key role in the rise of the intraregional trade in Asia. While trade within emerging Asia, excluding China, increased by 6 times from 1990 to 2006, China-related flows increased by 12 times (Figure 4.4). The rise in the China-related trade accounts for almost 60 percent of intraregional trade growth in emerging Asia in 1990–2006 (Figure 4.5), and its contribution has been gaining momentum in recent years.

Figure 4.4. Trade among Industrial Asia, China, NIEs, and ASEAN-5[1]
(In billions of U.S. dollars, 2006)



Sources: IMF, *Direction of Trade Statistics* and staff calculations.
[1] Numbers in brackets indicate how many times trade flows increased from 1990-2006.

Figure 4.5. Intraregional Trade in Emerging Asia: China-Related vs. Other



Sources: IMF, *Direction of Trade Statistics* and staff calculations.

As a result, China has raised its position as an export destination, as well as a source of imports, for other Asian economies (Table 4.3). At the same time, China increased the share of its exports to regions outside Asia, reflecting its role as the region's exporting platform to the rest of the world

(Table 4.4). For example, the share of NIE exports going to China reached 25 percent in 2006, compared with just 7 percent in 1990, while the share of Chinese exports going to regions outside Asia reached almost 60 percent, up from 41 percent in 1990.

Table 4.3. Direction of Exports in Asia, 2006[1]
(In percent of total exports)

		Direction				
		NIEs	ASEAN-5	China	Industrial Asia	Rest of World
Exporting Region/Country	NIEs	14.0	12.2	25.4	8.3	38.3
		(1.7)	(3.7)	(17.5)	(-5.1)	(-18.7)
	ASEAN-5	21.6	9.7	11.1	16.0	39.6
		(0.3)	(5.4)	(8.9)	(-10.9)	(-5.1)
	China	22.8	4.6		11.5	59.7
		(-18.4)	(1.7)		(-3.8)	(19.1)
	Industrial Asia	21.4	8.9	14.8	6.6	46.9
		(2.6)	(1.1)	(12.5)	(-0.7)	(-16.2)

Sources: IMF, *Direction of Trade Statistics* and staff calculations.
[1] Numbers in parentheses are changes in shares from 1990 to 2006. Shaded cells indicate intraregional trade flows.

Table 4.4. Source of Imports in Asia, 2006[1]
(In percent of total imports)

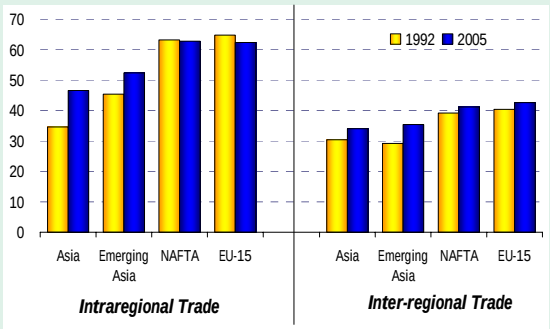
		Source				
		NIEs	ASEAN-5	China	Industrial Asia	Rest of World
Importing Region/Country	NIEs	14.0	11.0	23.3	16.6	33.9
		(2.2)	(3.4)	(11.3)	(-8.8)	(-8.8)
	ASEAN-5	29.0	11.8	11.2	16.4	30.4
		(6.5)	(7.6)	(8.9)	(-12.5)	(-10.9)
	China	34.7	7.7		15.7	40.6
		(-3.2)	(3.9)		(-0.2)	(-1.6)
	Industrial Asia	12.4	12.2	17.4	7.6	49.7
		(0.0)	(3.0)	(13.2)	(-1.8)	(-14.3)

Sources: IMF, *Direction of Trade Statistics* and staff calculations.
[1] Numbers in parentheses are changes in shares from 1990 to 2006. Shaded cells indicate intraregional trade flows.

The Rise in Intra-Industry Trade

Booming *intraregional* trade in Asia has been driven by an increase in *intra-industry* trade.[38] Across all regions, the share of trade accounted for by intra-industry trade is generally higher in intraregional trade than in inter-regional trade (Figure 4.6). And intra-industry trade has tended to rise faster than total trade in most parts of the world. In Asia, the share of intra-industry trade in regional trade was relatively low until the early 1990s but has increased sharply.

Figure 4.6. Intra-Industry Trade Index by Region[1]



Sources: UN Comtrade database; and IMF staff calculations.
[1] Grubel and Lloyd Index measured at the SITC 2-digit level.

