World Economic and Financial Surveys

Regional Economic Outlook

Asia and Pacific

NOV 08

INTERNATIONAL MONETARY FUND

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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:

ABCP	Asset-backed commercial paper
AIG	American International Group
CD	Certificate of deposit
CDO	Collateralized debt obligation
CDS	Credit default swap
CLO	Collateralized loan obligation
CPI	Consumer price index
FILP	Fiscal Investment and Loan Program (Japan)
forex	Foreign exchange
FSF	Financial Stability Forum
GFSR	*Global Financial Stability Report*
GPIF	Government Pension Investment Fund (Japan)
GSE	Government-sponsored enterprise
HIBOR	Hong Kong Interbank Offered Rate
IPO	Initial public offering
LDC	Less-developed country
LIBOR	London Interbank Offered Rate
NPF	National Pension Fund (Korea)
NEER	Nominal effective exchange rate
NIE	Newly industrialized economy
NPL	Nonperforming loan
OECD	Organization for Economic Cooperation and Development
OIS	Overnight index swap
PDCF	Primary Dealer Credit Facility
P/E	Price-earnings
q/q	Quarter-on-quarter
REO	*Regional Economic Outlook*
SAAR	Seasonally adjusted at an annual rate

SIBOR	Singapore Interbank Offered Rate
SIV	Structured investment vehicle
TAF	Term Auction Facility
VAR	Vector autoregression
WEO	*World Economic Outlook*
WPI	Wholesale price index
y/y	year-on-year

The following conventions are used:

- In tables, a blank cell indicates "not applicable," 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, 2007–08 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, 2007/08) indicates a fiscal or financial year, as does the abbreviation FY (for example, FY2008).

- 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

With the global economy entering a major downturn amid a deepening financial crisis, Asia is confronting the likelihood of sharply slowing growth and increased vulnerabilities. In particular, global financial stresses and the process of deleveraging by financial institutions are expected to continue beyond next year. This will dampen economic prospects in the region via a number of potential channels, notably lower demand for Asia's exports, tighter funding conditions, more volatile capital flows, depressed equity prices and confidence, and deteriorating loan quality.

As outlined in Chapter 1, our baseline scenario sees growth in Asia slowing substantially before beginning a recovery in late 2009. With the global slowdown dampening exports, growth in Asia is projected to come primarily from domestic demand, which is nonetheless expected to slow. With commodity prices easing and growth declining below potential, inflation should decline. In fact, there are signs that headline inflation—and to a lesser extent, core inflation—have already peaked.

Risks to the outlook are considerable and tilted firmly to the downside. A severe global recession, combined with a deeper-than-expected credit squeeze, would have significant spillovers to the region, through both exports—Asia's trade integration with the rest of the world has increased over the last decade—and a range of financial channels. In particular, it remains unclear how domestic demand would stand up to a sharp decline in export growth and tighter financial conditions.

In this volatile economic environment, policymakers in Asia need to be ready to react decisively to maintain financial stability and support growth:

- Policies to safeguard financial systems and maintain orderly credit conditions will be key. While the precise measures will vary across countries, efforts should include strengthening of crisis management systems and contingency planning, enhancing oversight of banks' liquidity management, and improving risk management to address the likely rise in nonperforming loans. Temporary credit guarantees may be necessary to ensure the normal flow of credit, and authorities have to stand ready to recapitalize banking systems if needed.

- In most Asian countries—where domestic demand is easing, financial conditions have tightened, and second-round price effects are modest—monetary easing would be appropriate. But with inflation still above targets or comfort levels in many of these countries, effective communication by central banks will be key to ensuring that inflation expectations remain well anchored. Beyond considerations of inflation, monetary policy will have to ensure sufficient provision of liquidity for orderly market functioning.

- Many countries would appear to have room for additional fiscal stimulus, which may prove necessary in particular should the current financial environment limit the effectiveness of monetary policy. Some countries have in fact already announced fiscal stimulus packages, in some cases sizable ones.

While attention now is rightly focused on near-term risks, longer-term issues will inevitably return to the fore when the worst of the crisis has passed. In this context, Chapter 2 examines the rising contribution of commodity prices in Asia's inflationary process and its potential implications for monetary policy. In the near term, sharply falling commodity prices may exert deflationary pressures on Asia. At the same time, commodity prices are tentatively expected to return to a high and volatile medium-term equilibrium, the result of underlying imbalances in commodity markets. Such gyrations in commodity prices may exacerbate already high inflation volatility, entrench wedges–– both positive and negative––between core and headline inflation, and worsen output/inflation volatility trade-offs faced by central banks. Such an environment will require a careful consideration of policy frameworks and place a premium on effective central bank communication.

Looking further ahead, a number of countries in the region are set to age dramatically over the next 50 years, and for some the process has already begun. As discussed in Chapter 3, vastly differential rates of aging across Asia and globally can have potentially large effects on current accounts and capital flows—with capital tending to flow "uphill" from younger to older countries— as well as on financial markets and asset prices. Despite the longer-term nature of the challenge, governments can ease the potentially costly transition by beginning to take steps now. For aging countries this may involve an emphasis on pension and labor force reform, while for younger countries requiring substantial capital, enhancing financial intermediation and boosting productivity will take center stage.

I. Overview

Implications of the Global Financial Crisis for Asia's Outlook

The global economy is projected to enter a major downturn amid a significant and deepening financial crisis. The credit turmoil that began in advanced countries has spread to emerging and developing economies, raising concerns over a synchronized slowdown and a global credit squeeze. Extraordinary policy actions globally have helped to shore up confidence, but financial markets are likely to remain under considerable stress as the process of deleveraging continues for some time and growth slows markedly. Aggressive policy easing, some stabilization in the U.S. housing market next year, and lower commodity prices should lay the groundwork for a recovery to take hold in late 2009. However, the pace of the recovery is likely to be very gradual given the considerable financial constraints on activity. Moreover, there is great uncertainty about the duration and depth of the expected downturn. Against this backdrop, growth in Asia is expected to slow substantially along with that in the rest of the world, as exports weaken and spillovers from the global financial turmoil weigh on domestic activity. The risks to the outlook are significant and firmly tilted to the downside, stemming mainly from a deeper and more-protracted global slowdown and tighter financial conditions from continued deleveraging. With commodity prices projected to ease, inflation should subside, providing room for policies to support growth and stabilize financial conditions.

The Deepening Global Financial Crisis

The turmoil in financial markets intensified in September 2008 following the bankruptcy of Lehman Brothers and other institutions and the extension of emergency credit lines to American International Group (AIG), as market participants lost confidence that the case-by-case approach to defaults adopted so far would prove effective in the

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Note: The main authors of this chapter are Kenneth Kang, Romuald Semblat, Olaf Unteroberdoerster, and Harm Zebregs. Xiangming Fang provided research assistance.

face of mounting systemic risks. Money markets, interbank markets, and markets for short-term commercial paper in the United States and Europe largely froze, as reflected, inter alia, in bank credit default swap (CDS) and corporate bond spreads, which rose to unprecedented levels (Figures 1.1 and 1.2).

Figure 1.1. Bank CDS Spreads
(5-year, in basis points)

Source: Datastream.
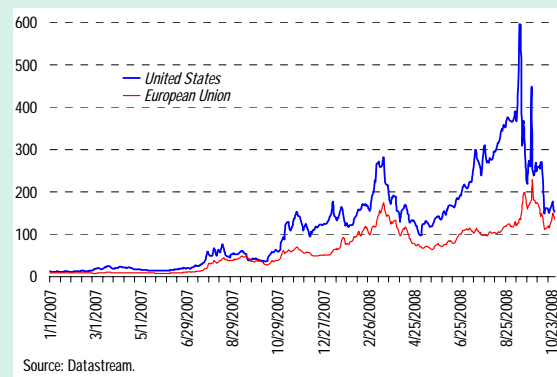
Figure 1.2. U.S. Corporate Bond Spreads
(10-year AAA-rated, in basis points)

Source: Bloomberg LP.
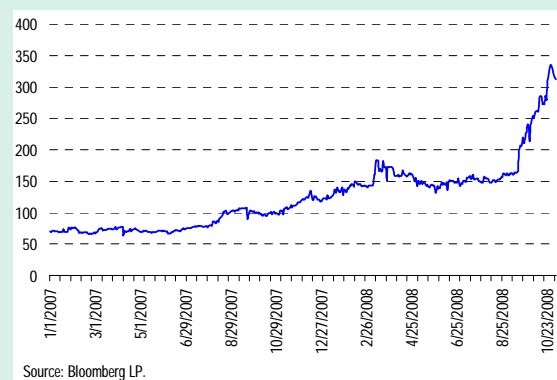
As the turmoil intensified, financial institutions accelerated their process of deleveraging, which, together with deepening fears that the crisis was spreading into the real economy, led to a sharp sell-off in global equity markets and the largest-ever spike in measured equity volatility. At the same time, dollar liquidity dried up as financial institutions

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around the world refused to lend to each other (Figure 1.3), with banks heavily dependent on wholesale funding particularly affected.

The deepening crisis led countries to take decisive policy actions, including the public recapitalization of financial institutions and extension of deposit guarantees. Central banks also introduced new facilities to inject liquidity into financial institutions or in some cases directly into money markets or commercial paper markets, resulting in a large expansion of their balance sheets (Figure 1.4). As a result of all these initiatives, liquidity strains in the main financial centers have eased, as seen in substantial drops in money market spreads (Figure 1.5).

The modest easing in financial conditions seen in recent days will not, however, prevent the major

slowdown in real economic activity already underway in the industrial countries. High-frequency data such as those for industrial production growth are now in negative territory (Figure 1.6), and forward-looking indicators signal more pain ahead.

Figure 1.5. Money Market Spreads
(3-month LIBOR minus government bond yields, in percent)

Sources: Bloomberg LP; and Datastream.

Figure 1.3. Cross-Currency Basis Swaps with U.S. Dollar
(1-year tenors, in basis points)

Source: Bloomberg LP.
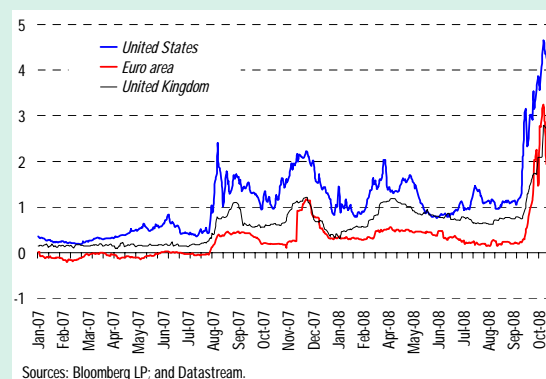
Figure 1.6. Industrial Production
(Year-on-year percent change)

Source: Haver Analytics.
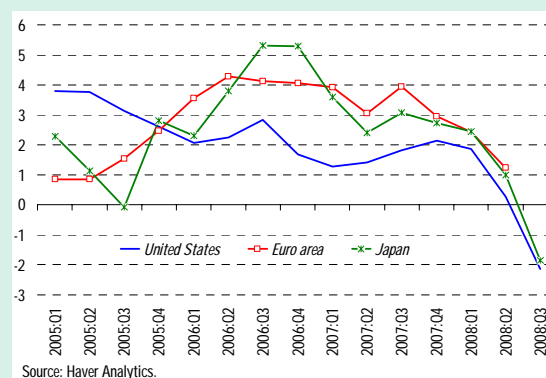
Figure 1.4. Total Assets on U.S. Federal Reserve's Balance Sheet
(In billions of U.S. dollars)

Source: U.S. Federal Reserve.
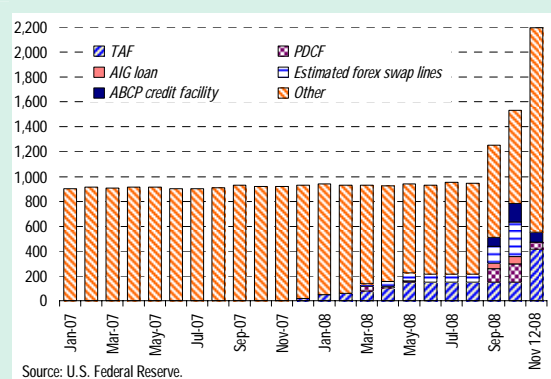
With the crisis intensifying in industrial countries, strains have spread to emerging markets. These markets, which for a while had seemed relatively insulated from the crisis, are now reeling as investors fly to safety in a context of deep uncertainty about global growth prospects. Equity markets in emerging countries have fallen substantially more than those in industrial countries, some 50 percent from 2007 peaks (Figure 1.7). At the same time, emerging markets' sovereign spreads have increased dramatically in response to heightened anxiety about their ability to meet their debt obligations (Figure 1.8).

Figure 1.7. MSCI Equity Markets
(January 1, 2007=100)

Source: Bloomberg LP.
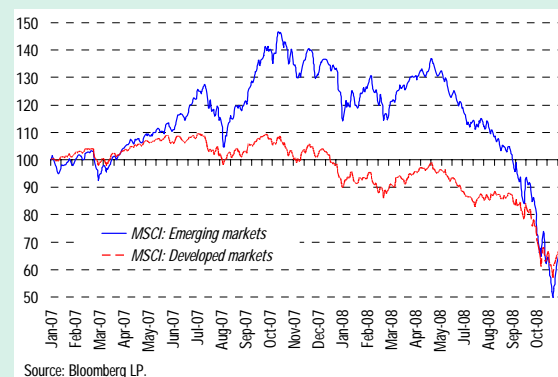
Figure 1.8. Emerging Market CDS Spreads
(5-year sovereign spread, in basis points)

Source: Bloomberg LP.
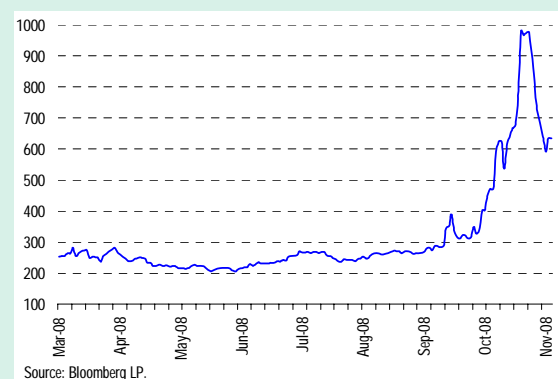
Key Risks to Asia from the Deepening Global Financial Crisis

Compared to other regions, Asia would have appeared a priori better placed to weather the storm with its substantial cushion in official reserves, improved macro policy frameworks, and generally robust corporate balance sheets and banking systems. Nevertheless, Asia is being rattled by the crisis as a result of its close trade and financial integration with the rest of the world, and any hope that the region would escape the crisis unscathed has by now evaporated. Looking ahead, the key financial risks for Asia stem from volatile capital flows, tighter external financing, and disruptive spillovers to domestic markets, which could lead to a sharp credit squeeze and slower growth.

The Global Turmoil Has Led to Significant Equity Declines

Asian equity markets have been hit hard this year by the global turmoil. Contrary to 2007, when Asian equity markets were the top performers, share prices this year have fallen sharply, as the growth outlook for the region has weakened. The MSCI emerging market Asia index has declined in line with other regions, falling by 49.6 percent from end-2007 to October 2008, compared to 34.1 percent for the United States, 58.5 percent for emerging Europe, and 41.3 percent for emerging Latin America. The equity declines have been led by heavy net selling, primarily by foreigners, but in some cases, such as in China, also by local residents (Figure 1A.1). From August 2007 through October 2008, net equity outflows amounted to US$160 billion, while Asia-focused hedge funds were the worst performers worldwide, with their returns consistently below those of other emerging market funds. With redemption pressures rising, the loss of several key prime brokers, and the recent bans on equity short selling (including in Australia, Korea, and Taiwan Province of China), hedge funds, including those in emerging Asia, remain under intense pressure to deleverage and reduce positions.

External Financing Is Likely to Remain Tight

With the rise in global risk aversion, external financing conditions have tightened substantially. Since June, CDS spreads for Asian sovereign, corporate, and financial borrowers have widened in line with global trends. For a number of countries, basis spreads for cross-currency swaps have also increased, reflecting both increased counterparty risk and heavy demand for U.S. dollar liquidity (Box 1.1). The cost of wholesale financing, particularly on external debt, has risen significantly. This has affected all countries that have made use of such funding (notably Australia, Korea, and New Zealand). With U.S. dollar and euro bond markets affected by the global credit squeeze, corporates in Asia have increasingly turned for alternative financing to the samurai bond markets in Japan, as well as the Malaysian ringgit market, but these markets have also dried up with the distress

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Box 1.1. The Widening of Basis Spreads in Asia

Cross-currency basis swap spreads ("basis spreads") have widened for a number of Asian currencies, reflecting market stress over and beyond the volatility signaled by spot exchange rates. Basis spreads provide a useful indication of market funding pressures, and the recent negative shift suggests greater difficulties in obtaining U.S. dollar funding in the midst of the global credit crisis.

What Are Basis Spreads?

Basis spreads measure the deviation between the market interest rate and the interest rate implied by spot and forward exchange rates. For example, if one-year interest rates in the United States and Japan are 4 percent and 1 percent, respectively, the spot exchange rate is ¥103 to the dollar, and the one-year forward exchange rate is ¥100 to the dollar, then the basis spread is zero. The 3 percent interest rate advantage for the U.S. dollar matches the expected 3 percent appreciation of the yen, and the Japanese market interest rate is equivalent to that implied by the forward and spot rates.[1] In practice, however, the forward exchange rate is likely to entail a nonzero basis spread and would then represent riskless profit that would be available to an arbitrageur with no transactions costs and full access to all interbank markets.

Basis spreads can also be calculated from cross-currency swaps, where parties exchange regular interest payments in two different currencies using the London Interbank Offered Rate (LIBOR) or a similar interbank benchmark rate. In a cross-currency swap, as opposed to a currency forward, the basis spread is generally quoted directly. In a basis swap—defined as a cross-currency swap in which the interest rates on both sides of the swap are floating and therefore not known in advance—the basis spread is quoted with respect to interbank rates as, for example, a five-year swap of floating yen against floating dollars at three-month yen LIBOR minus 30 basis points (the basis spread).[2] Cross-currency swaps are often used to borrow foreign currency, but the swaps themselves are not an original source of funding. For example, if a Korean firm wishes to obtain dollar funding using cross-currency swaps, it must first borrow in local currency, such as through the repo market, and then swap the proceeds into U.S. dollars. Although data are limited (as cross-currency swaps are traded mainly over the counter), cross-currency swap markets have emerged as important funding and/or hedging channels for both domestic and foreign players in Asia.

Example of a Cross-Currency Swap

	Bank A		Bank B
Initial period	$ principal	⇄	¥ principal
Intermediate periods	¥ floating rate payment @ ¥ LIBOR + basis spread	⇄	$ floating rate payment @ $ LIBOR
Final period	¥ principal + floating rate payment + basis spread	→	$ principal + floating rate payment
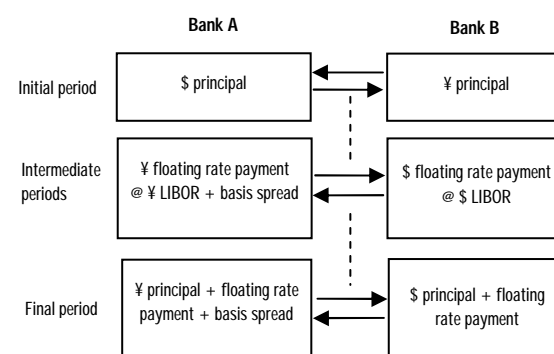
Note: Initial exchange of principal is made at the prevailing spot rate.

Why Do Basis Spreads Arise?

Nonzero basis spreads—representing a departure from a fundamental arbitrage condition—can arise for a number of reasons:

- Arbitrage constraints. The persistence of large spreads could indicate constraints on the free movement of capital. In the absence of capital account impediments, as with global currencies such as the euro or the yen, basis spreads

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Note: The main author of this box is Chris Walker.

[1] This is equivalent to covered interest parity, that is, $(1 + i) = (1 + i^*)(S/F)$, where i is the U.S. dollar interest rate, i^* is the local currency interest rate, S is the spot exchange rate in units of local currency to the dollar, and F is the forward rate. The basis spread can be thought of as the measured deviation from covered interest rate parity.

[2] In other words, Bank B lends yen at 30 basis points below yen LIBOR to Bank A, and Bank A lends dollars at the current dollar LIBOR rate to Bank B.

rarely exceed 50 basis points. Basis spreads could thus be an indicator of currency pressures that are not being reflected in the spot market on account of capital account restrictions.

- Funding pressures. Just as basis spreads may signal demand for one currency, they may also reflect the difficulty of borrowing in the other currency in the swap or forward markets (i.e., relative shortage). Market volatility can also play a role in the widening of basis spreads.

- Counterparty risk. Concerns over the creditworthiness of a borrower would give rise to a risk premium in the basis spread. For example, during the banking crisis of the late 1990s, Japanese banks, with their lower credit rating relative to overseas banks, faced a premium in borrowing in foreign currency using cross-currency swaps.

- Foreign exchange intervention. Market intervention by a central bank can influence basis spreads, depending not only on whether the bank is buying or selling reserves, but also on whether the intervention is in the spot or forward market.

Basis Spreads in Asia Have Widened

In Korea, basis spreads have long been negative, mainly as a result of strong demand to hedge into domestic currency. Exporters, particularly shipbuilders, have sold U.S. dollars forward to domestic banks to hedge their long-term contracts. The banks in turn have hedged their exposure by borrowing U.S. dollars and exchanging them for won in the spot market. Since July 2007, Korean basis spreads have fluctuated widely (to as much as minus 400 basis points) during periods of financial stress when the onshore availability of U.S. dollars has dried up (consistent with the close correlation between Korean basis spreads and sovereign CDS spreads). Also, recent intervention through the foreign exchange swap markets may have widened the basis spread by driving up the forward rates relative to the spot rate.