The rise in intra-industry trade in emerging Asia tracks developments in the more advanced economies, but the motivation behind this structural change in Asia is quite different. Intra-industry trade in emerging Asia is primarily a reflection of greater vertical specialization that exploits differences in comparative advantage to build a production nexus targeting foreign markets, while intra-industry trade in the developed economy groups appears to stem primarily from demand for product variety in the context of their large domestic markets. This difference can be seen clearly in the increasing intermediate-goods trade in Asia. The share of

[38] An economy engages in intra-industry trade if it exports and imports commodities that are in the same commodity categories. As a measure of the degree of intra-industry trade, the Grubel and Lloyd index defined as

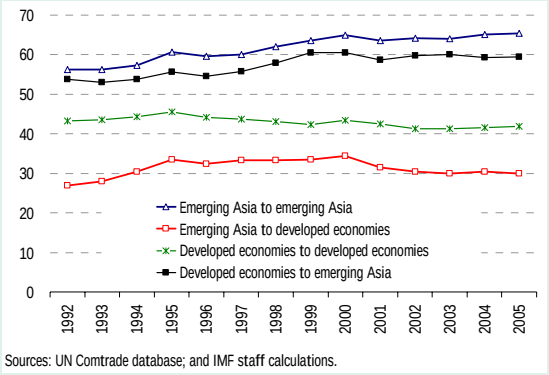
$$GLI(j,t) = \sum_i \frac{(X(i,j,t)+M(i,j,t)) - |X(i,j,t) - M(i,j,t)|}{\sum_i (X(i,j,t)+M(i,j,t))}$$

is widely used, where $X(i,j,t)$ is the value of commodity *i* exports by country *j* in year *t*, and $M(i,j,t)$ is that of imports. Here, we calculated the index using the SITC 2-digit classification for *i*. Although this index has a tendency to get smaller when measured with more detailed data, the 2-digit index is appropriate to identify the processing intra-industry trade (between parts and final goods in the same industries) in Asia.

intermediate goods in trade flows into emerging Asia has increased to the 60–65 percent level, while the share in trade flows among more developed economies is barely 40 percent (Figure 4.7). On the other hand, the share of intermediate goods flowing from emerging Asia to the more developed economies is low, at around 30 percent, as exports to the rest of the world tend to be final goods.

Figure 4.7. Intermediate Goods among Manufactured Goods Trade Flows

(Share in percent)



Sources: UN Comtrade database; and IMF staff calculations.

Again, China's role is key: intermediate goods are increasingly flowing into China, while final products are flowing out of the region through China. If we compare the direction of exports among the different types of commodities—i.e., intermediate, capital, and consumer goods—the share flowing to markets outside the region is the lowest for intermediate goods and the highest for consumer goods (Table 4.5). Within Asia, China is gaining as a destination for intermediate good exports, offsetting the declining importance of Asia's intermediate-goods exports to the developed economies. Capital goods appear to be going through a similar change, albeit to a lesser degree: more of Asia's exports are going to China and less to the rest of the world.

Table 4.5. Direction of Manufactured Goods Exports in Asia, 2005[1]

(Share in percent)

Intermediate Goods		Direction				
		NIEs	ASEAN-5	China	Industrial Asia	Rest of World
Exporting Region	NIEs	19.1 (-3.7)	12.3 (-1.3)	33.7 (15.3)	6.8 (-2.0)	28.2 (-8.2)
	ASEAN-5	30.0 (-5.0)	12.6 (5.7)	14.4 (11.4)	12.0 (-2.5)	31.0 (-9.7)
	China	34.7 (-20.6)	7.9 (2.2)		11.0 (0.1)	46.4 (18.3)
	Industrial Asia	27.4 (-1.4)	12.3 (0.0)	18.3 (13.6)	2.0 (-1.0)	40.0 (-11.3)

Capital Goods		Direction				
		NIEs	ASEAN-5	China	Industrial Asia	Rest of World
Exporting Region	NIEs	9.7 (-1.1)	8.0 (-0.3)	21.1 (10.8)	7.0 (0.8)	54.3 (-10.2)
	ASEAN-5	15.4 (-11.3)	5.7 (2.7)	8.4 (8.0)	13.7 (2.8)	56.8 (-2.2)
	China	21.7 (-26.2)	3.4 (-1.3)		10.5 (5.6)	64.4 (21.9)
	Industrial Asia	23.3 (3.1)	7.8 (-0.2)	13.8 (9.8)	3.4 (0.5)	51.8 (-13.3)

Consumer Goods		Direction				
		NIEs	ASEAN-5	China	Industrial Asia	Rest of World
Exporting Region	NIEs	5.9 (-0.5)	6.1 (2.7)	8.9 (4.6)	10.0 (-1.9)	69.1 (-4.9)
	ASEAN-5	10.3 (-3.4)	6.6 (5.2)	1.4 (1.3)	13.9 (2.0)	67.8 (-5.1)
	China	15.4 (-28.4)	1.4 (1.0)		14.0 (2.6)	69.1 (24.8)
	Industrial Asia	11.2 (-0.5)	4.3 (0.1)	5.0 (3.4)	7.1 (2.4)	72.4 (-5.4)

Sources: UN Comtrade database; and IMF staff calculations.

[1] Numbers in parentheses are changes in share from 1992 to 2005. Shaded cells indicate intraregional trade flows.

Finally, China continues to be a relatively small market for Asian consumer goods, although here too its share is rising. At the same time, China has drastically increased its share of exports destined for the rest of the world across all three categories of goods.[39]

[39] The present analysis does not preclude a rise in the domestic value-added content of China's exports. Indeed, some papers argue that China's role as the regional assembly line has started to decline, as rising domestic production capacity and strong domestic demand in China have made it a fast-expanding market (see Cui and Syed, 2007).

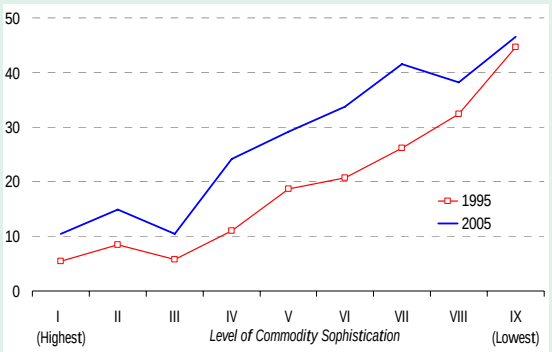
Explaining the Changing Pattern of Trade: The Role of Comparative Advantage

Using detailed product-level trade data, this section analyzes the changing pattern of comparative advantage among emerging Asia economies. We find that while China's export structure is rapidly catching up with that of more advanced Asian economies, the regional pattern of trade remains broadly in line with countries' levels of economic development, suggesting a complementary relationship aimed at exploiting differences in comparative advantage among countries in the region.

To analyze the changing role of the emerging Asian economies in world trade, we have constructed a proxy for the level of technology content in each manufactured export item.[40] First, we calculated the share of the top seven high-tech countries in world exports of manufactured goods at the SITC (revision 3) 5-digit level.[41] Based on these export shares, we then ordered the individual goods from high-value-added to low-value-added, under the assumption that high-value-added products are those that are exported from countries with a high-tech infrastructure. Given this ranking, we then divided manufactured good exports into nine groups, from high-value-added to low-value-added, and examined the performance of emerging Asian exports in each group. Our key findings are as follows:

- Emerging Asia is gradually moving away from a concentration in lower-end products toward a more diversified export base (Figure 4.8). In the early 1990s, emerging Asia's share in the lowest-end manufactured good exports, mainly consumer goods, had already reached about 45 percent, while in the highest-end goods, its share stood at about 5 percent. However, by 2005, the situation had changed: while the share in the lowest-end products has remained stable, emerging Asia gained shares in all export markets in the middle range and, to a lesser extent, in the high end. That is, emerging Asia moved up the value chain, with its exports becoming similar to those of the more (technologically) advanced countries in the world.

Figure 4.8. Emerging Asia's Exports by Level of Commodity Sophistication
(Share in percent of world total exports)



Sources: UN Comtrade database; and IMF staff calculations.

- *In intra-Asian trade, as expected, the more technologically advanced countries have supplied the less advanced countries with intermediate products.* Beginning the analysis in 1995, the NIEs were a supplier of mid-value-added intermediate goods to the rest of emerging Asia, while exports of consumer and capital good exports were limited, probably by the size of markets (Figure 4.9a). NIE exports were more diversified from high-end to low-end than other subregions in emerging Asia, but generally less sophisticated than commodities imported from more developed economies (Figure 4.9d). ASEAN-5 also played a role as a supplier of intermediate goods, but its contribution in the higher-end exports was limited compared with NIEs, while its modest exports of final goods were concentrated at the lower end (Figure 4.9b). Chinese exports centered on the lowest-value-

[40] Manufactured exports in this chapter are defined to include commodities classified in categories 5, 6 (except 68), 7, and 8 in the SITC (revision 3) classification of trade.

[41] The seven countries are selected using the rank in the IMD World Competitiveness Yearbook, and include Denmark, Finland, Germany, Japan, Sweden, Switzerland, and the United States.

added commodities, mainly consumer goods (Figure 4.9c).[42]

- *By 2005, emerging Asia had moved up the ladder of technological sophistication in intraregional trade*. NIEs have increased their share in the mid- to high-end products, in both intermediate and capital goods, and started to lose market share of low-end intermediate goods (Figure 4.9e). ASEAN-5 also has gained a foothold in the export of mid-range intermediate products, exhibiting a pattern of exports similar to that of NIEs in the mid-1990s (Figure 4.9f). While Chinese exports still center on the low-end consumer goods, China has started to export intermediate goods and capital goods within emerging Asia (Figure 4.9g). In this sense, China appears to be outgrowing the role of an "assembly line," and is increasingly competing with regional neighbors. However, still-modest intraregional consumer good exports suggest that emerging Asia may still be too small to count on as a leading market for final products.
- *In its trade with developed economies, emerging Asia was largely a producer of low-end final goods in 1995*. Even the NIEs' exports were largely in the low-end consumer goods and intermediate goods (Figure 4.10a). ASEAN-5 exports were even more concentrated on the lowest-end consumer goods (Figure 4.10b). The only Chinese products to penetrate developed economy markets as of 1995 were the lowest-end consumer goods (Figure 4.10c).
- *By 2005, there had been a dramatic switch in the exports of low-value-added products to developed markets, from the NIEs to China*. The NIEs' share of the low-end consumer goods market halved to 7 percent from 1995 to 2005 (Figure 4.10e). The NIEs also lost their share in the low-end capital and intermediate goods markets. Over the same period, China doubled its share, to close to a quarter in the lowest-end consumer goods market, and also gained share in the low- to mid-end markets of capital and intermediate goods (Figure 4.10g). These changes—combined with NIEs' gains in mid-value-added intermediate goods regionally—illustrate the migration of assembly operations from high-wage to low-wage countries.