Basis spreads in India have also widened amid greater volatility. Basis spreads in India have tended to persist, partly because of capital account controls that make cross-border arbitrage difficult. In early 2008, basis spreads widened to as much as minus 400 basis points as a result of an onshore shortage of U.S. dollars prompted in part by the earlier tightening of restrictions on external borrowing by Indian firms. Following a loosening of this restriction in May 2008, basis spreads narrowed but have remained negative, signaling continued U.S. dollar funding pressures.

In Japan, the widening of basis spreads reflects both U.S. dollar funding pressures and concerns over counterparty risk. Historically, yen–U.S. dollar basis spreads have been quite tight, reflecting the openness of Japan's capital account. However, in October, one-year basis spreads widened to as much as minus 70 basis points, reflecting both growing U.S. dollar funding pressures onshore and Japanese banks' concerns over the creditworthiness of foreign banks using swaps as a source of U.S. dollar funding. In April 2008, after the collapse of Bear Stearns, basis spreads for longer-maturity yen-dollar swaps, such as for 10 years, swung in the opposite direction, turning sharply *positive*, by as

Cross-Currency Basis Spreads[1]
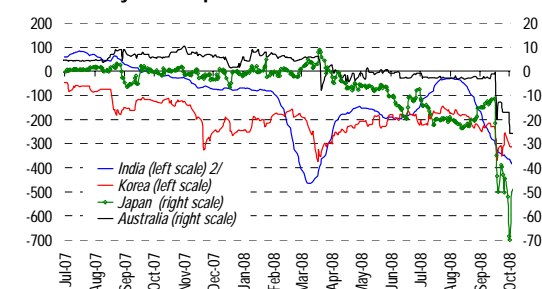
Sources: Bloomberg LP; and IMF staff calculations.
[1] Japan, Australia, and Korea are priced from 1-year basis swaps; India is priced from 3-month currency forwards.
[2] Indian basis spreads are computed from 20-day moving average.

much as 50 basis points, as foreign banks scrambled to repay yen obligations through the swap market as the exchange rate surged to a 13-year high of ¥96/U.S. dollar. This development stood in contrast to the "Japan premium" of the late 1990s and early 2000s, when Japanese banks had to pay a premium on their U.S. dollar borrowing from foreign banks on account of Japan's lower credit rating.

among major global banks that serve as key underwriters.

Emerging Asia private external financing (bond, equity, and loan issuance) has fallen steadily this year, reaching only US$137 billion through the third quarter of 2008, compared to US$211 billion over the same period last year (Figure 1.9). In addition, the domestic initial public offering (IPO) market, such as that in Hong Kong SAR, has collapsed (Figure 1.10). As funding has become more difficult, Asian corporations have delayed new bond issuances, refinanced at short maturities, or turned to local banks. If current trends continue, corporations are likely to face greater scrutiny of their ability to refinance their obligations, particularly during 2010–2012, when more than half of corporate bonds are estimated to fall due (Figure 1.11). Countries with sizable short-term external debt will also face greater difficulties in refinancing.

Capital Flows Are Likely to Remain Volatile

Portfolio outflows this year have significantly weakened currencies in some countries. In general, countries with projected current account deficits for 2008 have experienced much larger depreciations in nominal effective terms (Australia, India, Korea, New Zealand, and Vietnam), while surplus countries, like China, Japan, and Singapore, have seen their currencies gain (Figure 1.12). Several countries in the region have experienced substantial reserve losses as they have intervened in the markets to support their currencies in the face of capital outflows (Table 1.1).[1] Amid increased volatility, yen carry trades have also declined.

In this environment, capital flows are expected to remain volatile, driven both by changes in global risk aversion and by the growth outlook. Given Asia's close financial integration and high foreign participation in local markets, a further deterioration in global sentiment could trigger further capital outflows and weaken currencies across the region.

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[1] See "Sterilized Intervention in Emerging Asia: Is It Effective?" *Regional Economic Outlook: Asia and Pacific,* October 2007.

Figure 1.9. Asian External Financing: Bond, Equity, and Loan
(In billions of U.S. dollars)

Sources: IMF, Bond, Equities, and Loans database; and Dealogic.
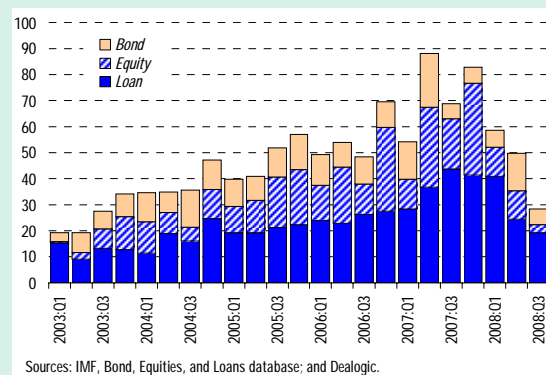
Figure 1.10. Hong Kong SAR: Stock Market IPO
(In billions of Hong Kong dollars)

Source: Hong Kong SAR Securities and Futures Commission.
[1] Shares of companies incorporated in mainland China that are traded on the Hong Kong Stock Exchange.
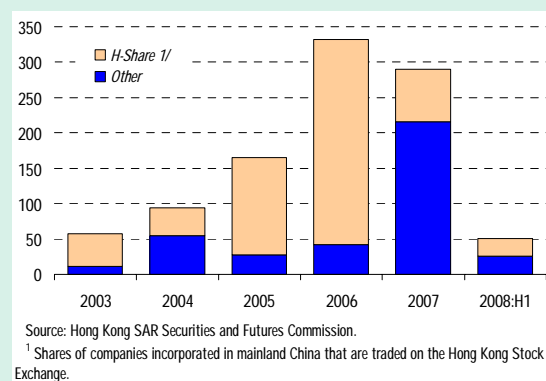
Figure 1.11. Emerging Asia: Amount of Maturing Corporate Debt, 2008—2018
(In billions of U.S. dollars)

Source: Morgan Stanley.
Note: Includes bonds and loans.

Figure 1.12. Current Account Projections versus Change in Nominal Effective Exchange Rate (NEER), 2008
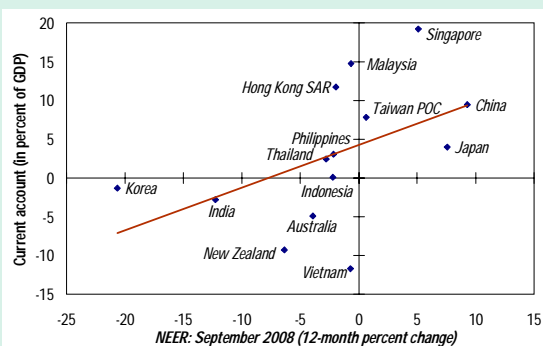
Sources: CEIC Data Company Ltd; and IMF, WEO database.

Table 1.1. Asia: Official Reserves
(In billions of U.S. dollars, end-period)

	2006	2007	2008 October[1]
Industrial Asia	**964**	**1,018**	**1,021**
Japan	895	973	978
Australia	55	27	29
New Zealand	14	17	15
Emerging Asia	**2,477**	**3,259**	**3,628**
NIEs	*775*	*848*	*813*
Hong Kong SAR	133	153	161
Korea	239	262	212
Singapore	136	163	162
Taiwan POC	266	270	278
China	1,073	1,534	1,912
India	177	275	258
ASEAN-5	*226*	*301*	*322*
Indonesia	43	57	51
Malaysia	82	101	110
Philippines	23	34	36
Thailand	67	87	102
Vietnam	11	21	24
Emerging Asia excl. China	**1,405**	**1,725**	**1,716**
Emerging Asia excl. China and India	**1,228**	**1,450**	**1,457**
Asia	**3,442**	**4,277**	**4,649**

Source: CEIC Data Company Ltd.

[1] October data except for the following countries, for which data end in September: Australia, China, Hong Kong SAR, New Zealand, and Vietnam.

Domestic Credit Markets Have Come Under Pressure

In financial centers (Hong Kong SAR, Singapore, Tokyo), interbank spreads over comparable government yields ("TED spreads") have risen (though they remain below those in Europe and the United States), reflecting concerns regarding counterparty risk as well as a flight to quality. Asian banks remain wary of lending to European and U.S. financial institutions, resulting in price tiering and liquidity shortages in some market segments. The

global shortage of U.S. dollar liquidity is also spilling over to affect local currency markets, such as those for swaps and repos, leading to some market dysfunction and higher domestic funding rates. At the same time, the introduction of deposit guarantees in advanced economies may also have squeezed Asian credit markets, by accelerating the flight to safety.

Concerns over Asian banks' exposures to highly leveraged overseas institutions have affected market confidence. A few banks in Asia experienced brief runs on deposits triggered by rumors over exposures to impaired overseas assets and other credit losses. With the exception perhaps of those in Japan, Asian financial institutions overall have limited exposure to overseas structured products, including U.S. subprime mortgages and monoline insurers.[2] Although Asia is a major holder of U.S. government-sponsored enterprise (GSE) debt (US$794 billion as of June 2008, or 61 percent of non-U.S. exposure), most GSE debt is held as official reserves, with commercial banks holding only limited amounts. Japanese banks had the largest exposures to Lehman Brothers (US$4.2 billion) within the region, but the size of these banks' exposures was very small compared to their overall assets. Financial institutions in China, Japan, Korea, Taiwan Province of China, and Singapore have reported losses on their overseas securities portfolios, but these losses have so far been well within their capital and operating earnings.[3]

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[2] According to the Japan Financial Services Agency, as of June 2008, Japanese deposit-taking institutions are estimated to hold around US$135 billion in overseas securitized products (28 percent of tier 1 capital), of which only US$9 billion are subprime, and the rest in the form of various collateralized loan and debt instruments and leveraged loans. According to the Korea Financial Supervisory Service, Korean bank investments in mortgage-related securities—mortgage-backed securities and collateralized debt obligations—are estimated at about US$70 million, while exposure to Fannie Mae and Freddie Mac bonds is estimated at about US$120 million.

[3] See the October 2008 *Global Financial Stability Report* for a geographic breakdown of the $760 billion in reported write-downs globally through September 2008.

Policymakers in the region have responded with a range of measures to stabilize financial conditions. For example, in addition to providing exceptional short-term liquidity, the Hong Kong Monetary Authority has taken steps to broaden the range of collateral and increase the attractiveness and maturity of its liquidity support. In India, the Reserve Bank has cut banks' cash reserve ratio requirement to relieve pressures in the interbank market. Central banks in India and Korea have also tapped their official reserves to supply U.S. dollar liquidity through local foreign exchange swap markets, and several countries have been assisted by swap arrangements with the U.S. Federal Reserve. Australia and New Zealand have announced guarantees of bank deposits and have also covered wholesale bank funding in international markets, while Hong Kong SAR, Indonesia, Korea, Malaysia, and Singapore have also raised guarantees or implemented a full guarantee on bank liabilities (Table 1.2).

Despite the global turmoil, conventional bank lending has so far held up, as corporates have shifted away from market financing towards domestic bank credit. Private credit growth has declined across the region but still remains robust, except in Vietnam, where credit expansion has decelerated sharply in part because of policy tightening. However, in some countries, pressures are being felt in local funding markets, such as for commercial paper and low-rated bonds, where spreads have widened. The cash market for domestic structured products also remains effectively shut down as investors continue to turn away from securitized instruments. Most worrisome for a region highly dependent on external trade, trade financing may be drying up. For instance, data from Swift, the global payments platform, indicate that the number of letters of credit in Singapore dropped by 30 percent between January and September 2008.

Looking ahead, global financial conditions are expected to tighten further, forcing corporates and households to rely more heavily on local markets and domestic banks for their funding. Therefore, there is heavy reliance on the health and soundness

Table 1.2. Asia: Selected Intervention Measures on Deposit Insurance and Debt Guarantees

	Measure
Australia	The government will guarantee total deposit balances up to a limit of $A 1 million per customer per institution held in Australian banks, building societies and credit unions, and Australian subsidiaries of foreign owned banks, for three years at no charge. The guarantee covers all types of deposits, regardless of the account through which the deposit is made, both retail and wholesale, held by any type of legal entity, and denominated in any currency.
	The government will guarantee, for a fee, eligible wholesale borrowing and deposits above the $A 1 million threshold (new and existing term issuance of up to five years) of Australian-owned banks, Australian subsidiaries of foreign-owned banks, building societies, and credit unions. This is a temporary measure, to be withdrawn when markets normalize. Foreign bank branches are also able to apply for coverage for their domestic deposits and wholesale funding, subject to additional conditions, including a limit on the amount that can be guaranteed and that the $A 1 million fee-free threshold does not apply to their domestic deposits.
Hong Kong SAR	The government will guarantee all customer deposits until 2010.
Indonesia	The government has increased the amount of guaranteed deposits to rupiah 2 billion from rupiah 100 million, while at the same time raising the maximum rupiah guaranteed deposit rate by 75 basis points to 10 percent.
Korea	The government will guarantee domestic banks' external debt incurred between October 20, 2008, and mid-2009 for three years, up to a total of $100 billion. Deposit insurance has been extended to foreign currency deposits. Credit guarantees for small and medium-sized enterprises have been increased.
Malaysia	All local and foreign currency deposits with commercial, Islamic, and investment banks and deposit-taking development financial institutions regulated by Bank Negara will be fully guaranteed by the government until December 2010. The guarantee covers all domestic and locally incorporated foreign banking institutions, and in the event of spillovers from external developments, would be extended to interbank obligations.
New Zealand	All retail deposits in banks and nonbank deposit takers are now covered up to $NZ 1 million per depositor per guaranteed institution for two years. There is a fee for the guarantee which depends on the credit rating of the institution. Nonresident deposits in New Zealand branches of overseas banks and subordinated debt of building societies and credit unions are also covered. Collective investment schemes that invest in government debt or government-guaranteed institutions are also covered subject to conditions. The country has also introduced a guarantee on wholesale funding for financial institutions with investment grade credit rating (BBB– or better). For branches of foreign banks, only issuance in New Zealand dollars is covered. The wholesale guarantee facility will operate on an opt-in basis, by institution and by instrument. A guarantee fee will be charged for each issue, differentiated by the riskiness of the issuer and the term of the security being guaranteed, up to the maturity of the issue or for up to five years, whichever is earlier. Locally incorporated registered banks will be required to maintain an additional 2 percent tier 1 capital buffer, above the 4 percent regulatory minimum.
Singapore	All Singapore dollar and foreign currency deposits of individual and nonbank customers in banks, finance companies, and merchant banks licensed by the Monetary Authority of Singapore will be guaranteed through December 31, 2010. The government guarantee will also be extended to deposits placed with credit cooperatives registered with the Registry of Cooperative Societies. The guarantee will be backed by S$150 billion in reserves of the Singapore government.
Taiwan POC	The government will provide a temporary unlimited insurance guarantee on all bank deposits and interbank lending.
Thailand	The cabinet has approved an extension of the existing blanket guarantee on all domestic deposits of local and foreign financial institutions until August 2011. The guarantee has been in effect since the 1997 crisis.

Sources: National authorities.

of the domestic banking core to provide this function. Despite banks' relatively sound capital positions, the economic slowdown will likely raise credit costs for banks and could scale back lending growth. Corporate default rates appear to be rising in countries where domestic demand has weakened (Figure 1.13), pointing to higher levels of nonperforming loans (NPLs) ahead, while cooling housing markets in some countries could affect bank asset quality. All in all, a major deterioration in regional banking conditions is not expected, but the combination of a protracted period of global financial stress and rising domestic defaults is a clear downside risk and could cause economic growth to decelerate more rapidly than expected.

Figure 1.13. Japan: Number of Corporate Bankruptcies
(3-month moving average)

Source: CEIC Data Company Ltd.
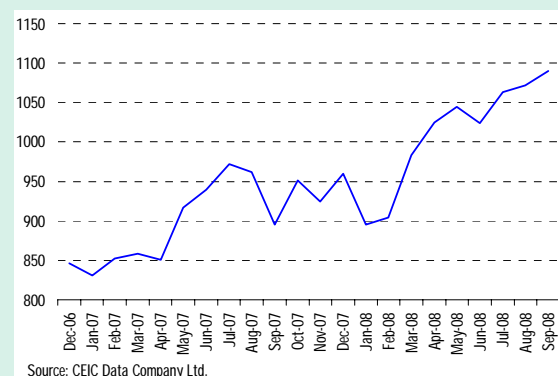
Local Banks Have Gained Market Share, Including Overseas

The global credit turmoil has also provided opportunities for Asian financial institutions to expand their overseas investment and business. With their relatively strong capital positions, Asian financial institutions have actively participated in capital increases by their European and U.S. counterparts. Since mid-2007, total capital injections from Asia have reached almost US$57 billion, representing nearly 15 percent of the total capital raised by European and U.S. institutions. Asian sovereign wealth funds, especially from China and Singapore, initially led the way, but more recently they have been joined by large Japanese banks and securities firms.

At the same time, Asian banks have gained market share in the global credit markets as European and U.S. banks have pulled back. In particular, Japanese banks have expanded their overseas lending (growing more than 20 percent year on year), mainly in the form of syndicated loans (Figure 1.14). Looking ahead, the capacity of Asian banks to expand their overseas lending will depend in part on their capital positions and ability to access international financing and/or hedge their foreign exchange exposure.

Figure 1.14. Overseas Lending by Japanese Banks
(Year-on-year percent change)

Source: Bank for International Settlements.
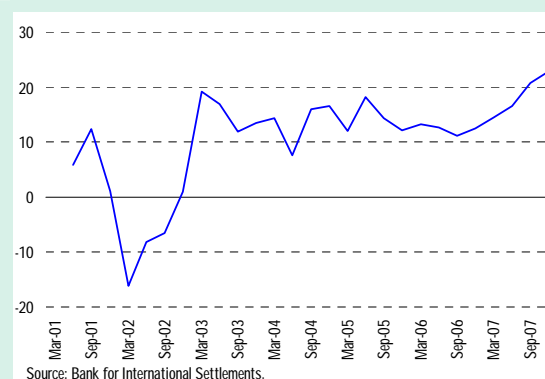
2009 Baseline Forecast: Continued Slowdown in the Face of a Global Financial Shock

In addition to our assumptions concerning the financial markets, our baseline scenario for Asia rests on a couple of assumptions regarding the global economy and commodity prices:

- According to revised forecasts released by the IMF in November, global growth is expected to slow sharply to its lowest pace since the 2001 recession. Global growth is projected to decline from 3.8 percent in 2008 to 2.2 percent in 2009, with industrial economies contracting next year (Figure 1.15). Growth in emerging and developing economies is also projected to decelerate and remain below trend. A recovery is expected to take hold in late 2009 but is likely to be very gradual by past standards on account of the significant financial strains.

- Despite recent declines, oil prices are expected to stabilize at relatively high levels as the underlying fundamentals of tight supply and robust demand, particularly from emerging economies, have not changed significantly. Oil options markets indicate a great deal of uncertainty surrounding future prices but on balance point to some increase from current values in 2009 and beyond (Figure 1.16). Food and other primary commodity prices have, like oil prices, come down significantly.

Figure 1.15. World Real GDP Growth
(Year-on-year percent change)

Source: IMF, WEO database.

Figure 1.16. Brent Crude Oil Prices
(From futures options on November 4, 2008; in U.S. dollars per barrel)

Sources: Bloomberg LP; and IMF staff calculations.
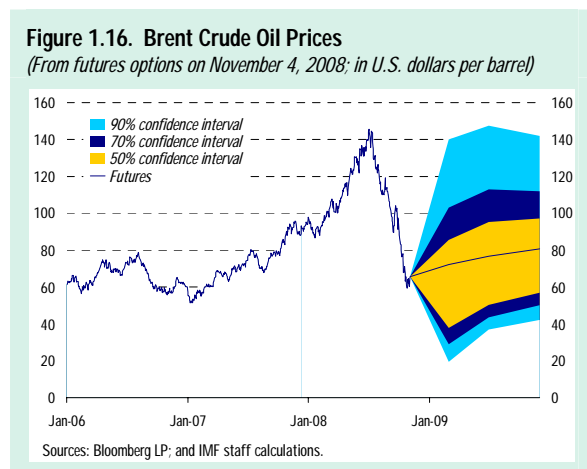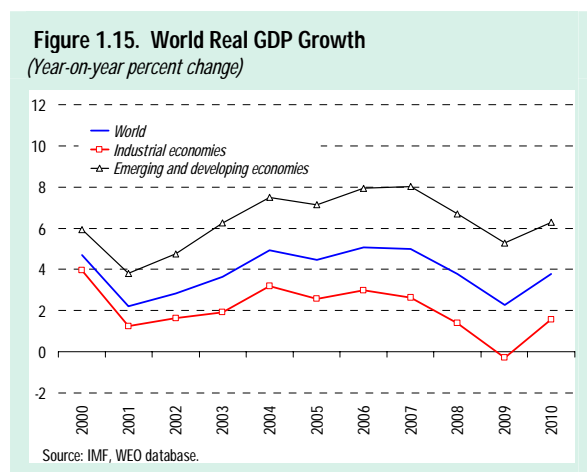
Against this backdrop, our revised baseline forecast sees growth in Asia slowing sharply along with the global economy. On an annual average basis, growth in Asia is projected to slow from 7.6 percent in 2007 to 6.0 percent this year and 4.9 percent in 2009. The likely profile of the slowdown and consequent recovery can be seen more clearly by examining growth on a quarterly

basis, which decelerates (and is below potential for many countries) through much of 2009 before gradually picking up in the second half of the year (Figure 1.17). The recovery is expected to be somewhat faster for the newly industrialized economies (NIEs)—where the slowdown is sharpest—while shallower for China, India, and industrial Asia. The uncertainties about the outlook for growth are particularly large, however, and the risks squarely on the downside.