[42] Here, we implicitly assume China is the last "goose."

The Rise in Intraregional Competition

While there remains a clear division of labor among Asian subregions, the complementary relationship shows some signs of evolving into a more competitive one.

We examine the extent of competition utilizing two measures. The first measure is the *index of export similarity* (IES). This measure seeks to capture the extent to which two economies are exporting a similar composition of products.[43] This index takes on a value of 100 if the share composition of exports is identical between two countries, and 0 if the sets of goods exported from the two economies are totally different. The second measure, the *index of export overlap* (IEO), gauges the extent of competition by the share of export overlap between two economies in each economy's total exports (see Figure 4.11).[44] The greater the area of overlap as a percentage of economy A's (or B's) total exports, the more economy B (A) is a competitor for economy A (B). This index also takes on a value between 100 (full overlap) and 0 (no overlap). Note that, unlike the IES, the IEO explicitly takes into account the size of an economy's exports relative to the size of its trading partners' exports.

[43] The export similarity index between economy j_1 and economy j_2 (for year t) is defined as

$$IES(j_1, j_2, t) = 100 \times \sum_i s(i, j_1, t) s(i, j_2, t) \Big/ \left(\sqrt{\sum_i s(i, j_1, t)^2} \sqrt{\sum_i s(i, j_2, t)^2} \right)$$

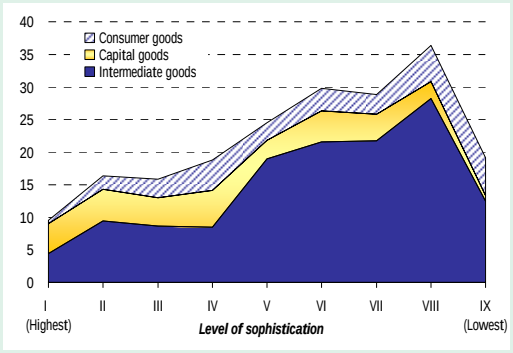
where $s(i,j,t)$ is the share of commodity i exports in economy j's total exports in year t. The reported indices are calculated using SITC (revision3) 5-digit data for more than 3,000 commodities.

[44] From economy j_1's viewpoint, the export overlap index between economy j_1 and economy j_2 (for year t) is defined as $IEO(j_1; j_1, j_2, t) = 100 \times \sum_i \min(X(i, j_1, t), X(i, j_2, t)) \Big/ \sum_i X(i, j_1, t)$, where $X(i,j,t)$ is the value of commodity i exports by economy j in year t.

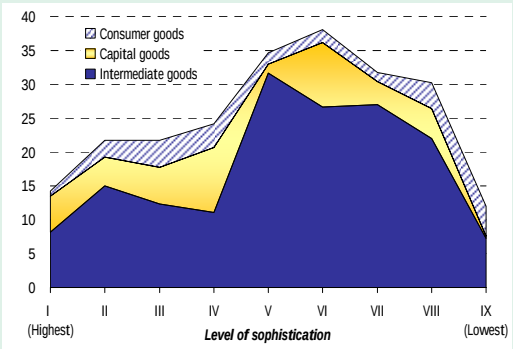
Figure 4.9. Patterns of Exports to Emerging Asia

(In percent of total imports in emerging Asia)