Figure 1.17. Emerging Asia: Quarterly GDP Growth Forecasts
(Year-on-year percent change)

Source: IMF, WEO database.
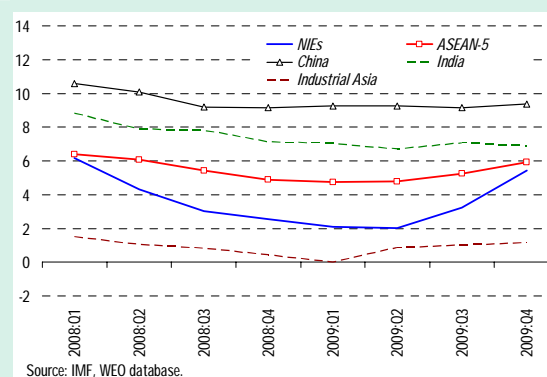
Exports from Asia are expected to slow sharply. Beyond indications of cooling global demand, forward-looking indicators of global trade such as the Baltic Dry Index of shipping costs show large declines. Exports have already slowed in much of the region (Figure 1A.2). In volume terms, growth has turned negative for Korea, Hong Kong SAR, and Taiwan Province of China (Figure 1.18). Moreover, intraregional exports to China are slowing, suggesting that the weakness in advanced

Figure 1.18. Selected Asia: Export Volume Growth
(3-month percent change of 3-month moving average, SAAR)

Source: CEIC Data Company Ltd.
[1] The data for Hong Kong SAR refer to reexports.
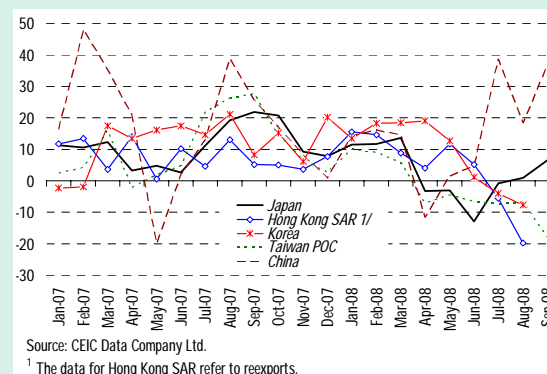
economies may be feeding through the regional supply chain. Forward-looking indicators for electronic exports, such as the book/bill ratio for U.S. semiconductor equipment and new electronics orders from the euro area, also point to a marked slowdown in momentum.

The outlook for domestic demand depends in part on the changes in the terms of trade (Figure 1.19) and on the spillovers from the global slowdown and financial turmoil. For commodity importers, such as Japan, Korea, the Philippines, and Taiwan Province of China, expected improvements in the terms of trade should support real incomes and domestic demand.[4] This being said, high-frequency indicators such as industrial production, retail sales, and consumer and business confidence point to a broad-based slowdown in domestic activity in tandem with cooling exports (Figure 1A.3).

Figure 1.19. Changes in the Terms of Trade versus Growth in Domestic Demand (2007:Q2—2008:Q2)
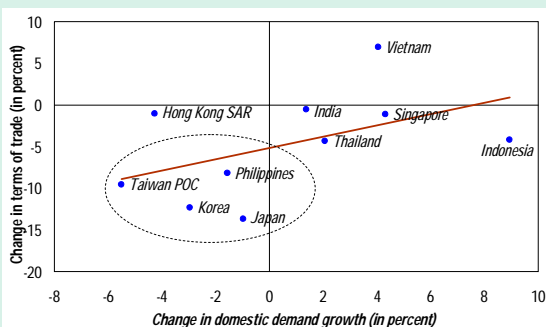
Sources: CEIC Data Company Ltd; IMF, WEO database and staff calculations.
Note: Latest data where available; for Vietnam, annual data are used.

Overall, growth next year is expected to rely on a modest increase in domestic demand, in part supported by lower commodity prices and, in some cases, more-accommodating macroeconomic policies (Figure 1.20). The contribution from net exports is expected to be slightly negative. However, the aggregate current account surplus for the region is projected to increase by half a percentage point to 4.9 percent in 2009, mostly on account of lower commodity prices.

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[4] Since 2005, the terms of trade are estimated to have deteriorated by close to 25 percent for Japan and the Philippines, and by around 17 percent for Korea and Taiwan Province of China.

Figure 1.20. Emerging Asia: Contributions to GDP Growth
(Year-on-year change in percent of previous year's GDP)
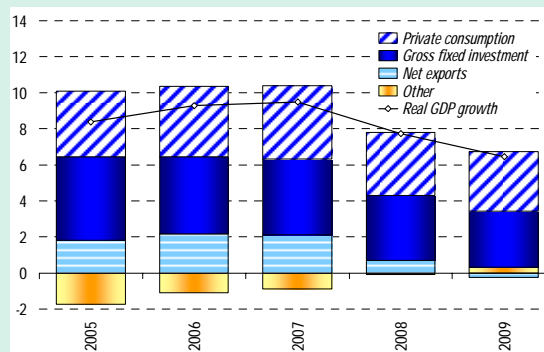
Sources: CEIC Data Company Ltd; and IMF staff calculations.

Looking within the region, growth in emerging Asia is expected to slow to 6½ percent in 2009 (Table 1.3).

- China's growth in 2009 is projected to decline to 8½ percent. With exports likely to fall sharply and the property sector weakening, risks to China's outlook are firmly tilted to the downside. Much will depend on the effectiveness of the policy response, including the large fiscal stimulus package announced in November.

- Growth in India is expected to decline to around 6¼ percent next year, as tighter financial

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

	2007	2008 Latest projections	2009 Latest projections	2008 Difference from October WEO	2009 Difference from October WEO	2008 Fourth quarter[1]	2009 Fourth quarter[1]
Industrial Asia	2.4	0.8	0.1	-0.2	-0.6	0.0	0.6
Japan	2.1	0.5	-0.2	-0.2	-0.7	-0.3	0.4
Australia	4.4	2.4	1.8	-0.1	-0.4	1.8	2.0
New Zealand	3.2	0.7	1.5	0.0	0.0	0.0	1.5
Emerging Asia	9.5	7.7	6.5	-0.1	-0.8	6.8	6.8
NIEs	*5.6*	*3.9*	*2.1*	*-0.1*	*-1.1*	*2.2*	*4.4*
Hong Kong SAR	6.4	3.7	2.0	-0.4	-1.5	1.0	4.4
Korea	5.0	4.1	2.0	0.0	-1.5	2.4	3.7
Singapore	7.7	2.7	2.0	-0.9	-1.4	1.6	4.4
Taiwan POC	5.7	3.8	2.2	0.0	-0.3	2.5	5.6
China	11.9	9.7	8.5	-0.1	-0.8	9.0	8.3
India	9.3	7.8	6.3	-0.1	-0.6	6.6	6.0
ASEAN-5	*6.3*	*5.4*	*4.2*	*-0.1*	*-0.7*	*4.6*	*5.4*
Indonesia	6.3	6.0	4.5	-0.1	-1.0	5.4	5.1
Malaysia	6.3	5.7	3.8	0.0	-0.9	4.7	4.4
Philippines	7.2	4.4	3.5	0.0	-0.3	3.9	3.6
Thailand	4.8	4.5	4.0	-0.2	-0.5	2.6	6.3
Vietnam	8.5	6.3	5.5	0.0	0.0	7.5	8.0
Emerging Asia excl. China	7.3	5.9	4.4	-0.1	-0.8	4.7	5.3
Emerging Asia excl. China and India	5.9	4.6	3.1	-0.1	-0.9	3.4	4.9
Asia	7.6	6.0	4.9	-0.1	-0.7	5.1	5.3

Sources: CEIC Data Company Ltd; and IMF, WEO database.
[1] Change from fourth quarter of preceding year.

conditions weigh on domestic activity, particularly investment.

- Our projection for the NIEs is for growth to slow to around 2 percent in 2009, with a recovery beginning towards the end of the year. The large decline in the growth rate results, in part, from these countries' higher-than-average dependence on exports.

- Growth in ASEAN-5 economies is expected to decline to around 4¼ percent in 2009. Consumption and investment should slow, especially in Vietnam, where monetary tightening has depressed activity.

- For industrial Asia, growth is projected to fall to around 0 percent in 2009 from about 1 percent this year. Growth in Japan is expected to turn negative on account of a contraction in exports and investment, while private consumption is likely to stay sluggish in the face of weak confidence and low wage growth. In Australia, growth is slowing below potential because of tighter credit conditions and the easing in commodity prices. In New Zealand, growth is expected to begin to recover in response to an easing in monetary and fiscal policies but to remain below trend as the reduced availability of credit constrains spending.

With Commodity Prices Stabilizing, Inflation Pressures Are Expected to Ease

Headline inflation across the region has shown signs of moderating along with the recent declines in commodity prices. The main source of inflation over the past year has been higher food and fuel prices, which make up nearly 35 percent of the consumer price index (CPI) baskets (for emerging Asia), compared to 20 percent in the euro area and the United States (Figure 1.21). The sharp rise in global food and fuel prices explains nearly two-thirds of the recent rise in inflation, with the impact being greater for countries with higher CPI shares of food and fuel, particularly ASEAN-5 and low-income countries (Box 1.2). Some of the recent increases also represent greater pass-through of higher import prices from the reduction in fuel subsidies (India, Indonesia, Malaysia, Taiwan Province of China), as

well as weaker currencies.[5] However, inflation has shown signs of decreasing along with declining commodity prices. Sequential indicators of inflation (seasonally adjusted three-month moving averages) suggest that inflation has already peaked in many countries, notably in India and in China, where CPI inflation in September fell to around 4½ percent, mainly in response to lower food prices (Figure 1A.4).

Figure 1.21. Food's Contribution to Inflation versus Its Weight in CPI, August 2008
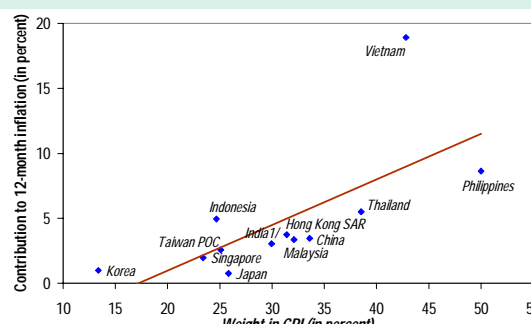
Sources: CEIC Data Company Ltd; country authorities; and IMF staff calculations.
[1] Data for India refer to wholesale prices.

Moreover, there are few indications of second-round price effects from the earlier commodity price run-up. Core consumer price inflation (excluding food and fuel) has increased for ASEAN-5 countries and India (6½ percent and 10 percent year on year, respectively, in September), but less so in China and the NIEs (Box 1.3). However, on a sequential basis, core inflation also shows signs of peaking (although less so than for headline inflation), while wage and employment growth appear to be weakening. Although still higher than at the beginning of the year, consensus forecasts for 2009 inflation have also stabilized and, for some countries, have started to decline.

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[5] Global factors have thus played an important role in recent inflation trends, with the correlation with inflation in other regions having increased substantially since 2000. Chapter 2 of this *Regional Economic Outlook* examines the issue of globalization of Asian inflation and finds that a substantial portion of inflation in Asia over the past 10 years has been imported largely through commodity prices and that this share has been rising. Rising commodity prices have meant not only higher, but also more volatile, inflation, with the standard deviation of inflation increasing by around 20 percent during 2005–2008 compared to five years ago.

Box 1.2. The Impact of High Food and Fuel Prices in Low-Income Asia—Implications for Inflation, Poverty, and Policies

Despite their recent decline, food and fuel prices remain well above historical levels. High food prices have undermined past gains in poverty reduction throughout the region, jeopardizing the achievement of the Millennium Development Goals. Going forward, further easing in commodity prices is expected to reduce inflationary pressures and could help alleviate their impact on poverty in low-income Asia.

Impact on Prices

Inflation has been rising in low-income Asia. Fueled by spikes in commodity prices, headline inflation has picked up since end-2007. Inflation is for the most part imported, driven by sharp increases in food and fuel prices, whose impact has been magnified by their large share in the consumer price index. In addition, for low-income countries, much of the food basket includes products that are unprocessed or have little value added, resulting in a relatively high pass-through of imported food prices.

Some supply-side factors have added to inflation. Adverse weather in Bangladesh has caused substantial crop damage, while Pacific Island countries that rely almost exclusively on oil-based fuel for their energy needs face limited scope for substitution in production.

Domestic demand pressures have also played a role. Credit growth remains high in some countries (Cambodia, Lao People's Democratic Republic, Papua New Guinea, and the Solomon Islands), while fiscal policies have turned expansionary in several economies (Bangladesh, the Solomon Islands, Sri Lanka, Timor-Leste, and Vanuatu).

Higher commodity prices have spilled over to core inflation. Second-round effects are emerging in Papua New Guinea, Sri Lanka, the Solomon Islands, Timor-Leste, and Tonga as higher costs for inputs (e.g., animal feed, fertilizer, and energy) have created upstream pressures on prices. Wage pressures also appear to be increasing in Papua New Guinea and the Solomon Islands.

Impact on Poverty

Inflation is of particular concern in low-income Asia because of its substantial social implications. Inflation, especially in food prices, increases income inequality by acting as a regressive tax that hits the poor the hardest (Easterly and Fischer, 2001). Because the poor do not generally have financial assets that provide an adequate hedge against inflation, and instead hold only cash and bank deposits, inflation can quickly erode their purchasing power.

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Note: The main author of this box is Patrizia Tumbarello.

Low-Income Asia: Headline Inflation
(Year-on-year percent change)

Sources: Country authorities; and IMF staff calculations.
[1] Includes countries for which monthly inflation data are available (Bangladesh, Cambodia, Fiji, Lao P.D.R., Mongolia, Nepal, Solomon Islands, Sri Lanka, Timor-Leste, and Tonga).

Low-Income Asia: Food Inflation
(Year-on-year percent change)

Sources: Country authorities; and IMF staff calculations.
Note: Data for 2008 refer to August, except for data for Papua New Guinea and Vanuatu, which refer to June.

Core Inflation[1]
(Year-on-year percent change)

Sources: Country authorities; and IMF staff calculations.
[1] Quarterly data.

Box 1.2 *(continued)*

The urban poor are most affected by high food and fuel prices, as the rural poor are more likely in the short term to be partially self-sufficient in food supplies (IMF, 2008b). However, those living in remote areas, especially landless farmers, are also highly exposed. Food-related expenditure represents a large share (about 50 percent) of household spending in low-income Asia. Higher expenditure on food crowds out spending on health and education and agricultural inputs, further undermining the needed supply-side response (Asian Development Bank, 2008a). Most low-income countries have only limited social protection systems to shield the most vulnerable segments of the population.

On balance, the empirical evidence suggests that the impact of food prices on poverty will be substantial in some low-income Asian countries. A World Bank study shows that the first-round effects of food inflation on urban poverty are higher than average in Bangladesh and Cambodia (Dessus, Herrera, and de Hoyo, 2008). For example, a 20 percent increase in the relative price of food is estimated to increase the poverty rate—defined as the proportion of the population below the "dollar-a-day" poverty line—by almost 6 percentage points in Cambodia and 5 percentage points in Bangladesh, compared to an average of 3.7 percentage points for the 20 most severely affected countries. The Pacific Islands are also at risk. According to the Asian Development Bank, a 10 percent reduction in real income of low-income households would bring an additional 5 percent of the population of the Pacific Islands below the poverty line in 2008 (Asian Development Bank, 2008b).

Countries' Policy Responses

Responses to cope with high food and fuel prices have varied across low-income Asia. Most countries have allowed full pass-through of commodity price increases for gasoline, but in a few countries, pass-through has been incomplete. The pass-through of diesel and kerosene prices has been much lower, since typically kerosene and diesel carry higher subsidies than gasoline, reflecting their importance for poor households. In Bangladesh, fuel subsidies on kerosene and diesel remain substantial. Additional measures introduced to limit the impact of higher prices include

Low-Income Asia: Food Weight in the CPI Basket
(In percent)

Bangladesh[1]	64.5
Cambodia	42.7
Fiji	35.4
Lao P.D.R.	40.9
Marshall Islands	46.7
Micronesia	45.5
Mongolia	41.1
Myanmar	68.3
Nepal	53.2
Papua New Guinea	40.9
Samoa	50.3
Sri Lanka	45.5
Solomon Islands	42.9
Timor-Leste	57.8
Tonga	44.4
Emerging Asia	**31.3**

Sources: Country authorities.
[1] Includes tobacco and beverages.

Impact of a 20 Percent Food Price Shock on Poverty[1]
(In percent)

	Before shock	After shock
	Poverty rate	Change in the poverty rate
Bangladesh	8.7	5.0
Cambodia	25.1	5.8
Lao P.D.R.	2.7	1.0
Sri Lanka	0.6	1.2
Most-affected countries[2]	18.7	3.7

Source: Dessus, Herrera, and de Hoyo (2008).
[1] Refers to a 20 percent change in the relative price of food.
[2] Average for the 20 most affected countries.

Low-Income Asia: Pass-Through of International Gasoline Prices[1]
(In percent)
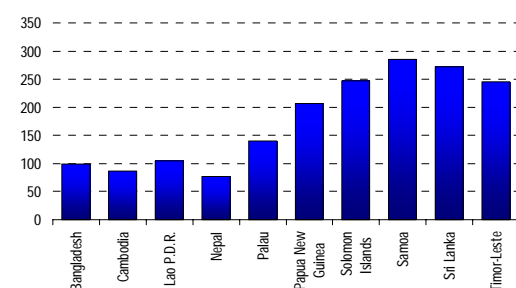
Source: IMF staff calculations.
[1] Absolute change of domestic retail prices in U.S. dollars between September 2008 (or latest available) and end-2007 divided by the absolute change of world prices over the same period.

- Import duty and tax cuts. Many countries have lowered import tariffs or introduced exemptions for tariffs on food staples (Bangladesh, Marshall Islands, Mongolia, the Solomon Islands, and Timor-Leste) and fuel (Fiji). Mongolia, the Solomon Islands, and Timor-Leste have also cut the sales tax.

- Price controls and subsidies to consumers. In Bangladesh, rice is being provided to the poor at subsidized prices. Fiji has introduced some price controls and delayed scheduled electricity tariff increases. In Timor-Leste, the government has spent more than 2 percent of gross national income on imported rice that is being resold with a 50 percent subsidy. The Lao People's Democratic Republic introduced a reference rather than a market price on fuel products for assessing taxation, effectively turning ad valorem taxes into specific taxes.

Policy Responses to High Oil and Food Prices in Low-Income Asia

	Reduce import duties	Build reserves/ stockpiles	Export restriction	Price controls/ consumer subsidies	Assistance/ subsidy to farmers	Promote self-sufficiency	Cash transfer
Bangladesh	X	X	X	X	X	X	X
Cambodia		X			X		
Fiji	X			X			
Lao P.D.R.	X	X					
Mongolia	X	X					
Myanmar				X			
Nepal			X	X			
Marshall Islands	X						
Sri Lanka					X		
Solomon Islands	X					X	
Timor-Leste	X	X		X	X		

Sources: Asian Development Bank; World Bank; and IMF country desks.

- Assistance/subsidies to farmers. In Bangladesh, Cambodia, and Timor-Leste, the governments have ensured adequate availability of agricultural inputs, including seeds, fertilizer, and diesel to farmers. In Sri Lanka, subsidies on fertilizer have increased in 2008 and are expected to cost around 0.6 percent of GDP.

- Other measures. Bangladesh and Nepal have introduced a ban on rice exports. Food reserves have been built up in Bangladesh (rice), the Lao People's Democratic Republic (rice), and Mongolia (meat). Two countries have promoted food self-sufficiency (Bangladesh and the Solomon Islands). In Bangladesh, existing safety net programs are being scaled up, and a new employment guarantee scheme and cash transfers have been introduced to help people in distressed areas.

The monetary policy response has also varied across countries. Some tightening has taken place. In Sri Lanka, the central bank has slowed reserve money, mainly through the sale of government paper; Bangladesh raised its policy rates by 25 basis points in September. In Cambodia, the central bank doubled the reserve requirement for foreign-denominated deposits in June. Because most of the Pacific Islands economies either are dollarized or have pegged exchange rates, the exchange rate plays a minimal role in curbing imported inflation. In Papua New Guinea—a country with a more flexible exchange rate—the central bank has increased the policy rate three times since June, but real interest rates remain negative. The central bank of the Solomon Islands has introduced standing deposit facilities to mop up excess liquidity.

Inflation pressures pose special challenges to low-income countries. Ideally, targeted transfer programs—as part of an integrated social safety net—could reach the poor efficiently. In the absence of effective safety nets, a package of measures building on existing programs (e.g., school feeding programs, cash transfers to the most vulnerable populations, reduction in education and health fees, and public transport subsidies) could be identified. Ad hoc general increases in public sector wages or changes in the tax system to alleviate the effects of commodity price hikes are not well-targeted and should be avoided.

A more effective approach would include targeted demand- and supply-side responses, combined with donor support. In general, countries should allow full pass-through of higher food and fuel prices to domestic prices, while allowing for some time to adjust. Longer-term measures, such as in agriculture, rural transport, and other support services, can increase domestic supply and reduce price pressure. Donor support, preferably in the form of grants, would also help limit the harm to real incomes and poverty.

Box 1.3. Measuring Underlying Inflation Trends

The recent volatility in commodity prices has raised the issue of whether to use headline or core inflation in setting monetary policy. Headline inflation has the advantage of being simple, widely recognized, and more representative in terms of covering household spending. At the same time, it also suffers from a number of limitations in guiding monetary policy—most critically, its short-run sensitivity to nearly every kind of economic shock. In this sense, underlying inflationary pressures may be better captured by measures that strip out from headline inflation the impact of temporary shocks over which the monetary authority has no control.[1]

The appropriate measure of core inflation ultimately depends on its purpose.[2] Commonly used measures of core inflation that exclude volatile price components, such as food and energy prices, have the benefit of being simple, timely, and independently verifiable. These measures are well suited for communicating inflation developments to the public and for anchoring expectations, but may not be ideal for guiding monetary policy, as their construction may not sufficiently capture underlying trends in future inflation. Theory-based measures, such as the model-based measure proposed by Quah and Vahey (1995) and the persistence-weighted approach suggested by Cutler (2001), attempt to extract the permanent component of inflation and thus may be more useful for forward-looking analysis. Ideally these alternative measures of core inflation should be (i) "unbiased" (on average, equal to headline inflation); (ii) "cointegrated" (i.e., core and headline inflation should converge over time); and (iii) an "attractor" for headline inflation (headline should converge towards core inflation but not vice versa; i.e., core should be a leading indicator for headline inflation). One important drawback, though, is that these measures are rather complex and require faith that the model used is the right one.

The figure on the next page plots headline and alternative measures of core inflation for four Asian countries that have experienced significant increases in inflation—India, the Philippines, Sri Lanka, and Vietnam.[3] In all four countries, the resulting measures of core inflation differ, but overall show underlying inflation subsiding. In India and Vietnam, most core inflation measures show underlying inflation running below the headline figure, while in the Philippines and Sri Lanka, they are running above the official measure of core inflation.[4] When the alternative measures are evaluated, the results do not suggest one dominant measure of core inflation, but rather that monetary authorities would benefit from examining a broad range of core indicators when judging underlying inflation trends.

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Note: The main authors of this box are Souvik Gupta and Magnus Saxegaard.

[1] See Chapter 2 of this *Regional Economic Outlook* for a discussion of core versus headline inflation measures when exogenous shocks are persistent.

[2] See, for example, Roger (2000), Heath, Roberts, and Bulman (2004), Mankikar and Paisley (2004), and Silver (2007).

[3] These measures include (i) one that excludes the most volatile 10 percent of the components of the price index; (ii) one that trims parts of the tails of the distribution of price changes; (iii) one that reweights the components of the price index according to the estimated persistence of inflation; and (iv) one based on an approach by Quah and Vahey (1995) that identifies core inflation as that component of inflation that has no medium- to long-term impact on real output (i.e., movements in core inflation are output-neutral once financial and wage contracts have been written to take them into account).

[4] In the Philippines and Sri Lanka, the official measure of core inflation excludes food and energy components from headline CPI. These account for 54.6 percent of the total weight in Sri Lanka's CPI and 18.4 percent in the Philippines.

Core Inflation Measures
(In percent, annualized)

India
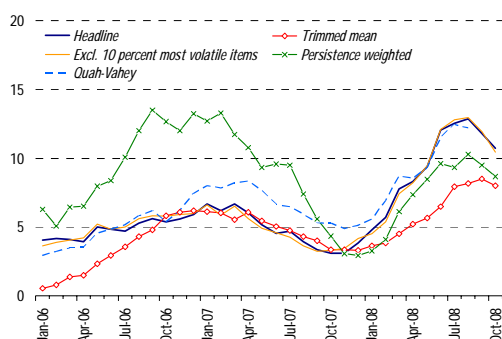
Philippines
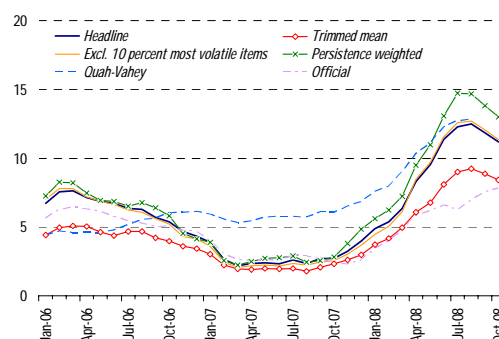
Sri Lanka
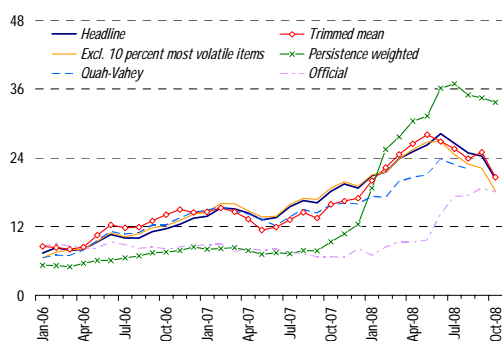
Vietnam
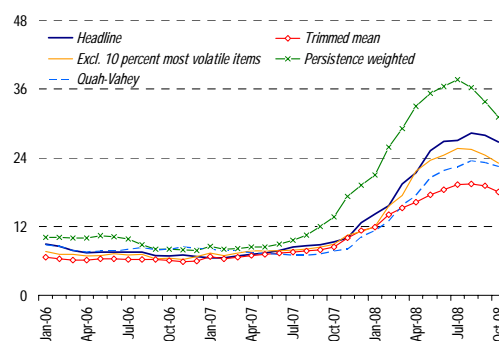
Sources: CEIC Data Company Ltd; Central Bank of Sri Lanka; and IMF staff estimates.
Note: The wholesale price index is used for India. Trimmed mean measures trim the tails of the distribution of the price changes. Reported trimmed mean measures differ across the countries depending on their desired statistical properties.

For 2009, our baseline forecast is for inflation to moderate back to 2007 levels. A key component of our forecast is the IMF's commodity price baseline, which sees prices stabilizing in 2009. On this basis, headline inflation in Asia is projected to ease from 6 percent in 2008 to around 3 percent in 2009 (Table 1.4). Inflation in emerging Asia is projected to fall to 4 percent in 2009, while for industrial Asia inflation will be lower, at about ½ percent. In Japan, falling commodity prices are likely to push headline inflation down, possibly even below zero for a brief period, but inflation is expected to return to positive levels once commodity prices stabilize. The risks of more entrenched deflation seem low, given the improved balance sheets of banks and corporates and the supportive actions taken by the government and the Bank of Japan.

Table 1.4. Asia: Headline CPI Inflation
(Year-on-year percent change)

	2007	2008	2009	2008	2009	2008	2009
		Latest projections		Difference from October WEO		Latest consensus	
Industrial Asia	0.4	2.0	0.4	-0.1	-1.0	2.1	1.5
Japan	0.1	1.4	-0.3	-0.1	-1.2	1.7	1.1
Australia	2.3	4.6	3.6	0.1	0.0	4.5	3.2
New Zealand	2.4	4.2	3.8	0.0	0.0	4.2	3.3
Emerging Asia	4.3	7.3	4.0	-0.4	-1.0	7.0	4.7
Hong Kong SAR	2.0	3.9	2.7	-0.9	-1.6	4.8	3.9
Korea	2.5	4.7	3.0	-0.1	-1.0	4.8	3.6
Singapore	2.1	6.5	3.1	0.0	-0.1	6.4	3.0
Taiwan POC	1.8	3.7	1.0	-0.5	-1.5	3.8	2.5
China	4.7	6.2	3.4	-0.2	-0.9	6.4	3.6
India[1]	4.7	10.1	4.3	-1.5	-1.7	7.8	6.6
Indonesia	6.3	10.0	9.0	0.2	0.3	10.5	8.2
Malaysia	2.0	6.0	4.3	0.0	-0.4	5.8	4.1
Philippines	2.8	9.8	6.0	-0.3	-1.0	9.9	7.1
Thailand	2.2	5.6	3.0	-0.1	-0.2	6.5	3.7
Vietnam	8.4	24.0	15.0	0.0	0.0	23.8	12.9
Asia	3.3	6.0	3.1	-0.4	-1.0	5.8	3.9

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

[1] Wholesale price index data for India; 2008 and 2009 forecasts are on a fiscal year basis.

Financial Conditions Will Likely Tighten Further

As noted earlier, financial markets in Asia are expected to remain closely tied to developments outside the region. Exceptional policy responses by both advanced and emerging economies have helped to stabilize market conditions, but the financial impact from the sharp global downturn and credit turmoil has yet to be fully felt, as global deleveraging and rising corporate defaults are likely to continue through next year. As a result, Asia's financial markets will likely remain under stress from the global credit turmoil and slowdown and represent an important downside risk to our baseline forecast.

Risks to the Outlook Are Firmly on the Downside

As already noted and as shown in Figures 1.22 and 1.23, the risks to our baseline forecast for the region are significant and tilted firmly to the downside.[6] The main downside risks are external—stemming from a sharper-than-expected global slowdown that would affect Asia's exports and a protracted period of financial turmoil that would tighten both external and domestic credit conditions (Figure 1.23). On the upside, further declines in commodity prices could give a boost to domestic demand and help to reverse some of the trend deterioration in the terms of trade, while larger-than-expected policy stimulus cannot be ruled out at this stage.

The possibility of significant deviations from the baseline scenario are much greater than usual. A severe global recession that is deeper and more protracted than expected, combined with a significant global credit squeeze, would have significant spillover repercussions for Asia. Previous *Regional Economic Outlook* analysis has shown that, while spillovers from the United States to Asia have been modest on average, they have increased over

Figure 1.22. Asia: GDP Growth
(Central forecast and 50, 70, and 90 percent confidence intervals; in percent)

Source: IMF staff assessment of the balance of risks.
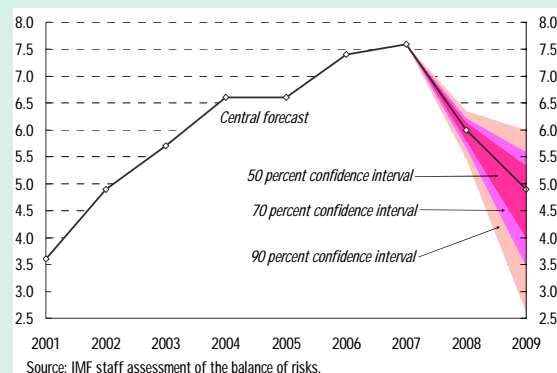
Figure 1.23. Risk Factors
(Contribution to balance of short-term risks for Asia's growth forecast)

Source: IMF staff assessment.
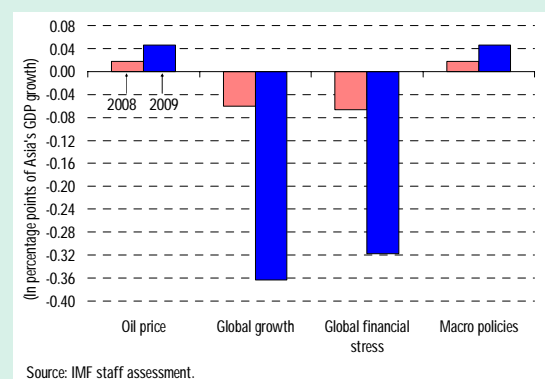
time as a result of Asia's increased trade and financial integration with the rest of the world.[7] A larger-than-anticipated slowdown in China would also have a significant impact given the growing importance of intraregional trade. In this context, corporate distress in the region stemming from lower demand and tighter financial conditions could impair bank assets and feed into a vicious macrofinancial circle.

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[6] The fan chart and associated risk factors in the two figures are constructed from a survey of the IMF's Asia and Pacific Department country economists on the risks to their baseline forecast, where each response is then weighted by the country's purchasing power parity weight in the region's GDP.

[7] According to the IMF Global Economy Model, a protracted slowdown of 1 percentage point in the United States combined with continued financial stress that affects confidence globally would reduce growth in emerging Asia by 0.8 percentage point ("Can Asia Decouple?" *Regional Economic Outlook: Asia and Pacific*, April 2008).

Policy Challenges to Safeguard Macro and Financial Stability

In this highly uncertain environment, Asian policymakers face the difficult challenge of navigating their economies through a global downturn while safeguarding financial stability. Given the considerable downside risks, policymakers will need to remain vigilant in regard to spillovers from the global turmoil and be prepared to respond quickly and flexibly to a sharp slowing of domestic activity. Financial policies will need to focus on addressing spillovers from the global credit turmoil as well as domestic risks from a slowing economy. With inflation projected to moderate, monetary policy in most countries has room to ease to stabilize financial conditions and provide support to address significant downside risks. Greater exchange rate flexibility in some cases will provide more monetary policy autonomy and help mitigate the impact of volatile capital flows. Progress in fiscal consolidation has also created scope for fiscal policy to provide timely and well-targeted support.

Financial Policies to Safeguard Stability

Financial policies will need to focus on anticipating and addressing spillovers from tighter global financial conditions and domestic risks arising from weaker growth. Given the potential spillovers from individual country actions, financial policy coordination at the regional level may be more effective in stabilizing financial conditions. While precise policies will vary across countries, generally they should cover

- *Strengthening crisis management frameworks.* Failures of several large distressed institutions have raised concerns over potential exposures to other highly leveraged players, including those in Asia. Further defaults can be expected, and policymakers should review contingency plans, including addressing possible fallout in interbank markets and ensuring the adequacy of deposit insurance and public recapitalization schemes. Early disclosure of exposures can help ease market concerns and help investors

differentiate across institutions (and countries).[8] Greater cross-border collaboration among the relevant authorities would help strengthen monitoring of financial distress overseas, while in countries whose financial systems are closely interconnected, coordinated policy action would be more effective and help prevent "beggar-thy-neighbor" consequences that would harm other countries. For countries that have implemented or are considering blanket guarantees on bank liabilities, the schemes should have firm deadlines for expiring, be sufficiently funded and transparent to enhance credibility, and include safeguards, such as enhanced supervision and limits on deposit rates, to prevent unfair competition nationally and across borders. While blanket guarantees may support financial stability and be a necessary response to guarantees introduced in other regions, they should be viewed as a temporary, not a final, solution to provide time for a more fundamental resolution of banking difficulties.

- *Enhancing liquidity risk management.* Supervisors will need to ensure that banks have proper regulatory standards for liquidity risk management, such as through avoiding maturity mismatches, more extreme stress testing, and contingency planning in the event of an extended cutoff in external financing. Central banks should also consider reviewing the range of available liquidity instruments, including in foreign currency. Expanding the range of acceptable collateral and shifting to a regular auction-type facility for discount lending may help minimize the market stigma attached to emergency funding. Central banks should also consider contingency plans to expand access of their standing facilities to nonbanks, securities firms, and even nonfinancial corporations to address possible liquidity shortages.

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[8] For example, quarterly publication by the Japanese Financial Services Agency of deposit-taking institutions' holdings of subprime and other structured products has helped to allay market concerns regarding the size of these exposures in relation to banks' capital positions.

- *Protecting access to cross-border funding, including trade financing.* Foreign exchange and cross-currency swap markets have emerged as important U.S. dollar funding and hedging channels for both foreign and domestic players and have come under stress during the current period of high risk aversion. At the same time, the cost of trade financing and the demand for letters of credit and trade insurance have risen as international banks have scaled back their overseas lending. To ensure adequate cross-border funding, regulators should review plans to provide emergency foreign financing to banks and other intermediaries, including through swap arrangements, or possibly extend guarantees to cover trade credits in the event of a temporary cutoff in financing.

- *Promoting the smooth refinancing of maturing corporate and financial sector debt.* Markets are likely to pay closer attention next year to the bunching of corporate bonds maturing starting in 2010. Countries with a banking system that relies on wholesale financing, especially short-term external debt, are also likely to continue to face repayment pressures. Collecting and disclosing information on the aggregate profile of maturing debt, particularly external debt, could help individual firms to manage their obligations better and alert banks to potential demands for short-term financing.

- *Strengthening risk management.* With growth slowing, corporate default rates and nonperforming loans within the region are expected to rise. Regional banks with exposures to sectors that are more vulnerable to a domestic slowdown, such as housing or small and medium-sized enterprises, may be at greater risk. Supervisors will need to ensure that local banks are properly classifying loans and setting aside adequate provisioning against problem loans. At the same time, Asian banks are helping to fill in the lending void created by the distress among major global banks. Having in place robust credit risk systems will help Asian banks to manage their growing overseas portfolios while guarding against possible risks.

- *Standing ready to recapitalize banking systems if needed.* At this stage, the possibility of a larger than expected wave of corporate defaults leading to bank failures cannot be ruled out. Authorities should thus consider contingency plans in the event that public funds are required to prop up the capital base of financial institutions.

- *Implementing longer-term financial reforms.* Although the crisis is still unfolding and its lessons still being learned, policymakers may take this opportunity to implement longer-term reforms that would strengthen their financial systems, such as those recommended by the Financial Stability Forum (FSF) and discussed in the IMF's *Global Financial Stability Report.* For Asia, this would include addressing the procyclical risks from changes in leverage, further developing local bond and hedging markets, and enhancing the monitoring of systemically important institutions, including those outside the banking system.

Monetary Policy to Address Downside Risks to Growth

With the balance of risks having shifted towards slowing growth, most central banks in Asia have ended their tightening cycle and, in many cases, have started to ease while providing exceptional liquidity to stabilize market conditions (Figure 1A.5). Japan, Australia, China, India, Korea, New Zealand, Taiwan Province of China, and Vietnam have either lowered rates or eased reserve requirements in response to slowing growth. Some countries, including India, Indonesia, and Korea, have also intervened to support their currencies, while Singapore has moved to an exchange rate band with zero appreciation. In Sri Lanka, given the still-high level of inflation, the authorities remain committed to a tight monetary program, but have taken measures to accommodate the liquidity shock from the global turmoil.

Real policy rates in many countries remain negative, whether adjusted for headline or core inflation, suggesting that the monetary stance is supportive. Measures of real monetary conditions

that incorporate exchange rate changes also show that conditions are looser compared to 12 months ago (a key exception being China). However, a broader measure that includes credit risk indicates that financial conditions have tightened and are more restrictive than suggested by the stance of monetary policy as a result of the global credit turmoil.

In this highly uncertain environment, central banks face the difficult challenge of navigating their economies through a major global downturn, while stabilizing financial conditions. Given its flexibility, monetary policy should be the first line of defense. With the global credit turmoil tightening domestic financial conditions, monetary policy should stand ready not only to stabilize market conditions, but also to ease in response to slowing growth. The appropriate stance would vary across countries and depend on the outlook for domestic demand, exchange rate regimes, and financial conditions.

- *In most countries, where domestic demand is weakening, financial conditions are tightening, and second-round price effects are modest, further monetary policy easing would be appropriate to address downside risks to growth.* Central banks will need to respond flexibly in the event that domestic credit tightens appreciably and depresses activity.

- *For inflation-targeting countries, greater communication on the risks to the outlook and their implications for monetary policy would help reinforce policy credibility.* Explaining how and when inflation would be expected to fall back within the target range would help anchor price expectations over the medium term (Figure 1.24).

- *More generally, excessive intervention creates the risk of one-way bets on the exchange rate and greater volatility.* Countries where exchange rates have weakened in response to negative terms-of-trade shocks and capital outflows face the added challenge of containing the pass-through of the depreciation on domestic inflation. While a case can be made for intervention to smooth excess exchange rate volatility and address possible overshooting, sustained one-sided intervention may backfire,

Figure 1.24. CPI Inflation: Inflation-Targeting Countries versus Non-Inflation-Targeting Countries[1]
(Year-on-year percent change)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] Unweighted average. Inflation-targeting countries are Indonesia, Korea, Thailand, and the Philippines.
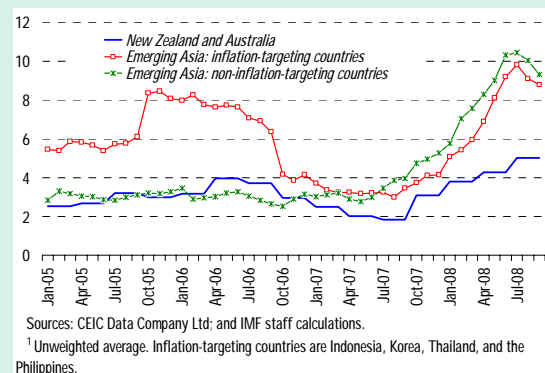
resulting in larger and more disruptive adjustments later. Instead, allowing exchange rates to adjust would help absorb market pressures and reduce the drain on reserves. In China, a key argument for greater flexibility would be to help rebalance growth towards consumption.

Scope to Ease Fiscal Policy

With growth slowing and fuel and food subsidies higher, the fiscal deficit in Asia is expected to widen modestly by about ½ percentage point of GDP in 2008 but remain small (Table 1.5). The turnaround is the greatest for emerging Asia, particularly for the NIEs, where the fiscal balance has shifted by 2¼ percent of GDP. In 2009, the fiscal balance for Asia is projected to widen further, reflecting the effects of slower growth and policy measures to offset higher food and fuel prices and, in some cases, to support aggregate demand. Public debt levels (as a share of GDP) should continue to decline in Asia, but remain high in India and Japan.

With progress in fiscal consolidation, many countries in Asia have room to ease to address downside risks to growth. Indeed, several countries have already announced fiscal policy measures to support aggregate demand, most notably China, which is commendably planning to undertake substantial spending in infrastructure and other areas over the next two years. Strengthening social safety nets to protect vulnerable households would also allow automatic stabilizers to play a more

supportive role. In countries such as Japan or India where fiscal sustainability is an issue, it would be important not to lose sight of the need for medium-term fiscal consolidation. Despite progress in reducing deficits, the public debt ratios in these countries are expected to come down only slightly or remain at high levels.