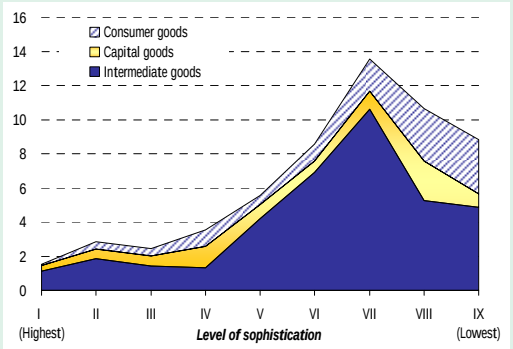
a. Share of NIEs' Exports, 1995



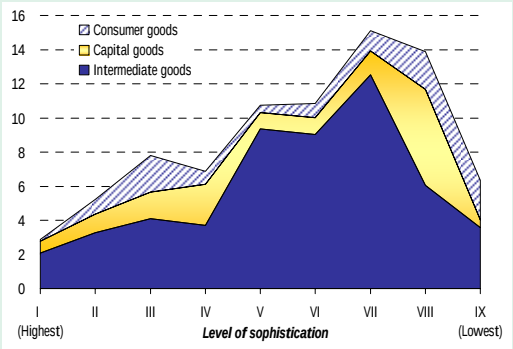
e. Share of NIEs' Exports, 2005



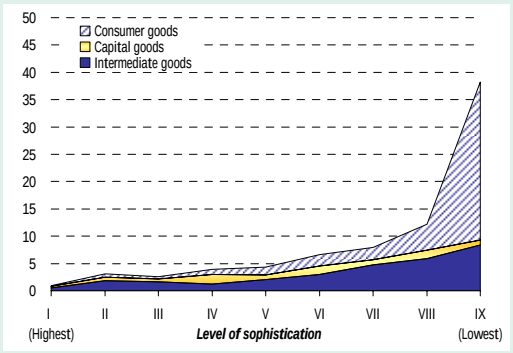
b. Share of ASEAN-5's Exports, 1995



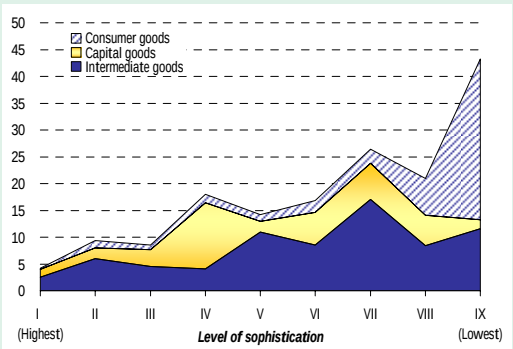
f. Share of ASEAN-5's Exports, 2005



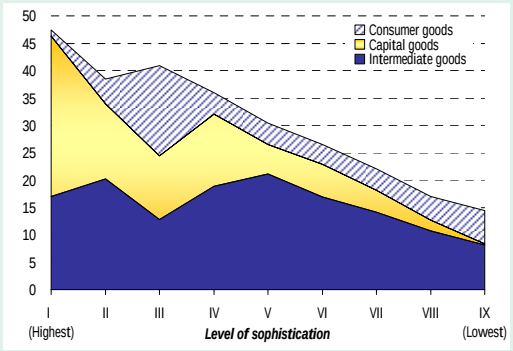
c. Share of China's Exports, 1995



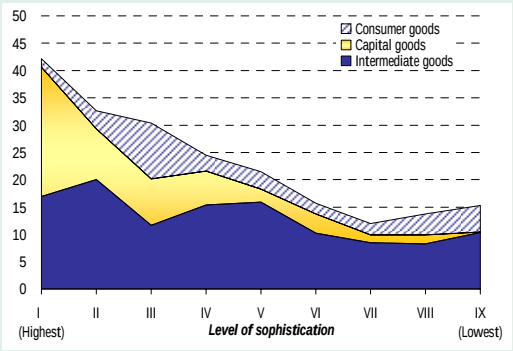
g. Share of China's Exports, 2005



d. Share of Developed Economies' Exports, 1995[1]



h. Share of Developed Economies' Exports, 2005[1]



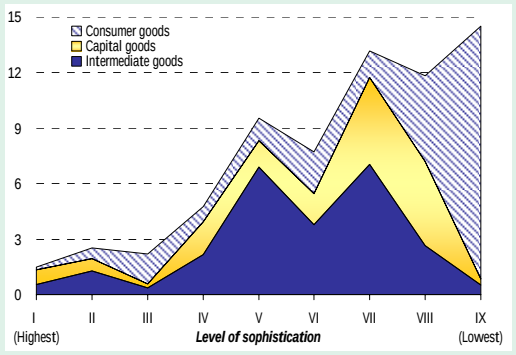
Sources: UN Comtrade database; and IMF staff calculations.

[1] Developed economies include industrial Asia, NAFTA, and EU-15.

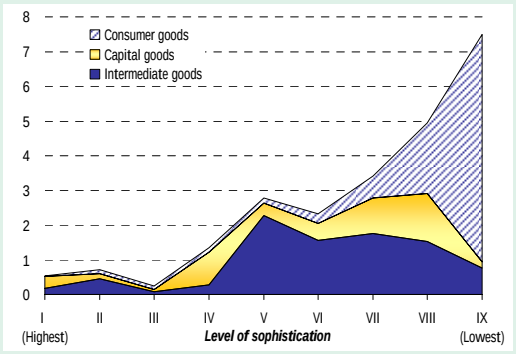
Figure 4.10. Patterns of Exports to Developed Economies[1]

(In percent of total imports in developed economies)

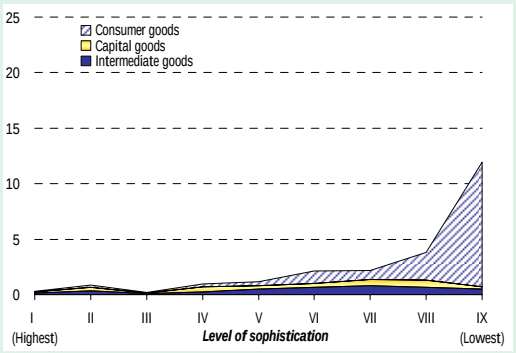
a. Share of NIEs' Exports, 1995



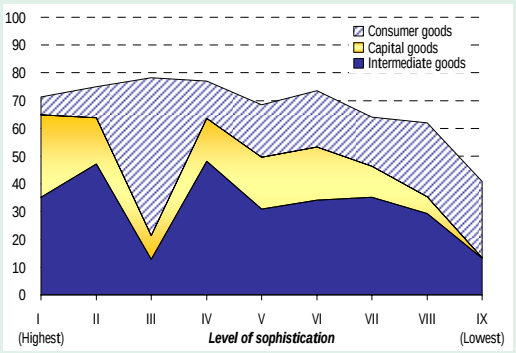
b. Share of ASEAN-5's Exports, 1995



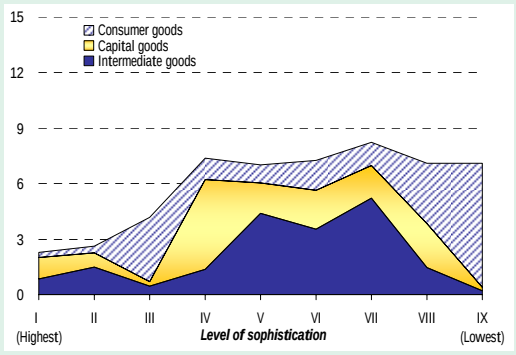
c. Share of China's Exports, 1995



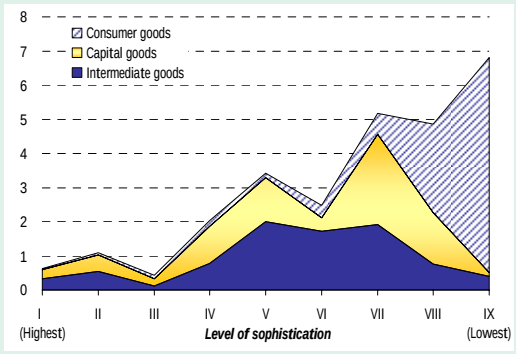
d. Share of Developed Economies' Exports, 1995[2]



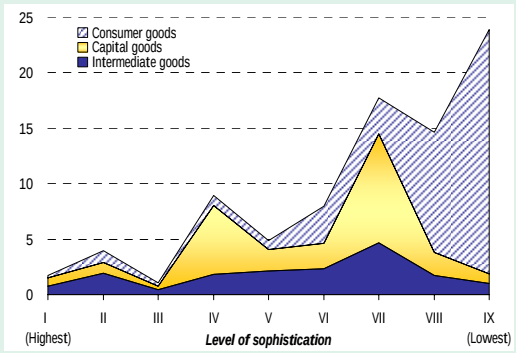
e. Share of NIEs' Exports, 2005



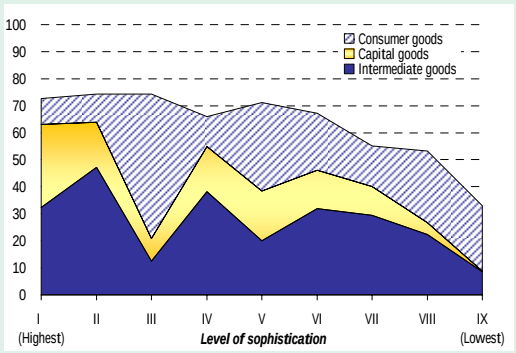
f. Share of ASEAN-5's Exports, 2005



g. Share of China's Exports, 2005



h. Share of Developed Economies' Exports, 2005[2]

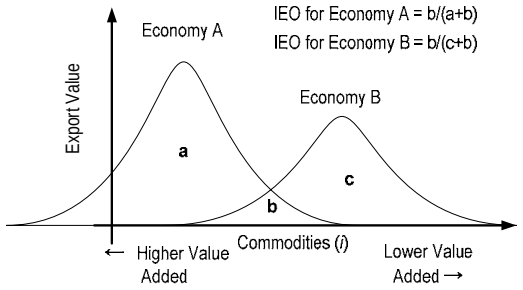


Sources: UN Comtrade database; and IMF staff calculations.

[1] Developed economies include industrial Asia, NAFTA, and EU-15.

[2] The large share of developed economies' consumer goods exports in the third category are due to automobiles.

Figure 4.11. Competition between Economy A and B: Export Overlap Measure



Sources: IMF staff calculations.

As these two indices are complementary,[45] we analyze developments in both dimensions of competition in Figure 4.12. An observation in the upper right quadrant of the chart indicates a higher similarity of export good composition and greater share of export overlap, suggesting relatively intense competition. An observation in the lower left quadrant would, on the other hand, point to regional specialization.

Generally speaking, competition among subregions in Asia is intensifying (Figure 4.12):

- For industrial Asia, competition from other subregions is becoming stronger, by both measures, although competition with latecomers in ASEAN-5 and China is still modest.
- The export composition of ASEAN-5 is quickly becoming similar to that of the NIEs, while the pace of increase in their export overlap is more gradual.
- ASEAN-5 is experiencing rising competition with all other subregions, especially China.
- From China's viewpoint, export overlap with other subregions has declined recently, while export similarity is rising, owing to the much larger volume and faster rate growth of China's exports.

While these two indices point to rising competition within Asia, they may overstate the case. First, while our data are quite detailed, it is still the case that within any product category more developed economies tend to specialize in higher-value products. Indeed, the derived unit prices of Japanese exports of a given commodity are 1.5–2.5 times higher than those of emerging Asian exports, while those of China are the lowest in the region (Figure 4.13).[46] Second, high-end exports of less developed economies, especially China, are likely to include more imported intermediate goods than exports by more advanced countries. This reinforces the notion that the export structures of Asian subregions are still primarily complementary, although we cannot disregard the possibility of increased future competition as latecomers catch up.