Table 1.5. Asia: Selected Fiscal Indicators
(In percent of GDP)

	General Government Gross Debt				Central Government Fiscal Balance			
	2006	2007	2008 Proj.	2009 Proj.	2006	2007	2008 Proj.	2009 Proj.
Industrial Asia	**163.9**	**163.8**	**166.1**	**168.9**	**-3.6**	**-2.4**	**-2.7**	**-2.9**
Japan	194.7	195.4	198.9	203.0	-4.7	-3.3	-3.7	-3.8
Australia [1]	8.6	7.8	7.3	6.6	1.6	1.5	1.8	1.6
New Zealand [2]	23.3	22.3	21.5	20.3	5.1	3.5	2.9	0.7
Emerging Asia	**36.7**	**37.7**	**35.2**	**34.0**	**-1.1**	**0.0**	**-0.6**	**-1.3**
NIEs	*29.0*	*28.3*	*28.0*	*29.6*	*0.6*	*2.2*	*-0.1*	*-0.6*
Hong Kong SAR	1.7	1.3	1.1	0.9	4.0	7.6	0.1	-0.2
Korea [3,4]	32.2	32.1	32.4	34.2	-1.3	0.4	-1.3	-1.5
Singapore	...	...	...	...	7.6	9.0	6.1	5.7
Taiwan POC	34.9	33.3	32.0	33.7	0.3	0.9	-0.1	-1.1
China [5]	16.5	20.9	17.1	15.8	-0.7	1.0	0.8	-0.6
India [6]	80.5	79.9	78.3	76.1	-3.4	-2.8	-3.8	-3.3
ASEAN-5	*45.2*	*41.1*	*39.6*	*38.3*	*-1.0*	*-1.6*	*-1.6*	*-2.0*
Indonesia [3]	39.0	35.0	33.3	31.2	-1.0	-1.2	-1.0	-1.0
Malaysia [3]	43.2	41.8	43.2	44.7	-3.3	-3.2	-4.6	-4.2
Philippines [7]	73.9	60.9	60.8	56.6	-1.4	-1.7	-1.0	-1.7
Thailand [7,8]	41.0	38.1	36.1	35.9	-0.3	-1.1	-0.5	-2.5
Vietnam [7]	42.9	43.1	38.2	36.0	1.1	-2.2	-2.2	-2.0
Asia	**72.4**	**71.5**	**68.8**	**67.1**	**-1.8**	**-0.6**	**-1.2**	**-1.7**

Sources: IMF, WEO database; and staff estimates.
[1] Fiscal year ending June. Fiscal balance includes net surplus from state-owned enterprises.
[2] Fiscal year ending June. Fiscal balance is defined as operating balance net of gains and losses. Figures exclude net New Zealand Superannuation Fund asset returns.
[3] Central government only; balance excluding Social Security Fund.
[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. 2009 fiscal balance is budget number.

Appendix

Figure 1A.1. Financial Developments

Asian equity prices have fallen sharply from their peaks...

Selected Asia: Stock Market Indices
(January 2006=100)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] Weighted by market capitalization.
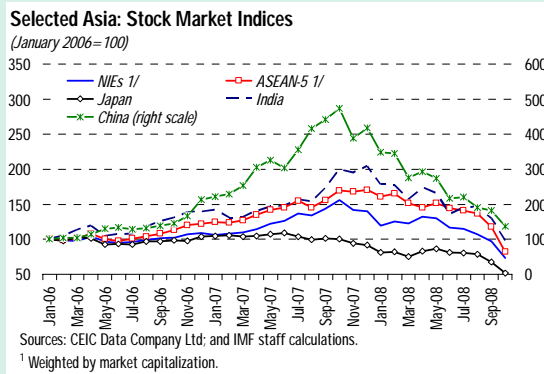
...led primarily by heavy selling by foreigners amounting to US$160 billion since August 2007.

Selected Asia: Net Equity Inflows
(In billions of U.S. dollars)

Source: Bloomberg LP.
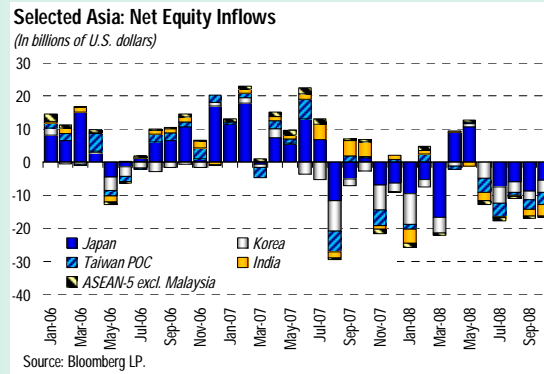
Exchange rates have weakened for a number of countries, particularly Korea...

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

Sources: IMF, Information Notice System; and IMF staff calculations.
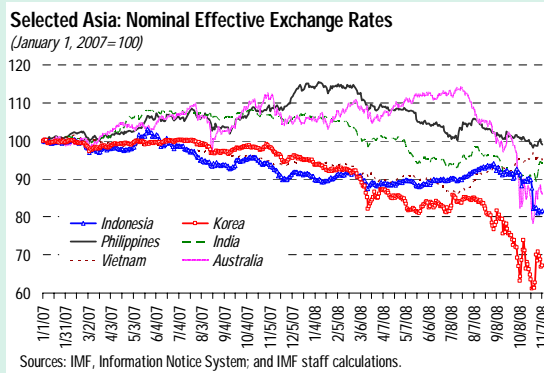
...while China's currency continues to appreciate.

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

Sources: IMF, Information Notice System; and IMF staff calculations.
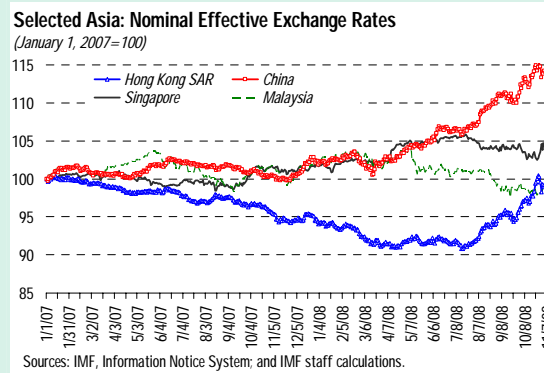
Corporate credit default swap spreads have risen above their end-March peak...

Credit Risk: iTraxx Indices[1]

Sources: Bloomberg; and IMF staff calculations.
[1] iTraxx Indices are a set of credit default swap indices covering regions or sectors and containng the most liquid names in that market, based on a dealer poll.
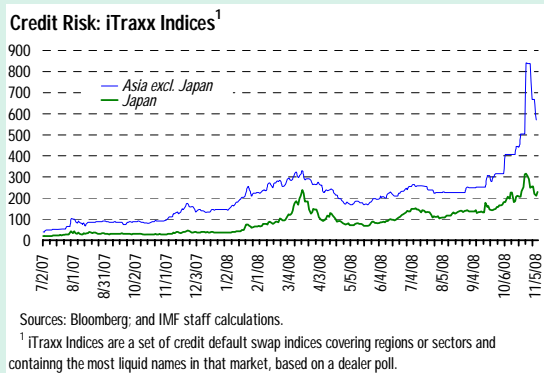
...while liquidity risk has increased on concerns over the deepening financial crisis.

Asia Liquidity Risk: Composite Indicator[1]

Sources: Bloomberg; and IMF staff calculations.
[1] The indicator is calculated based on (i) currency bid-ask spreads, (ii) spreads between interbank rates and T-bills, and (iii) daily equity market return-to-volume ratios. A higher value indicates higher liquidity risk.
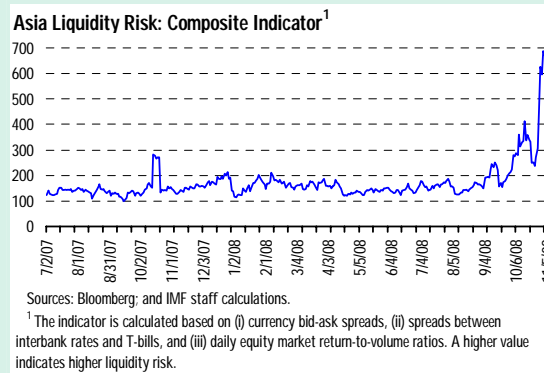
Figure 1A.2. Trade Developments

Exports have slowed in Japan and the NIEs ...

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

Sources: CEIC Data Company Ltd; and IMF staff calculations.
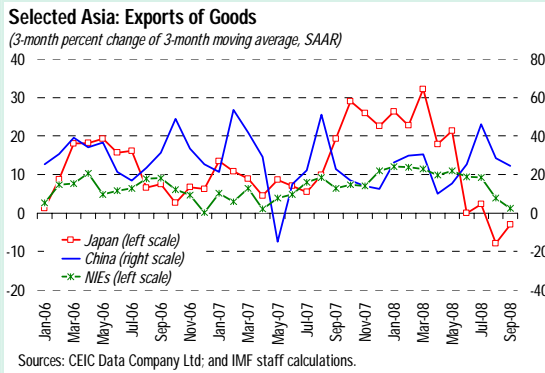
...while the growth decline in India is very noticeable.

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

Sources: CEIC Data Company Ltd; and IMF staff calculations.
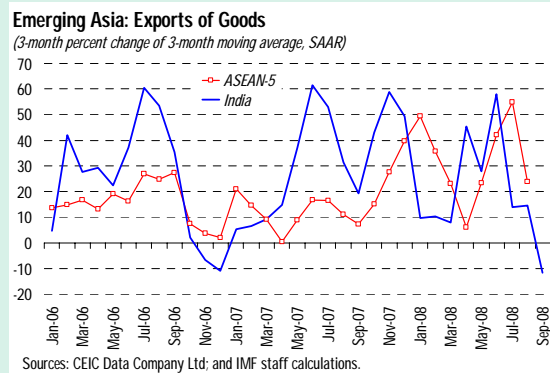
Forward-looking indicators of global trade show sharp declines...

Baltic Dry Index[1]
(Benchmark for commodity shipping costs; in U.S. dollar terms)

Source: Bloomberg LP.
[1] A composite of the Baltic Capsize, Panamax, Handisize, and Supramax indices.
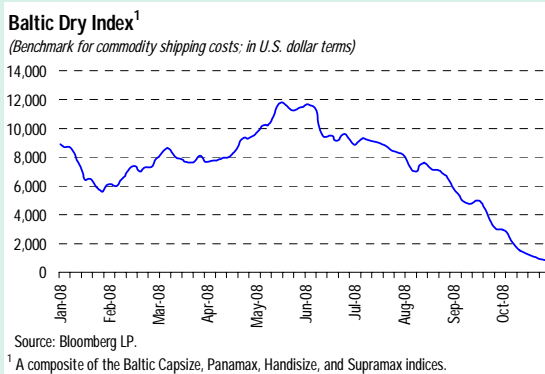
...while leading indicators for the tech sector point to slowing momentum ahead.

Tech Sector Indicators
(3-month moving average)

Source: CEIC Data Company Ltd.
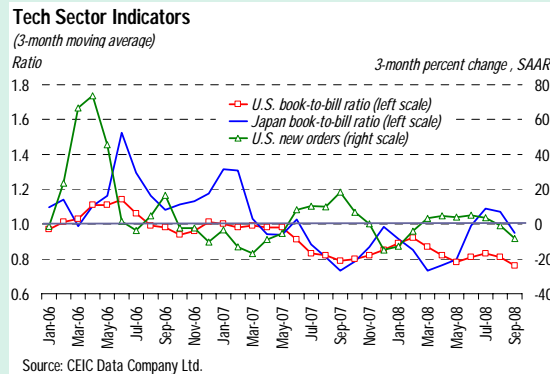
Import growth has slowed in the NIEs and ASEAN-5...

Emerging Asia: Imports of Goods
(3-month percent change of 3-month moving average, SAAR)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
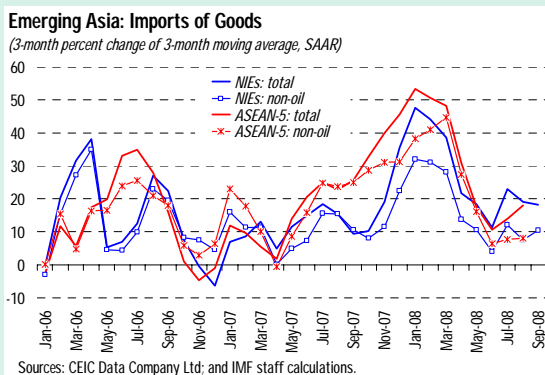
...as well as in Japan, China, and India.

Japan, China, and India: Imports of Non-oil Goods
(3-month percent change of 3-month moving average, SAAR)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
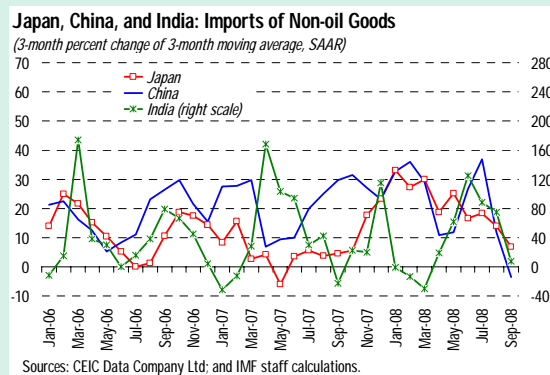
Figure 1A.3. Real Sector Activity

Terms-of-trade losses have been a drag on industrial activity...

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

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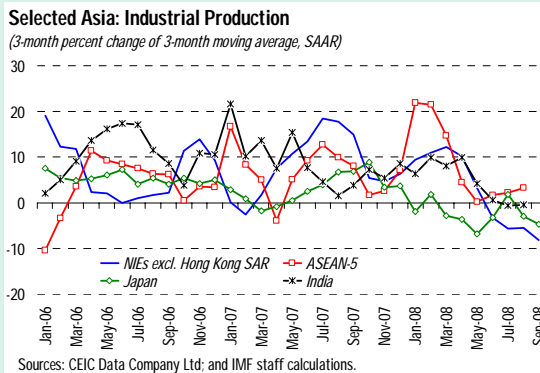
...and weakened business confidence.

Selected Asia: Business Confidence
(January 2006=100)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
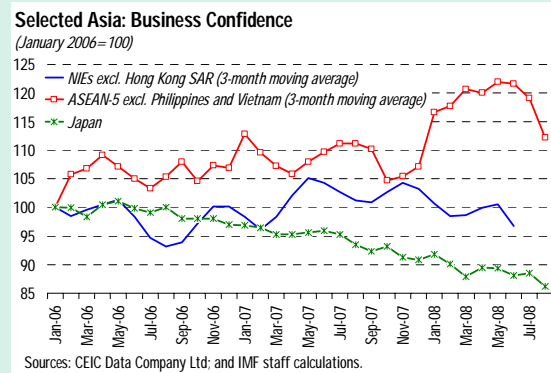
Profit margins have been squeezed as producer prices continue to outstrip consumer prices...

Emerging Asia: Consumer and Producer Prices
(3-month percent change of 3-month moving average, SAAR)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] Excludes Hong Kong SAR and Vietnam.
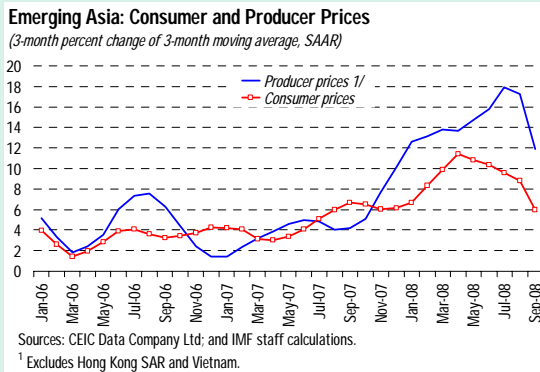
...while employment remains sluggish.

Selected Asia: Employment Growth
(3-month percent change of 3-month moving average, SAAR)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
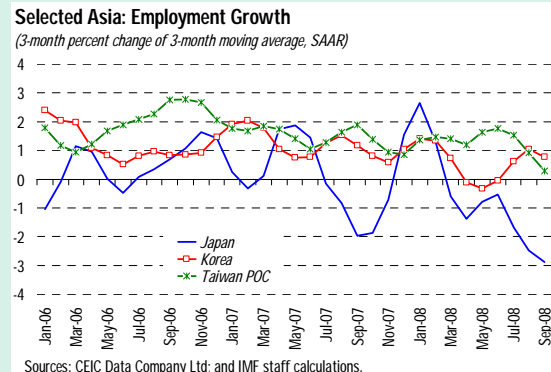
Consumer sentiment has weakened, particularly for the NIEs and Japan...

Selected Asia: Consumer Confidence
(January 2006=100)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
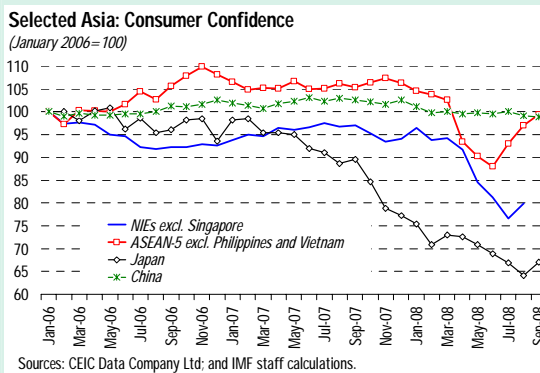
...holding back personal spending, except in China.

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).
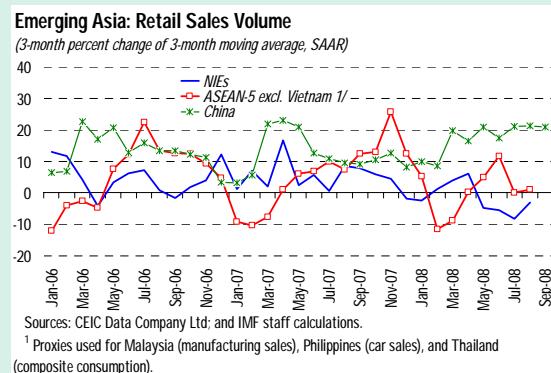
Figure 1A.4. Inflation Developments

Headline inflation has risen across the region (though in China, it has been falling for a while)...

Emerging Asia: Consumer Prices
(12-month percent change)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
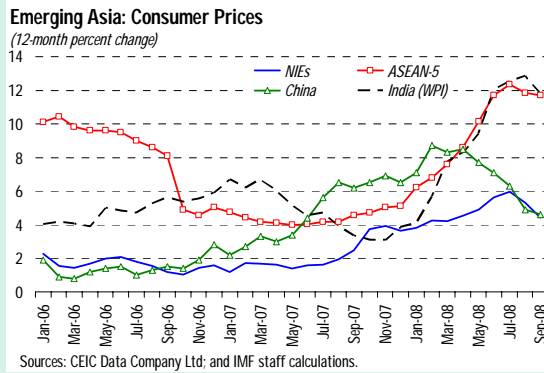
...driven mainly by rising food prices, which account for a large share of the CPI basket...

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

Sources: CEIC Data Company Ltd; and IMF staff calculations.
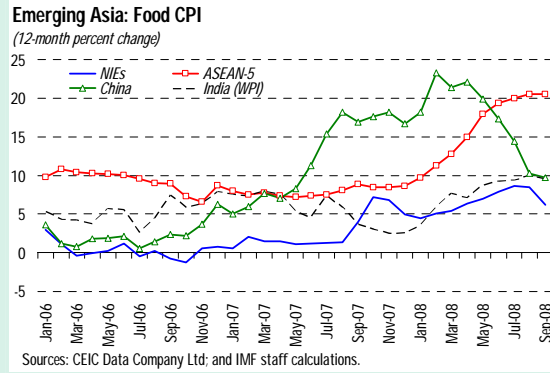
...and to a lesser extent by fuel prices.

Emerging Asia: Fuel CPI
(12-month percent change)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
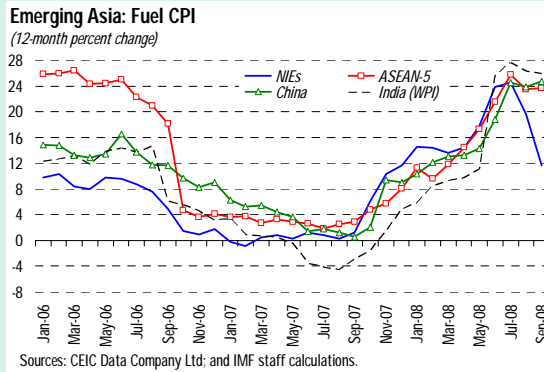
However, headline inflation has already peaked...

Emerging Asia: Consumer Prices
(3-month percent change of 3-month moving average, SAAR)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
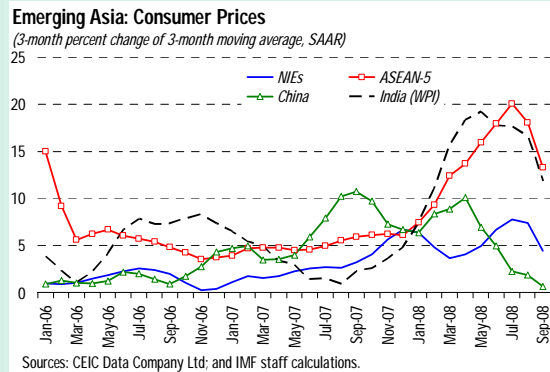
...and the same seems to be the case for core inflation...

Emerging Asia: Core CPI
(3-month percent change of 3-month moving average, SAAR)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
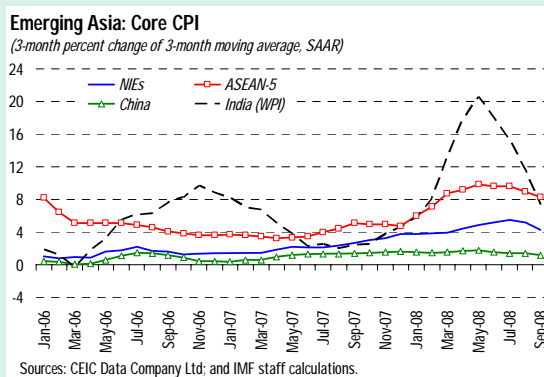
...while real wage growth in Japan, Malaysia, and the Philippines is negative and trending downwards.