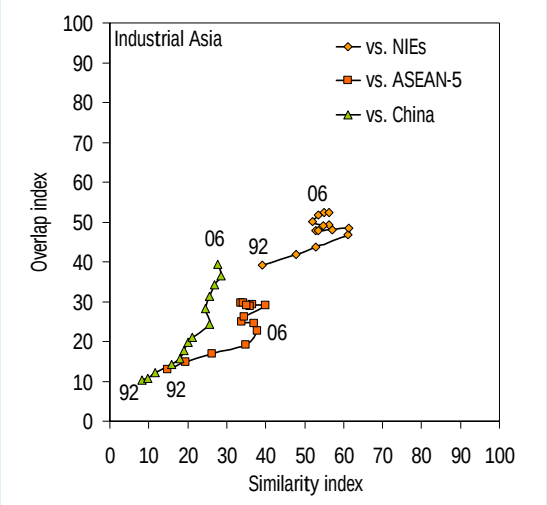
Summary and Implications

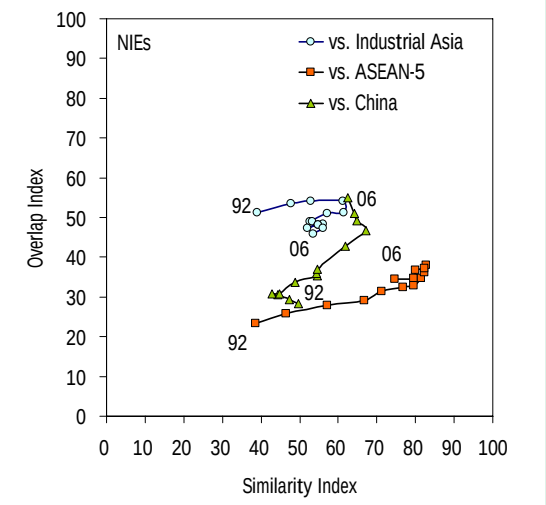
This chapter has aimed to provide a comprehensive description of the evolution of trade in emerging Asia. We confirmed that, as widely believed, trade expansion has been driven by deepening intraregional trade. This, in turn, reflects the geographical dispersion of production processes, with assembly operations migrating to low-wage countries, especially China, while high-wage economies specialize in the production of high-value components.

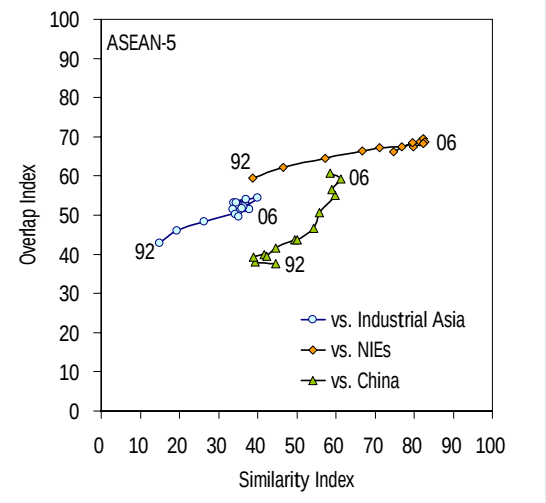
[45] While the IES captures the similarity of the comparative advantage structures of two economies, it totally omits their size effects, which sometimes matter in competition and are captured by the IEO.

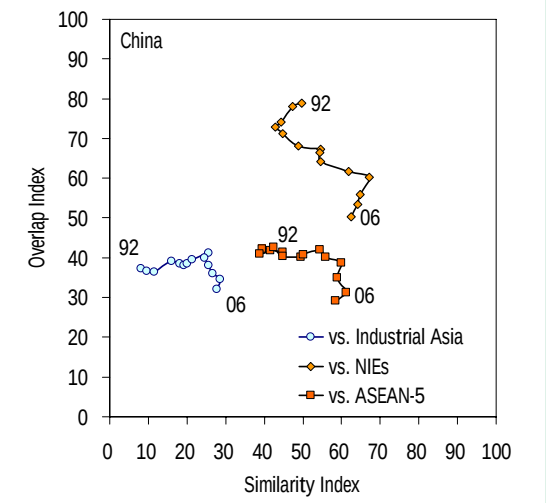
[46] The unit price of commodity *i* exports by country *j* in year *t* (*P*(*i*,*j*,*t*)) is derived as the value of country *j* exports of commodity *i* divided by its volume. We calculated the unit price relative to the ASEAN-5 price as $RP(i,j,t) = P(i,j,t) / P(i,ASEAN5,t)$ for all SITC 5-digit commodities, and took the median as a representative measure.

Figure 4.12. Two-Dimensional Charts of Competition Measures: Competition from Other Subregions in Asia





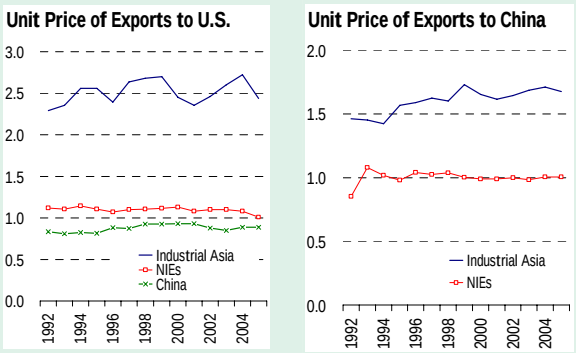




Sources: UN Comtrade database; and IMF staff calculations.