Selected Asia: Real Wage Growth
(3-month percent change of 3-month moving average, SAAR)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
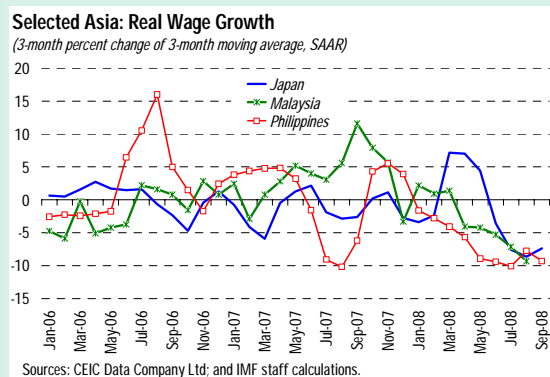
Figure 1A.5. Monetary Developments

With higher inflation and some easing, real policy rates remain negative in many countries, providing support to activity.

Selected Asia: Real Policy Rates (Headline)[1]
(In percentage points)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] Real policy rates are measured on the basis of latest available headline inflation.
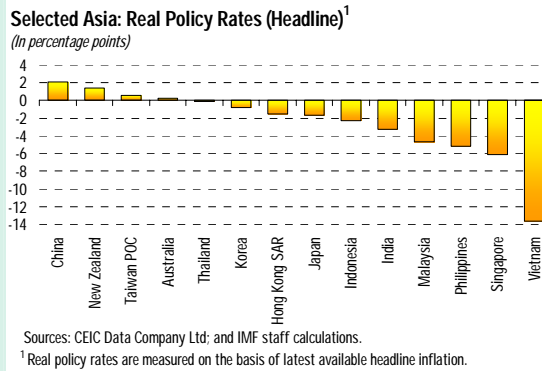
Real policy rates adjusted for core inflation are also negative in several countries.

Selected Asia: Real Policy Rates (Core)[1]
(In percentage points)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] Real policy rates are measured on the basis of latest available core inflation.
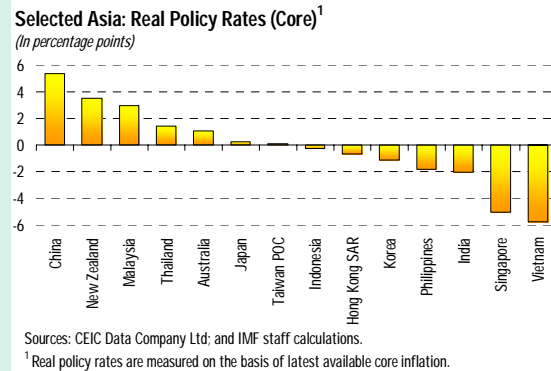
Nominal monetary conditions have loosened (except in China)...

Selected Asia: Nominal Monetary Conditions Indices[1]

Sources: Bloomberg LP; IMF, Information Notice System, and staff calculations.
[1] The monetary conditions index is a weighted average of changes in the monetary policy rate and changes in the NEER.
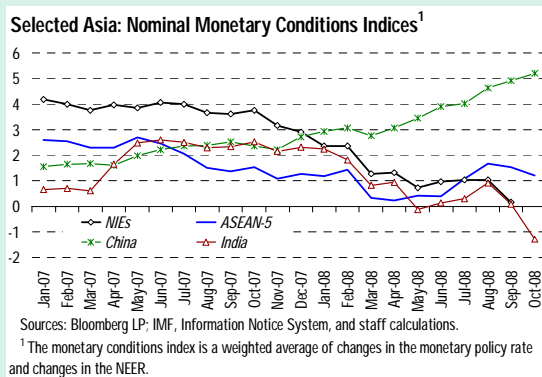
...and credit growth remains robust except in Vietnam, where policies have been tightened.

Selected Asia: Private Sector Credit Growth
(3-month percent change of 3-month moving average, SAAR)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
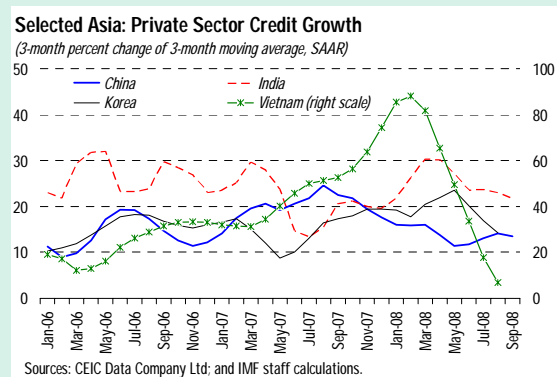
But because of the global credit turmoil, financial conditions are tighter than suggested by the stance of monetary policy...

Selected Asia: Financial Conditions Indices[1]

Sources: Bloomberg LP; IMF, Information Notice System, and staff calculations.
[1] The financial conditions index is a weighted average of changes in the monetary policy rate, the NEER, and the JPMorgan Emerging Market Bond Index Global sovereign spread.
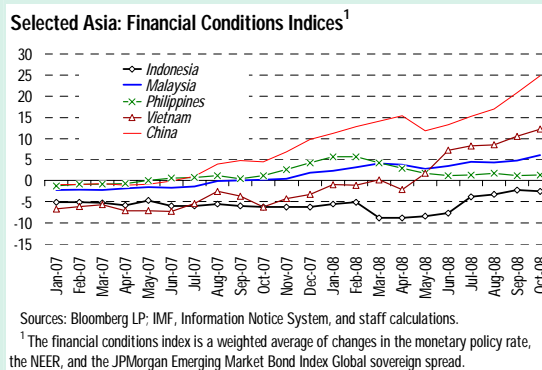
...prompting some central banks to inject exceptional liquidity to stabilize short-term money market rates.

Hong Kong SAR, Japan, and Singapore: "TED" Spreads[1]
(In percentage points)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
[1] For Hong Kong SAR, 3-month HIBOR and exchange fund bills; for Japan, 3-month LIBOR and OIS rates; for Singapore, 3-month SIBOR and treasury bill rates are used.
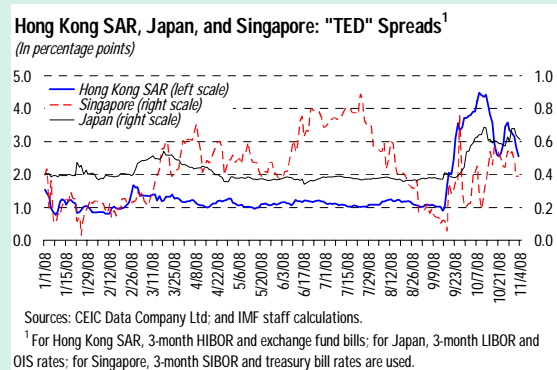
II. The Globalization of Asian Inflation

Emerging Asia has recently experienced a sharp rise in inflation, although concerns have now shifted away from inflation onto growth. After reaching double-digit levels in several countries in the region and breaching the target in almost all inflation-targeting regimes, inflation has peaked in most cases through a combination of declining commodity prices, tightened monetary policy, and slowing growth. At the same time, the global financial crisis and concerns that it may translate into a hard landing for global and regional growth have understandably become the main focus of policymakers.

Yet behind this changing short-term focus, Asia has experienced a significant change in the structure of its inflationary process. While in the past, inflation in the region could be traced back to domestic factors and domestic channels, the big increase in global relative prices, notably of commodities, has been the driving force behind rising headline and core inflation this time around. At the same time, increases in commodity prices have been driven in good part by rapid growth in Asia, implying that the region has both exported inflation to the global economy and simultaneously imported it back. In a sense, this has been the counterpart to Asia's global deflationary impact through the integration of its large and highly productive labor pool into the global economy.

In the near term, sharply falling commodity prices may exert strong deflationary pressures on Asia. At the same time, commodity prices are tentatively expected to return to a high and volatile medium-term equilibrium, the result of underlying imbalances in commodity markets that this chapter will explore. Such gyrations in commodity prices combined with their rising impact on the region's

inflationary process may exacerbate already high inflation volatility, entrench wedges––both positive and negative––between core and headline inflation, and worsen output/inflation volatility trade-offs faced by central banks. Going forward, both the design and conduct of policy in the region will have to take these considerations into account.

Asia's Changing Inflation Landscape

Inflation in Asia has increased substantially. On a year-on-year basis, emerging Asia's inflation jumped from 3.6 percent in late 2006 to 7 percent in September 2008, and that in industrial Asia from 0.8 percent to 2.6 percent (Figure 2.1). While some countries, such as Vietnam, Indonesia, and India, have been more affected than others, the increase in inflation has been widespread. Moreover, inflation is now above the target set by the monetary authorities in most inflation-targeting countries. While there are signs that inflation has peaked in some countries, not least thanks to monetary tightening, high producer price inflation coupled with still-biting subsidies suggests that inflationary pressures remain in the system.

Figure 2.1. Asia: Consumer Prices
(12-month percent change)[1]

Sources: CEIC Data Company Ltd; and IMF, *World Economic Outlook* and staff calculations.
[1] Purchasing-power-parity-weighted average.
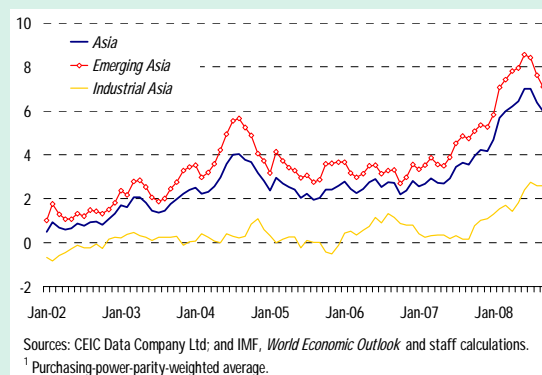
Note: The main authors of this chapter are Carol Baker, Souvik Gupta, Jacques Miniane, and Francis Vitek.

More than in the past, inflation in Asia appears to be driven by global factors. Correlations between inflation in Asia and that in the Americas or Europe were already quite high in the early 2000s, at close to 0.5, possibly as a result of monetary policy links (Table 2.1). But in the past four years, inflation in these three regions has been moving in almost perfect tandem, suggesting a common factor underpinning global inflation.

Table 2.1. Asia Inflation: Correlation with Inflation in Other Regions
(Contemporaneous correlation between estimates of principal components of headline CPI inflation)

	1999–2002	2003–2008	2007–2008
Americas[1]	0.47	0.81	0.92
Europe	0.59	0.91	0.98
World	0.69	0.96	0.98
Commodities	-0.06	0.80	0.97

Source: IMF staff calculations.
[1] Excludes Argentina and Ecuador.

Commodity prices, including those for food and fuel, have been the key global factor driving inflation. In recent years, headline inflation in Asia has been very highly correlated with global commodity price inflation. At the domestic level, retail food and fuel prices have contributed between one-third and three-fourths of total cumulative CPI inflation since 2003 (Figure 2.2). This has happened despite below-market prices on these goods in various countries in the region, resulting from the use of direct and indirect subsidies, as well as other administrative measures.

Figure 2.2. Asia: Price Movements
(Cumulative percent change, January 2003 to September 2008)
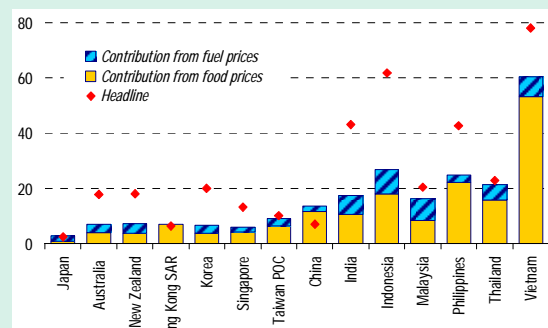
Sources: CEIC Data Company Ltd; and IMF staff calculations.

More accurate measurement suggests that imported inflation has accounted for a substantial share of total inflation in Asia, but domestic inflation has also played its part (Figure 2.3). Food and fuel prices need not be a good gauge of true imported inflation, as retail prices for these goods have a large domestic component, while many nonfood, nonfuel items in the CPI can have a large imported component.[9] Separating for each good and service its underlying imported versus domestic component yields clear patterns:

- In commodity-importing countries, which represent most of Asia's economy, imported inflation has typically contributed about half of total cumulative inflation since 2000. In some economies, like Japan and Taiwan Province of China, estimated imported inflation more than explains inflation, implying that the domestic component may have contributed negatively overall.[10] Moreover, the estimated contribution from imported inflation has risen noticeably over the last two years.[11]

- Nonetheless, the contribution of domestic inflation in commodity-importing economies can be significant, notably in China, where it has accounted for close to 80 percent of total inflation over the last three years.[12]

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[9] Moreover, in some cases the shocks to food prices can be domestic, as in the pig epidemic in China.

[10] This categorization of imported and domestic inflation has important limitations, such as the assumption of complete pass-through of import prices in domestic currency to retail prices. This assumption may not be a good approximation in some countries, such as Japan. It should also be noted that "imported inflation" need not mean "exogenous inflation" in this categorization. One example of this difference could be energy prices, which here enter through imported inflation yet may be affected by trends in Asia, as discussed later.

[11] The contribution from imported inflation has also risen sharply in the United States over this period, particularly in the most recent quarters. The appreciation of the euro has also helped dampen import prices in the euro area over this period.

[12] In China, as in countries like Malaysia or Indonesia, direct and indirect subsidies have limited the impact of imported inflation.

Figure 2.3. Consumer Price Inflation and Contribution from Import and Domestic Prices[1]

(Year-on-year, in logarithmic difference)

■ *Estimated contribution from import prices*　■ *Estimated contribution from domestic prices*　—— *Headline inflation*

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

[1] The contribution from import prices to headline inflation is obtained by weighting import unit values (in domestic currency) with the import content in the consumption basket. The contribution from domestic prices is obtained by weighting the GDP deflator with one minus the import content in the consumption basket. Reported headline inflation may differ slightly from the official year-on-year inflation rate because of the logarithmic transformation and seasonal adjustment of the consumer price index.

- In commodity-exporting countries such as Australia and New Zealand, the pattern has been different, with domestic inflation estimated to have contributed upwards of 70 percent of cumulative inflation over the period. This is because exchange rate appreciations in some of these countries have dampened the impact of rising import prices, while strong domestic expansions related to terms-of-trade gains have contributed to higher prices in nontradables, such as housing.

It appears inflation in the region has been driven primarily by a large increase in the relative price of commodities, in tandem with inflation elsewhere. With commodity prices falling rapidly in recent months, a key question is whether the run-up that started in 2003 was a temporary or a lasting phenomenon. Part of the answer lies in understanding the role that Asia played in soaring global demand for commodities. This is the focus of our next section.

Asia and the Commodities Boom

Rising demand coupled with inelastic supply contributed to soaring commodity prices in recent years. From 2003 to mid-2008, demand for oil surged under the impetus of emerging markets, while global supply rose only modestly despite the very large price increase. As a result, spare capacity has fallen to historically low levels, at which the impact of small shocks on prices can be disproportionately large, resulting in high price volatility (Figure 2.4). Similar dynamics, albeit less

Figure 2.4. Oil: OPEC Spare Capacity
(In million barrels per day)
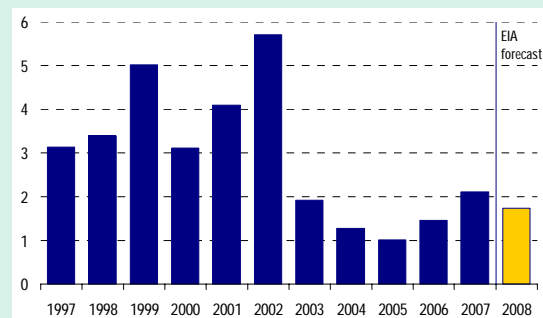
Source: Short-Term Energy Outlook, November 2008, Energy Information Administration, U.S. Government.

extreme, have characterized other commodity markets.

A key question, then, is whether these demand/supply imbalances are temporary or are here to stay. This question is particularly relevant on account of the sharp drop in commodity prices in recent months. Yet it is worth noting that options markets in early November still signaled close to 25 percent probability that oil prices will be above US$100 at end-2009 despite the global slowdown, and over 10 percent probability that prices will exceed US$120. Most important, options markets signal large uncertainty about the future path of oil prices, implying potentially high volatility (Figure 2.5).

Figure 2.5. Expected Brent Crude Oil Price
(From futures options on November 4, 2008; in U.S. dollars per barrel)
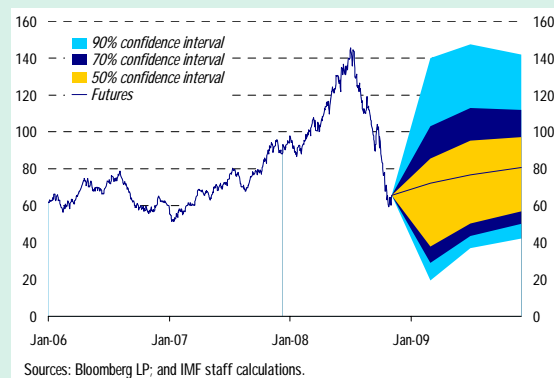
Sources: Bloomberg LP; and IMF staff calculations.

Model estimations also support the view that imbalances have a significant permanent component. These estimations stem from a five-region model of the global economy, which among other features decomposes commodity prices into cyclical output gap, on one side, and permanent changes in the supply/demand balance on the other.[13] According to these estimates, a substantial share of commodity price inflation in recent years has stemmed from permanent shocks (Figure 2.6), signaling that estimated trend demand has been running faster than estimated trend supply,

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[13] See the appendix to this chapter for details on our estimated model.

thereby putting pressures on prices.[14] As others have noted, *trend* demand from emerging markets is not expected to slow substantially in the medium to long run, while supply has been dogged by lasting factors such as higher extraction costs in marginal fields. Indeed, the "time to build" lags have increased relative to past oil booms, and capacity expansion has consistently fallen short of expectations in recent years.[15] At the same time, cyclical factors played an important role in the latest price run-up before the correction in the third quarter.

Figure 2.6. Historical Decomposition of Commodity Price Inflation
(Annual percent change)

Source: IMF staff estimates.
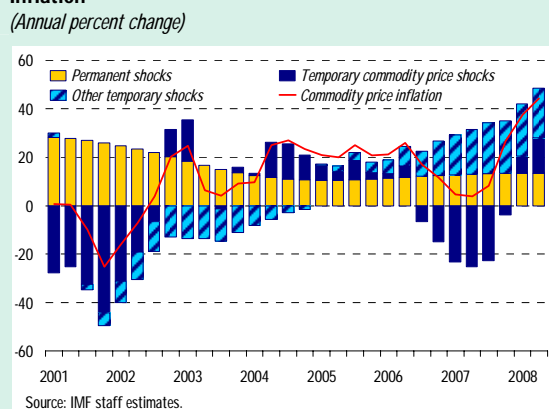
What role did Asia play in soaring energy demand? A key one. Given Asia's rapid energy intensive industrialization, rising incomes, and expanding middle classes, *all of which appear to be secular rather than transitory phenomena*, it is not surprising (in hindsight) that global energy demand has increased so sharply over the last five years. For instance, global demand for primary energy increased by some 600 million oil equivalent tonnes between 1998 and 2002, but by more than 1,500 million between 2002 and 2007 (Figure 2.7). Asia—mostly China and India—contributed close to two-thirds of the latter increase.

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[14] Related work also finds a large permanent component in surging oil prices; see Arbatli (2008). Needless to say, all such estimates should be interpreted with a good deal of caution, given difficulties in, inter alia, separating trend and cyclical components in commodity markets or accounting for nonlinearities in prices when spare capacity is low or financial markets are under heavy stress.

[15] See IMF (2008a) for more details.

Figure 2.7. Annual Change in Consumption of Primary Energy
(Relative to previous year, in million tonnes oil equivalent)

Sources: Statistical Review of World Energy, 2008, BP PLC; and IMF staff calculations.
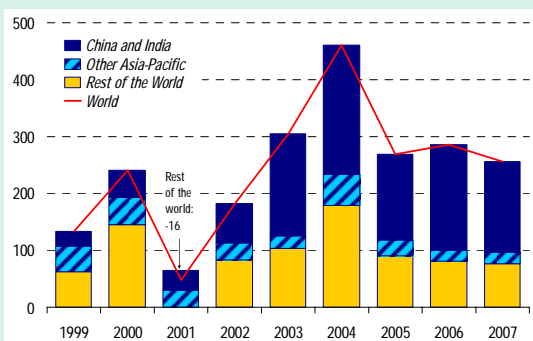
A similar story applies to metals and foods. The cumulative increase in global demand for aluminum and copper—the two key base metals—more than tripled over 2003–2007 relative to 1999–2002 (Figure 2.8). Asia by itself accounted for close to 75 percent of the 2003–2007 increase. Similarly, global demand for soy increased by more than 70 million metric tonnes over 2003–2007, compared with a 50 million metric ton increase in the previous five years. Asia accounted for more than 40 percent of the 70 million metric ton increase. Demand for other grains shows similar patterns.