China's rapidly expanding exports, as well as its rising presence in some IT products, have given rise to the perception that it is a special case, breaching the so-called flying-geese pattern of developments in emerging Asia, and moving quickly to high-tech exports. However, our findings suggest that the expansion of vertical intra-industry trade in emerging Asia has been a relatively orderly process in which subregions (including China) largely specialize in the production of goods that broadly coincide with their level of economic development.

Figure 4.13. Comparison of Unit Prices by Exporters
(Relative to ASEAN-5's unit price)



Sources: UN Comtrade database; and IMF staff calculations.

Looking ahead, one can expect heightened competition as the latecomers catch up with more advanced countries. China is growing out of its role as a final assembler of goods, embarking on domestic production of parts and components. However, this production still centers for the most part on less sophisticated products. In that sense, the trade relationship in emerging Asia still appears largely complementary.

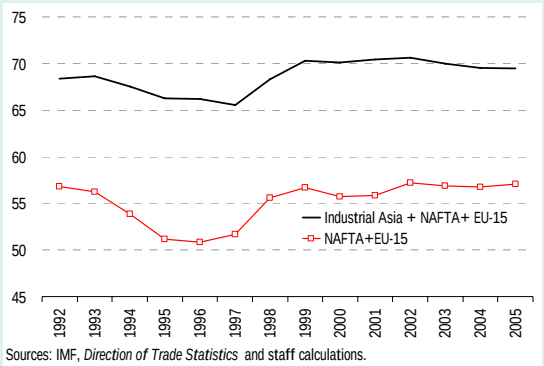
The findings above have several implications for the interdependence among economies as well as for policymakers.

- *Decoupling*. Given the increasing share of intraregional trade, it may be tempting to argue that emerging Asian business cycles will become less synchronized with those outside the region. However, the findings in this chapter suggest that this is likely not the case. Developed economies remain the main destination of final good exports by emerging Asia (Figure 4.14). Indeed, the exposure of Asian economies to inter-regional exports has actually *increased* over the past 15 years (Figure 4.15).

- *The impact of exchange rate fluctuations on Asian final good exports*. Given that the processing trade accounts for an important share of total trade, exchange rates may have only a limited impact on export prices of final goods, as these will be mitigated by a countervailing movement of import prices that represent a sizable portion of production costs.[47] However, the observed shift of trade toward higher-end products suggests that exports and imports could become more sensitive to the relative price changes over time.

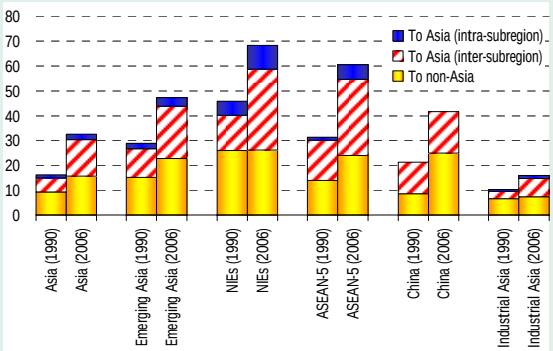
- *Policies to enhance complementarities*. Booming intraregional trade seems likely to facilitate the "catching up" process through technology transfers from more advanced economies to less advanced to latecomers. However, to ensure that this process remains a sustainable impetus to continued regional growth, these positive complementary relationships need to be maintained among subregions. In this regard, structural reforms in the leading countries to encourage smooth upgrading of their technological competitiveness, such as those in labor and financial sectors to facilitate

Figure 4.14. Developed Economies' Share of Consumer Goods Exports from Emerging Asia
(In percent)



Sources: IMF, *Direction of Trade Statistics* and staff calculations.

Figure 4.15. Breakdown of Exposure to Exports
(Total exports in percent of GDP)



Sources: IMF, *Direction of Trade Statistics* and staff calculations.

[47] This effect depends on Asian cross rates, and is strongest when only the renminbi appreciates among currencies in the supply chain countries. In that case, the prices of Chinese (intermediate good) imports will decline, implying a smaller rise in Chinese export prices in U.S. dollar terms needed to maintain profit levels. On the other hand, if all supply chain country currencies appreciate equally against the U.S. dollar, Chinese export prices will need to rise one-for-one with the dollar depreciation to maintain profit levels, with a correspondingly larger decline in exports.

the reallocation of resources along the lines of comparative advantage, are important, as is the further easing of trade and investment barriers in the region more generally.

- *Free trade arrangements*. Given the structure of the vertical intra-industry trade with final goods targeted at the developed economies (outside the region), market access to third countries, especially in Europe and North America, appears to be crucial for further trade expansion, and hence for industrial development. A successful Doha Round is obviously in the interest of the region. Additionally, well-designed bilateral free trade arrangements with the developed economies may also benefit the region as long as they complement trade liberalization on a nonpreferential basis.

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