Figure 2.8. Annual Change in Consumption of Aluminum
(Relative to previous year, in thousand metric tonnes)

Sources: World Bureau of Metal Statistics; and IMF staff calculations.
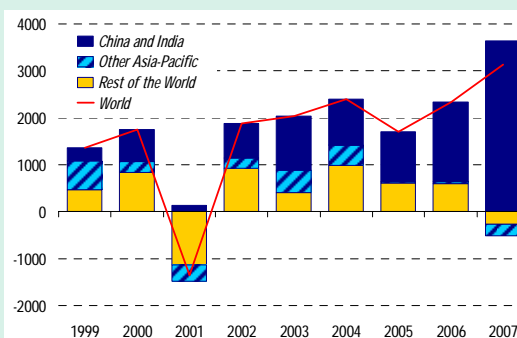
While rapid trend growth in the global economy contributed to commodity market imbalances, policy distortions also played a part. As is well known, countries in Asia and abroad have kept energy and food prices down through direct and indirect subsidies, preventing demand from fully adjusting to

higher international prices. In the case of fuel subsidies, our estimates suggest that removing them throughout the world would have translated into a 2–4 percent drop in global demand for oil (see Box 2.1). Were Asia alone to remove its subsidies, we estimate that global demand would be 1¼–2½ percent lower. While this may not seem large, it is potentially significant in the context of historically low spare capacity. Indeed, a 3 percent lower 2007 global demand would have been equivalent, ceteris paribus, to a doubling of 2007 global spare capacity, restoring some two-thirds of the decline in such capacity since the demand boom started in 2003.

What are the possible policy implications stemming from the underlying changes in Asia's inflationary process, notably the rising contribution from imported inflation through volatile commodity prices? Addressing this is the purpose of the next section.[16]

Policy Considerations

Even in a context where a substantial share of inflation is imported, monetary policy has a key role to play. It is true that shifts in commodity prices have played an important role in fanning inflation in Asia and that these shifts seem not to owe much to global or Asia-specific cyclical considerations. However, monetary policy can ensure that there are no second-round effects from imported inflation on domestic inflation. Beyond these second-round effects, monetary policy has a causal impact on other sources of domestically generated inflation, such as capacity constraints in labor and capital markets. Indeed, the correlation between inflation and model estimates of monetary policy tightness is negative and large in Asia, and negative correlations persist after many quarters, indicating that the effect of monetary policy on inflation is persistent (Figure 2.9).

While monetary policy remains as relevant as ever, changes in Asia's inflationary process will create

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[16] See Habermeier and others (forthcoming).

Figure 2.9. Asia: Dynamic Correlation between Monetary Policy and Inflation[1]

Source: IMF staff estimates.
[1] Model estimate of the dynamic correlation between the real interest rate gap and headline inflation.
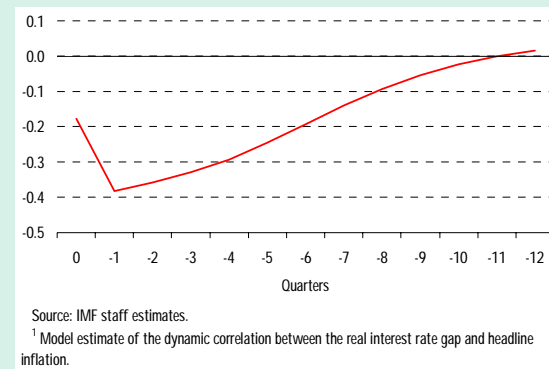
new challenges for policy and may entail some reconsideration of policy frameworks. To start, standard practice dictates that monetary policy should not respond to external shifts in relative prices, and contractionary policies should not be implemented to compensate for temporarily higher headline inflation. But standard practice is based on the assumption that the gap between headline and core inflation will be relatively short lived, when in fact the persistence of the commodity price shift has led to large and persistent gaps, in Asia and abroad (Figure 2.10). Going forward, fast declines in commodity prices may now lead to persistent *negative* gaps between headline and core inflation. Since households and firms ultimately care about headline inflation, persistent gaps, both positive and negative, call into question the usefulness of core inflation as the primary or implicit operational target.

Figure 2.10. Asia: Difference between Headline and Core Inflation
(In percent)

Sources: CEIC Data Company Ltd; and IMF staff calculations.
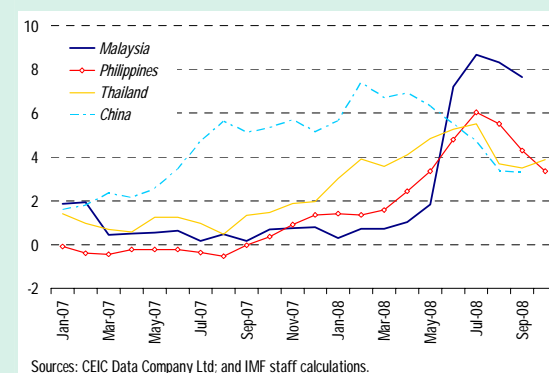
Box 2.1. Food and Fuel Subsidies in Asia and the World: Are They High, and Have They Affected International Prices?

Subsidies—broadly defined to include administered prices—affect demand and supply through impeding price adjustment. On the supply side, a price ceiling gives little incentive to producers to increase production, while a price floor leads to inefficient overallocation of resources into a sector. From the demand side, direct subsidies and price ceilings lead to overdemand relative to equilibrium. Pervasive subsidization by a group of countries, especially countries in which demand is growing rapidly, could result in market power, pushing global demand, and hence prices, higher.

Direct budget subsidies are a global phenomenon common in both developing and emerging markets, and Asia does not appear to have particularly high direct subsidies by international standards.[1] Nearly one-third of 147 countries sampled by the IMF report direct fuel subsidies in their budgetary accounts, and nearly one-fifth report food subsidies.[2] The proportion of Asian countries directly subsidizing food—mostly rice—is higher than that in other regions except the Middle East, as is the average fiscal cost, which remains relatively modest. Regarding direct fuel subsidies, the fiscal burden, estimated at 0.1 percent of Asia's GDP, is small relative to that in other regions. These facts reflect in part that the Asia region is a net oil importer, home to a mere 3 percent of proven reserves. At the same time, the reported Asia average may be artificially low as a result of data limitations in large countries like China. It also masks wide variance within the region, with countries like Indonesia spending more than 2 percent of GDP on fuel subsidies.

Countries with Direct Food and Fuel Subsidies and the Estimated Fiscal Cost, 2007

	Number of Countries Reporting Subsidies in Fiscal Accounts		Weighted Group Average (in percent of regional GDP)[1]	
	Food subsidies	Fuel subsidies	Food subsidies	Fuel subsidies
Africa (44)	7	8	0.0	0.6
Asia (20)	7	6	0.2	0.1
Europe (26)	0	5	0.0	0.0
Middle East (27)	9	14	0.3	1.4
Americas (30)	4	14	0.0	0.1
Total (147)	27	47	0.1	0.1

Sources: Country authorities; and IMF staff estimates.
[1] Share in the regional nominal GDP in U.S. dollars used as weights. Numbers in parentheses specify number of countries covered in a particular region.

An alternative and in some sense broader measure of fuel subsidies compares the domestic retail fuel price to the international price, with a higher price implying a net tax and a lower price indicating a net subsidy.[3] About 17 percent of the 127 countries for which retail gasoline prices are available for end-2007 have a retail price below the world price, with many of these countries in the Middle East; a somewhat higher percentage of countries have net subsidies on diesel. Calculating subsidies on this basis, it does not appear that Asia has higher subsidies than

Fuel Subsidy Estimates Based on Retail Price Data, End-2007

	Number of Countries for Which Retail Data Are Available		Number of Countries with Retail Price Less Than World Price[1]		Percent Subsidy (average)		Number of Countries with Retail Price More Than World Price[1]		Percent Tax (average)	
	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel
Africa	37	35	4	4	-23.3	-39.5	33	31	135.0	91.7
Asia	16	15	2	3	-10.7	-26.8	14	12	85.9	43.4
Europe	32	32	0	0	0.0	0.0	32	32	201.3	145.6
Middle East	26	28	14	21	-41.9	-56.8	12	7	39.9	28.1
Americas	16	15	2	4	-12.5	-29.8	14	11	66.1	38.9
Total	127	125	22	32	-22.1	-38.2	105	93	105.6	69.6

Sources: IMF, Fiscal Affairs Department, based on desk submissions, and staff calculations.
[1] The world price reflects complete pass-through plus processing and distribution costs, but net of any taxes or subsidies.

_____

[1] Direct subsidies are found most often in countries with liberalized product import and/or distribution, with the government setting a ceiling price then compensating private sector firms for the price differential plus an agreed margin.

[2] IMF, "Food and Fuel Prices—Recent Developments, Macroeconomic Impact, and Policy Responses," available via the Internet: www.imf.org/external/np/exr/foodfuel/index.htm.

[3] The world price reflects complete pass-through plus processing and distribution costs, but net of taxes and subsidies.

the rest of the world—indeed the average net tax in Asia (including countries with net subsidies) is higher than that in the United States. Net taxes in fast-growing China, while positive, are significantly below the world average.

Data on indirect subsidies through the use of administered prices for fuels sold to industry are very limited, but anecdotal evidence suggests that such subsidies also span the globe. In addition to Asia, indirect subsidies can be found in Latin America, the Middle East oil-producing nations, and Eastern Europe/Central Asia. Indirect subsidies usually imply direct or close participation by the government in the production and/or distribution process. In some cases, governments directly control import levels, domestic distribution, and domestic prices. In others, government-owned or government-linked companies sell their products at a ceiling price without direct budgetary compensation, depressing profit margins and leading to quasi-fiscal losses to revenue.

There is some evidence that fuel subsidies, direct and indirect, have contributed to higher demand for oil. The rate of growth of consumption of both primary fuels and oil between 2003 and 2007 in a group of subsidizing countries chosen for study[4] was five times that of nonsubsidizing countries (18.9 percent versus 3.6 percent), in part driven by very high demand growth in China. As a result, subsidizing countries' share of primary fuels consumption has increased by nearly 5 percentage points since 2003, and by about half that amount for oil. Even taking into consideration low GDP and income growth in nonsubsidizing OECD countries versus subsidizing emerging markets, the difference in demand growth is sizeable, pointing to a likely impact of subsidy policies on consumption.

Moreover, fuel subsidies may have had enough of an impact on *global* demand to affect market balances materially. To start, it is worth noting that OECD countries, which typically do not subsidize fuels, still account for more than 50 percent of total primary fuels consumption and just under 60 percent of global oil consumption. Moreover, only about half of the non-OECD fuel consumption is taken up by emerging markets reported to have sizeable subsidies. This being said:

Growth in Consumption of Oil and Primary Fuels, 2003–07
(In percent)

	Oil			Primary Fuels		
	2003–07	2003	2007	2003–07	2003	2007
	Change	*Share*	*Share*	*Change*	*Share*	*Share*
World	7.4	100.0	100.0	12.9	100.0	100.0
Selected subsidizing countries	18.9	24.7	27.3	30.6	31.0	35.8
excl. China	12.2	14.9	15.6	16.4	16.6	17.1
World excluding selected subsidizers	3.6	75.3	72.7	5.0	69.0	64.2
OECD countries	1.2	60.4	56.9	2.7	55.2	50.2

Sources: Statistical Review of World Energy, 2008, BP PLC.; and IMF staff calculations.

- If oil consumption in subsidizing countries had grown at the same rate as that in nonsubsidizing emerging countries, global demand in 2007 would have been 1½ percent lower. If demand from subsidizing countries had grown at the same rate as that in all nonsubsidizing countries, emerging and developed, global demand would have been 3½ percent lower.

- If it is assumed that the domestic price in subsidizing countries is, on average, one-third to one-half of the full pass-through price, and that the short-run elasticity of oil demand is between 5 percent and 10 percent, total global consumption without subsidies would have been 1½–5½ percent lower than the 2007 outturn.[5]

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[4] Information on indirect subsidies is elusive, hence the need to focus on a selected group of countries. The selected 13 emerging countries are Argentina, Brazil, China, Ecuador, Egypt, India, Indonesia, Iran, Malaysia, Pakistan, Russia, Saudi Arabia, and Venezuela. They were chosen among all subsidizing countries because of their relatively large contribution to global energy demand.

[5] Recent studies find that the short-run elasticity of oil demand has fallen dramatically over the past few decades and is now very low, in the range of less than 10 percent. See Hamilton (2008) and Cooper (2003).

Box 2.1 *(concluded)*

- While demand in subsidizing countries rose rapidly, net exports by these countries also rose if one excludes China, with increased production by Russia, and to a lesser extent Brazil, Ecuador, and Iran, more than offsetting increases in demand and in some cases declines in production elsewhere. When China is included, net exports of subsidizing countries declined by 67 million tonnes, less than 2 percent of global 2007 consumption.

These three approaches suggest that, in the absence of subsidies across all countries, global 2007 demand would have been some 2–4 percent lower. Were Asia alone to remove its subsidies, global 2007 demand would have been some 1¼–2½ percent lower, given that Asia has accounted for a large share in global demand growth.[6] While these numbers may not seem large, it is worth noting that global oil markets have in recent years been characterized by historically low spare capacity, which in turn may have been a cause of high oil prices or a symptom of prospective oil scarcity. Indeed, a 3 percent lower 2007 global demand would have been equivalent, ceteris paribus, to a doubling of 2007 global spare capacity, restoring some two-thirds of the decline in such capacity since the demand boom started in 2003.

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[6] This calculation is derived using the simplifying assumption that subsidies in Asia had the same impact on Asian demand as subsidies in other regions had on demand in those regions.

With inflation increasingly driven by external shocks, policymakers may face a more difficult trade-off between output and inflation stabilization. In normal times, most central banks in the region pursue the dual objectives of output and inflation stabilization around a certain target.[17] When inflation is driven primarily by shocks to domestic demand, the two objectives may be fully compatible, as stimulating/slowing economic growth would a priori lead to higher/lower inflation. But when external price shifts—both positive and negative— play an important role in the inflationary process, policymakers may be forced to choose between stabilizing inflation and stabilizing output around their targets, in particular in commodity-importing countries. For instance, exogenous increases in commodity prices could feed into headline inflation at a time when a country's output is below potential. To quantify these issues, we looked at what would happen to the volatility of inflation around its target in the context of larger (in absolute value) commodity shocks, assuming central banks in the

region keep constant the volatility of output around potential. In almost all countries in the region, inflation volatility would go up (Figure 2.11); conversely, were central banks to keep inflation volatility constant under stronger commodity price shocks, output volatility would go up.[18]

Figure 2.11. Asia: Worsening Inflation/Output Stabilization Trade-Off[1]
(In percent)
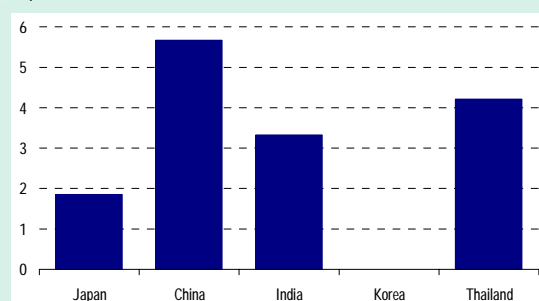
Source: IMF staff estimates.
[1] Increase in inflation volatility resulting from a simulated 10 percent increase in the volatility of commodity price shocks, normalized to keep output volatility constant.

––––––––
[17] In the current exceptional circumstances, some cental banks may be primarily concerned with containing systemic financial risk.

––––––––
[18] Regarding the estimated trade-off in individual countries, note that the trade-off depends on a variety of country factors, such as the share of imported goods in consumption, the exchange rate regime, and the credibility of monetary policy.

Moreover, highly volatile commodity prices are likely to translate into more volatile inflation. Indeed, there is evidence that inflation volatility has gone up in Asia in recent years, with the standard deviation increasing by around 30 percent since 2005 (Table 2.2). While inflation volatility may have increased as a result of other factors, it is noteworthy that commodity-importing countries have experienced the highest jump in volatility. The more volatile inflation is, the harder it is for economic agents to predict it correctly, leading to greater resource misallocation.

Table 2.2. Volatility of Inflation

Economy	Standard Deviation	
	2000–2004	2005–July 2008
Asia	1.57	2.06
Industrial Asia	0.78	0.69
Emerging Asia	1.78	2.43
Commodity exporters[1]	1.55	1.77
Commodity importers[2]	1.58	2.18

Sources: IMF, Information Notice System, *World Economic Outlook,* and staff calculations.

[1] Commodity exporters are Australia, New Zealand, Indonesia, and Malaysia.

[2] Commodity importers are Japan, Hong Kong SAR, Korea, Singapore, Taiwan POC, China, India, the Philippines, Thailand, and Vietnam.

These challenges will put a premium on good central bank communication. With highly volatile inflation, clear communication by central banks will be key to help anchor expectations. Central banks, and especially inflation targeters, need to communicate the time frame within which they expect shocks (positive and negative) to inflation to subside and inflation to return to its implicit or explicit target; what assumptions underpin this view; and what policy measures would be undertaken in the event this baseline scenario does not materialize. This is particularly true in countries where monetary policy credibility still remains to be fully established.

Should the endogeneity of commodity prices be taken into account by policymakers? As discussed, high commodity prices have resulted in part from strong underlying growth in Asia, begging the important question of whether commodity prices should be part of the policy reaction function of central banks. In countries whose effect on global commodity prices is negligible, it seems uncontroversial that they should not be. But even in the larger countries, "targeting" of commodity prices would appear misplaced given the global nature of commodity markets and the fact that imbalances in these markets seem more secular than policy driven. At the same time, commodity prices seem to contain useful information for monetary policy. In particular, higher commodity-driven inflation in recent years at a time when wage data and other indicators signaled little in the way of capacity pressures seems to suggest that energy prices are a better indicator of the output gap, in Asia and globally. Conversely, falling commodity prices appear to be a leading indicator of future capacity constraints, ahead of labor market data.

Concluding Remarks

Beyond short-term considerations in regard to the expected path of inflation in various Asian countries, the *nature* of inflation in Asia has changed substantially over the last several years. In particular, global relative price shifts, both positive and negative, are now playing a larger role. Cyclically low commodity prices are tentatively expected to return to a high and volatile medium-term equilibrium, the result of underlying imbalances in commodity markets. These trends have important implications for the design and conduct of monetary policy in the region, as well as the challenges and trade-offs that policymakers are likely to face.

Appendix

Decomposing Imported and Domestic Components of Inflation

We perform this decomposition not by arbitrarily classifying each goods category in the CPI basket as "imported" or "domestic," but by proxying the CPI index through a convex combination of the import price deflator and the GDP deflator, with weights

equal to the import content of consumption and one minus the import content of consumption, respectively. Such a decomposition is at the root of most modern open macro models, as can be seen in Obstfeld and Rogoff (1996). When not available, the respective weights were estimated through regression analysis to minimize the distance between the proxy and the actual CPI. In Asian countries, the convex combinations track the actual CPI quite closely.

Estimated Model of the Global Economy

Our econometric analysis is based on an estimated unobserved-components model of the world economy featuring five open economies connected by trade and financial linkages. Cyclical components are modeled as a multivariate linear rational expectations model of the monetary transmission mechanisms in these five economies. The monetary transmission mechanism in each economy is described by an aggregate supply relationship, an aggregate demand relationship, a nominal interest rate rule, and a generalized real uncovered interest parity condition. Trend components are modeled as independent random walks.

In what follows, $x_{i,t}^f$ denotes the arithmetic trade-weighted average of variable $x_{i,t}$ across the trading partners of economy i, while x_t^w denotes the arithmetic output-weighted average of variable $x_{i,t}$ across all economies. Furthermore, $\mathrm{E}_t\, x_{i,t+s}$ denotes the rational expectation of variable $x_{i,t+s}$ associated with economy i, conditional on information available at time t. Finally, $\hat{x}_{i,t}$ denotes the cyclical component of variable $x_{i,t}$, while $\overline{x}_{i,t}$ denotes the trend component of variable $x_{i,t}$. Cyclical and trend components are additively separable, that is, $x_{i,t} = \hat{x}_{i,t} + \overline{x}_{i,t}$.

Cyclical Components

The cyclical component of consumption price inflation $\hat{\pi}_{i,t}$ depends on a linear combination of its past and expected future cyclical components driven by the contemporaneous cyclical component of output according to the aggregate supply relationship,

$$
\begin{aligned}
\hat{\pi}_{i,t} = {} & \phi_{1,1}\hat{\pi}_{i,t-1} + \phi_{1,2}\,\mathrm{E}_t\,\hat{\pi}_{i,t+1} + \theta_{1,1}\ln\hat{Y}_{i,t} \\
& + \theta_{1,2}\frac{M_i}{Y_i}\left[\Delta\ln\hat{Q}_{i,t} - \phi_{1,1}\Delta\ln\hat{Q}_{i,t-1} - \phi_{1,2}\,\mathrm{E}_t\,\Delta\ln\hat{Q}_{i,t+1}\right] \\
& + \theta_{1,3}\frac{M_i}{Y_i}\left[\Delta\ln(\hat{S}_{i,t}^{USA}\hat{P}_t^{COM}) - \phi_{1,1}\Delta\ln(\hat{S}_{i,t-1}^{USA}\hat{P}_{t-1}^{COM}) - \phi_{1,2}\,\mathrm{E}_t\,\ln(\hat{S}_{i,t+1}^{USA}\hat{P}_{t+1}^{COM})\right] + v_{i,t}^{\hat{P}},
\end{aligned}
\tag{2A.1}
$$

where supply shock $v_{i,t}^{\hat{P}} = \rho_{\hat{P}}v_{i,t-1}^{\hat{P}} + \varepsilon_{i,t}^{\hat{P}}$ with $\varepsilon_{i,t}^{\hat{P}} \sim$ iid $\mathcal{N}(0,\sigma_{\hat{P},i}^2)$. The cyclical component of consumption price inflation also depends on contemporaneous, past, and expected future changes in the cyclical components of the real effective exchange rate and the domestic-currency-denominated price of commodities. The response coefficients of this relationship vary across economies with their degree of openness, measured by the ratio of imports to output $\frac{M_i}{Y_i}$.

The cyclical component of output $\ln\hat{Y}_{i,t}$ depends on a linear combination of its past and expected future cyclical components, driven by the contemporaneous cyclical component of the real interest rate according to the aggregate demand relationship,

$$
\begin{aligned}
\ln\hat{Y}_{i,t} = {} & \phi_{2,1}\ln\hat{Y}_{i,t-1} + \phi_{2,2}\,\mathrm{E}_t\,\ln\hat{Y}_{i,t+1} + \theta_{2,1}\left(1+\frac{M_i}{Y_i}\right)^{-1}\hat{r}_{i,t} \\
& + \theta_{2,2}\frac{X_i}{Y_i}\left(1+\frac{M_i}{Y_i}\right)^{-1}\left[\ln\hat{Y}_{i,t}^f - \phi_{2,1}\ln\hat{Y}_{i,t-1}^f - \phi_{2,2}\,\mathrm{E}_t\,\ln\hat{Y}_{i,t+1}^f\right] \\
& + \theta_{2,3}\frac{X_i+M_i}{Y_i}\left(1+\frac{M_i}{Y_i}\right)^{-1}\left[\ln\hat{Q}_{i,t} - \phi_{2,1}\ln\hat{Q}_{i,t-1} - \phi_{2,2}\,\mathrm{E}_t\,\ln\hat{Q}_{i,t+1}\right] + v_{i,t}^{\hat{Y}},
\end{aligned}
\tag{2A.2}
$$

where demand shock $v_{i,t}^{\hat{Y}} = \rho_{\hat{Y}}v_{i,t-1}^{\hat{Y}} + \varepsilon_{i,t}^{\hat{Y}}$ with $\varepsilon_{i,t}^{\hat{Y}} \sim$ iid $\mathcal{N}(0,\sigma_{\hat{Y},i}^2)$. Reflecting the existence of both interest rate and exchange rate channels of monetary policy, the cyclical component of output also depends on the contemporaneous, past, and expected future cyclical components of foreign output and the real effective exchange rate. The response coefficients of this relationship vary across economies with their degree of openness, measured by the ratio of exports to output $\frac{X_i}{Y_i}$ or imports to output $\frac{M_i}{Y_i}$.

The cyclical component of the nominal interest rate $\hat{i}_{i,t}$ depends on a weighted average of its past and desired cyclical components according to the monetary policy rule,

$$\hat{i}_{i,t} = \phi_{3,1,i}\hat{i}_{i,t-1} \qquad (2A.3)$$
$$+(1-\phi_{3,1,i})(\theta_{3,1,i}\hat{\pi}_{i,t} + \theta_{3,2,i}\ln\hat{Y}_{i,t} + \theta_{3,3,i}\hat{i}_{USA,t} + \theta_{3,4,i}\ln\hat{S}_{i,t}^{USA}) + \varepsilon_{i,t}^{\hat{i}},$$

where monetary policy shock $\varepsilon_{i,t}^{i} \sim$ iid $\mathcal{N}(0,\sigma_{i,i}^{2})$. The desired cyclical component of the nominal interest rate depends on the contemporaneous cyclical components of consumption price inflation, output, a foreign nominal interest rate, and the nominal bilateral exchange rate. The response coefficients of this rule vary across economies, nesting flexible inflation targeting and fixed exchange rate regimes as special cases of the conduct of monetary policy. The cyclical component of the real interest rate $\hat{r}_{i,t}$ satisfies $\hat{r}_{i,t} = \hat{i}_{i,t} - \mathrm{E}_{t}\hat{\pi}_{i,t+1}$.

The cyclical component of the real bilateral exchange rate $\ln\hat{Q}_{i,t}^{USA}$ depends on a linear combination of its past and expected future cyclical components driven by the contemporaneous cyclical component of the real bilateral interest rate differential,

$$\ln\hat{Q}_{i,t}^{USA} = \phi_{4,1}\ln\hat{Q}_{i,t-1}^{USA} + \phi_{4,2}\mathrm{E}_{t}\ln\hat{Q}_{i,t+1}^{USA} + \theta_{4,1}(\hat{r}_{i,t} - \hat{r}_{USA,t}) + \varepsilon_{i,t}^{\hat{S}}, \qquad (2A.4)$$

where risk premium shock $\varepsilon_{i,t}^{\hat{S}} \sim$ iid $\mathcal{N}(0,\sigma_{\hat{S},i}^{2})$. The cyclical component of the real bilateral exchange rate also satisfies $\ln\hat{Q}_{i,t}^{USA} = \ln\hat{S}_{i,t}^{USA} + \ln\hat{P}_{USA,t} - \ln\hat{P}_{i,t}$, where $\ln\hat{S}_{i,t}^{USA}$ denotes the cyclical component of the nominal bilateral exchange rate.

The cyclical component of the change in the price of commodities $\ln\hat{P}_{t}^{COM}$ depends on a linear combination of its past and expected future cyclical components driven by the contemporaneous cyclical component of world output,

$$\Delta\ln\hat{P}_{t}^{COM} = \phi_{5,1}\Delta\ln\hat{P}_{t-1}^{COM} + \phi_{5,2}\mathrm{E}_{t}\Delta\ln\hat{P}_{t+1}^{COM} + \theta_{5,1}\ln\hat{Y}_{t}^{w} + \varepsilon_{t}^{\hat{P}^{COM}}, \qquad (2A.5)$$

where commodity price shock $\varepsilon_{t}^{\hat{P}^{com}} \sim$ iid $\mathcal{N}(0,\sigma_{\hat{P}^{com}}^{2})$. As an identifying restriction, all innovations are assumed to be independent.

Trend Components

The growth rates of the trend components of the price of consumption $\ln\overline{P}_{i,t}$, output $\ln\overline{Y}_{i,t}$, and the price of commodities $\ln\overline{P}_{t}^{COM}$ follow random walks:

$$\Delta\ln\overline{P}_{i,t} = \Delta\ln\overline{P}_{i,t-1} + \varepsilon_{i,t}^{\overline{P}}, \quad \varepsilon_{i,t}^{\overline{P}} \sim \text{iid } \mathcal{N}(0,\sigma_{\overline{P},i}^{2}), \qquad (2A.6)$$

$$\Delta\ln\overline{Y}_{i,t} = \Delta\ln\overline{Y}_{i,t-1} + \varepsilon_{i,t}^{\overline{Y}}, \quad \varepsilon_{i,t}^{\overline{Y}} \sim \text{iid } \mathcal{N}(0,\sigma_{\overline{Y},i}^{2}), \qquad (2A.7)$$

$$\Delta\ln\overline{P}_{t}^{COM} = \Delta\ln\overline{P}_{t-1}^{COM} + \varepsilon_{t}^{\overline{P}^{COM}}, \quad \varepsilon_{t}^{\overline{P}^{COM}} \sim \text{iid } \mathcal{N}(0,\sigma_{\overline{P}^{COM}}^{2}). \qquad (2A.8)$$

The trend components of the nominal interest rate $\overline{i}_{i,t}$ and nominal bilateral exchange rate $\ln\overline{S}_{i,t}^{USA}$ also follow random walks:

$$\overline{i}_{i,t} = \overline{i}_{i,t-1} + \varepsilon_{i,t}^{\overline{i}}, \quad \varepsilon_{i,t}^{\overline{i}} \sim \text{iid } \mathcal{N}(0,\sigma_{\overline{i},i}^{2}), \qquad (2A.9)$$

$$\ln\overline{S}_{i,t}^{USA} = \ln\overline{S}_{i,t-1}^{USA} + \varepsilon_{i,t}^{\overline{S}}, \quad \varepsilon_{i,t}^{\overline{S}} \sim \text{iid } \mathcal{N}(0,\sigma_{\overline{S},i}^{2}). \qquad (2A.10)$$

The trend component of the real interest rate $\overline{r}_{i,t}$ satisfies $\overline{r}_{i,t} = \overline{i}_{i,t} - \mathrm{E}_{t}\overline{\pi}_{i,t+1}$, while the trend component of the real bilateral exchange rate $\ln\overline{Q}_{i,t}^{USA}$ satisfies $\ln\overline{Q}_{i,t}^{USA} = \ln\overline{S}_{i,t}^{USA} + \ln\overline{P}_{USA,t} - \ln\overline{P}_{i,t}$. As an identifying restriction, all innovations are assumed to be independent.

Estimation Procedure

The parameters and unobserved components of this unobserved-components model are jointly estimated with a Bayesian procedure, conditional on prior information concerning the values of parameters and trend components. Inference on the parameters is based on an asymptotic normal approximation to the posterior distribution around its mode, which is calculated by numerically maximizing the posterior density kernel.

Evaluation of the posterior density kernel involves first constructing a multivariate linear rational expectations representation of those equations governing the evolution of cyclical components, then solving for the unique stationary solution to this multivariate linear rational expectations model with the algorithm due to Klein (2000). The resultant first-order vector autoregressive representation of those equations governing the evolution of cyclical components is then combined with a dynamic factor representation of those equations governing the evolution of trend components to form a linear state space model. This linear state space model is then augmented with a set of stochastic restrictions summarizing prior

information concerning the values of the trend components. The predictive density function is then evaluated, conditional on the parameters associated with this linear state space model, with an adaptation of the filter due to Kalman (1960) that incorporates prior information. Finally, this conditional density function is combined with a multivariate normal density function summarizing prior information concerning the values of parameters.

Description of the Data Set

The data set consists of quarterly observations on several macroeconomic and financial market variables for seven economies over the period 1999:Q3 through 2008:Q1. The economies under consideration are China, the European Union, India, Japan, Korea, Thailand, and the United States.

The macroeconomic variables under consideration are the price of consumption, output, and the price of commodities. The price of consumption is proxied by the seasonally adjusted total consumer price index. Output is measured by seasonally adjusted real gross domestic product. The price of commodities is proxied by a broad commodity price index denominated in U.S. dollars. All macroeconomic data were obtained from the IMF's World Economic Outlook database.

The financial market variables under consideration are the nominal interest rate and the nominal bilateral exchange rate. The nominal interest rate is measured by the money market rate expressed as a period average where possible, and the bank rate quoted as an end-of-period value where necessary. The nominal bilateral exchange rate is measured by the domestic currency price of one U.S. dollar quoted as an end-of-period value. All financial market data were extracted from the IMF's International Financial Statistics database.

III. The Graying of Asia: Demographics, Capital Flows, and Financial Markets

While policymakers are understandably focused on short-term growth prospects in the current environment, Asia continues to face longer-term challenges to which attention will need to return over time. One of the key challenges is rapid population aging, which could have a significant macroeconomic impact on the region in coming decades. In particular, diverse demographic trends across Asia could influence external positions and, thereby, capital flows over the long term. Moreover, aging could affect returns on asset classes and change the structure of financial markets. Pre-emptive policy responses at both the country and regional levels would help to accommodate these aging-related changes.

Asia is facing a demographic shift that will see its population age significantly over the next half century. There are a variety of ways in which aging could affect the region's economies over the long term:

- Their growth potential could decline as their labor forces shrink.

- Their fiscal positions could come under pressure from rising pension and health care spending needs and shrinking income tax bases.

- Both private savings and investment could be adversely affected. As populations age, aggregate savings are expected to decline as the older cohorts draw down their savings to smooth lifetime consumption. At the same time, investments could also fall as the capital stock shrinks in tandem with the labor force. The interplay between savings and investment will have significant impacts on the dynamics of current accounts and, thereby, both inter- and intraregional capital flows. In turn, this could

also have important implications for regional economic and financial integration.

- The changes in savings associated with aging may have an impact on financial markets. Asset returns and relative asset prices could be affected as risk appetite changes with age, leading to a redistribution of savings from higher- to lower-risk instruments. In addition, financial product structures may also change in response to age-related demands.

The first two of these issues have been covered extensively in the economics literature and have been at the center of the public debate for years. However, much less work has been done in regard to Asia on the latter two issues, and these are the main focus of this chapter.

Demographic Trends and Patterns

Like other regions of the world, Asia[19] has experienced a demographic shift over the last half century, reflecting a drop in fertility rates and an increase in life expectancies due to higher incomes, healthier lifestyles, and medical advances (Figure 3.1). Most industrial countries experienced a steep increase in births immediately after World War II, the emergence of the so-called baby boomer generation. But fertility rates subsequently dropped off and, together with rising life expectancies, this led to a higher median age. These trends were less pronounced and took hold somewhat later in less-developed countries (LDCs), including in Asia, where the median age started to rise only after the mid-1970s and remains well below advanced-country levels. Within Asia, aging trends have varied

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[19] In this chapter, Asia refers to the following 13 economies: Australia, New Zealand, Japan, China, India, Hong Kong SAR, Korea, and Singapore (NIEs excluding Taiwan Province of China) and Indonesia, Malaysia, the Philippines, Thailand, and Vietnam (ASEAN-5).

Figure 3.1. Global Demographic Trends

Total Fertility, World
(Children per woman)

- World
- Less-developed regions
- Europe
- United States
- Asia (weighted)

Total Fertility, Asia
(Children per woman)

- NIEs excl. Taiwan POC
- ASEAN-5
- Australia
- Japan
- China
- India

Median Age, World
(Years)

- World
- Less-developed regions
- United States
- Europe
- Asia (weighted)

Median Age, Asia
(Years)

- Japan
- Australia
- China
- India
- NIEs excl. Taiwan POC
- ASEAN-5

Life Expectancy
(Years)

- 1950
- 2000
- 2050

(Less-developed regions, World, India, Asia (weighted), ASEAN-5, China, Europe, United States, NIEs excl. Taiwan POC, Australia, Japan)

Old-Age Dependency Ratios
(In percent)

- 2005
- 2020
- 2035
- 2050

(India, Less-developed regions, World, ASEAN-5, Asia (weighted), United States, China, Australia, Europe, NIEs excl. Taiwan POC, Japan)

Source: United Nations Population Database.

considerably. Japan has been at the forefront throughout, and aging is now approaching a more-advanced stage in the NIEs. Australia, China, New Zealand, and Thailand are in the middle phase, while the rest of the ASEAN-5 and India remain relatively young.

Looking ahead, populations across the world are set to age markedly, as baby boomers retire and life expectancies continue to improve.[20] Among industrial economies outside of Asia, Europe will experience the most dramatic aging, with the old-age

[20] There is some uncertainty surrounding long-term population projections, which are sensitive to different assumptions about fertility, mortality, and participation rates. The analysis presented in this chapter is based on UN population data (2006 revision, medium variant).

dependency ratio (the ratio of the elderly to the working-age population) expected to more than double over the next 40 years. Less-developed countries, on the other hand, are faced with a much more gradual aging of their populations, as their fertility rates are expected to remain relatively high. Aging in Asia will be rapid over the next four decades, with the old-age dependency ratio tripling to approach the U.S. level by 2050 (Figure 3.2).

Figure 3.2. Asia's Impending Demographic Transformation
(Population in millions)

Source: United Nations Population Database.
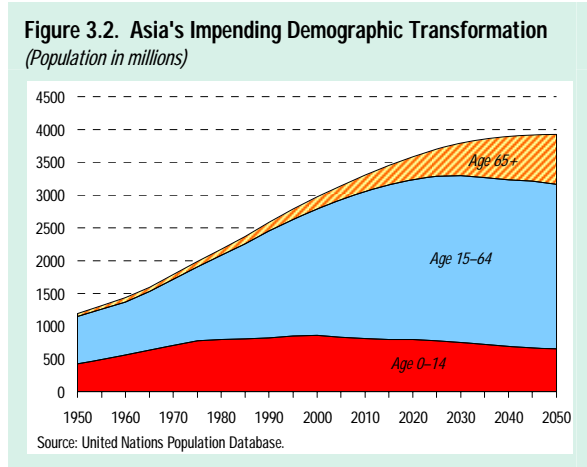
Aging trends within Asia will become even more diverse (Figure 3.3). Higher-income countries in the region will generally age much faster, with Japan and the NIEs seeing their old-age dependency ratios rise by around 3 to 4 times, and are also expected to age much faster than their current trading partners. Countries such as Australia, China, and Thailand will also age markedly, but the pace will be broadly in line with their trading partners. At the other end of

Figure 3.3. Age Structure
(In percent of total population)

Source: United Nations Population Database.
[1] Excludes Taiwan POC.

the spectrum, India, Indonesia, Malaysia, the Philippines, and Vietnam are expected to age at a significantly slower pace.

How Demographics Affect Capital Flows and Financial Markets

Aggregate saving and investment are the channels through which population aging affects the current account, capital flows, and financial markets. Saving behavior, according to the life cycle hypothesis, is age-dependent, with people saving during their working years and running down their savings during retirement. Hence, aggregate saving should fall with population aging, as the relative number of pensioners—or prime consumers—increases.[21] Investment depends positively on the return on capital, which, in turn, depends on capital's relative availability. As the working-age population shrinks, capital becomes relatively more abundant, and, other things equal, returns on capital should fall. Hence, investment should fall with population aging.

This chapter finds that the current account deteriorates as populations age. Since both domestic savings and investment fall as the share of pensioners increases, the effect on the current account is theoretically indeterminate. However, econometric evidence presented in this chapter suggests that the effec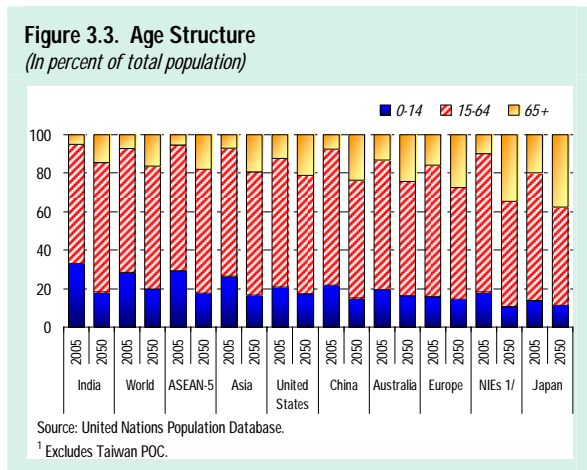t of population aging on saving outweighs the effect on investment, leading to a deterioration in the current account as the population ages.

By the same token, population aging should affect international capital flows. The effect follows from the discussion above, since capital flows reflect the financing of current account deficits or the foreign investment of current account surpluses. The channel through which population aging generates capital flows is interest rate arbitrage between countries at different stages of the demographic

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[21] Extensions of the basic hypothesis that take into account liquidity constraints, precautionary saving, and preferences for leaving bequests imply a less sharp decline in saving during retirement.

transition.[22] A country that is relatively advanced in the demographic transition should experience a fall in savings that—according to the empirical findings of this chapter—outweighs the fall in investment. As a result, real interest rates would tend to move upward and attract foreign capital. A country that is at an earlier stage of the demographic transition will see a boost in investment to accommodate its rising labor force, but the saving generated by the larger labor force will be more than sufficient to cover the additional investment. This will lead, other things equal, to downward pressures on the interest rate and capital outflows. In equilibrium, the real interest rate—which is identical to the return on capital under perfect competition—should be equalized across countries.

It should be kept in mind that there are other determinants of capital flows that work in the opposite direction of demographic trends. According to the development literature, capital should flow from slow-growing industrial countries to fast-growing emerging markets. This is because emerging markets exhibit higher productivity growth than industrial countries. They should, therefore, offer higher returns on capital, which would be arbitraged away by capital inflows. In reality, capital flows to emerging markets are much smaller than theory would suggest, which has been blamed on capital market imperfections (Lucas, 1990).

Population aging can also have an impact on asset prices. The movement of saving and investment in response to population aging is mirrored by, respectively, the demand and supply of financial assets. As the relative number of pensioners rises, aggregate saving and the demand for financial assets fall. Since the working-age population shrinks at the same time, capital investment and the supply of financial assets also fall. However, the empirical findings in this chapter suggest that this effect is insufficient to prevent a fall in asset prices. Of course, such a scenario requires imperfect capital mobility: if relatively young countries can make up for the falling asset demand in relatively old countries, steep drops in asset prices should be avoided.

Relative asset returns and the structure of financial markets could also respond to population dynamics. Young and working people should prefer stocks over bonds since the returns on stocks have historically been higher and the long investment horizon of young workers allows them to accommodate the relatively higher return volatility. In contrast, without wage income after retirement, people tend to prefer the relatively safer investment in bonds. As a result, relative asset prices and returns should be affected by population aging. Moreover, the structure of financial markets could change as the supply of different types of assets responds to these changing preferences. For example, bond markets could expand relative to equity markets, and companies could rely more heavily on debt versus equity financing as the cohort of elderly people approaches retirement.

Empirical Findings[23]

This section provides empirical evidence of the impact of aging on net external flows—and, thereby, capital flows—and financial markets in Asia.

Demographics and the External Position

The empirical analysis suggests that the current account deteriorates as the population ages. A multi-country panel regression is used to estimate determinants of current account balances with a focus on the impact from aging. The exercise expands on much of the existing literature in two important aspects. First, relevant variables, including demographic variables, are expressed relative to trading partners, reflecting the fact that countries need to be at different stages of the demographic transition in order for it to have an impact on their

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[22] This requires that capital be able to flow freely across borders, while labor is relatively immobile. If labor were more mobile than capital, immigration would arbitrage away most of the international return differentials.

[23] Further details on the empirical approaches and data are provided in the appendix.

external positions.[24] Second, the estimation includes both the ratios of prime savers (aged 40–65) and prime consumers (aged 65+) to the working-age population. The latter corresponds to the "old-age dependency ratio." This distinction has been made to better reflect the dynamics of aging in determining the current account. As shown in Table 3.1, the coefficients on both demographic variables (prime saver share and old-age dependency) are highly significant, showing that the current account improves with the share of prime savers and deteriorates with the share of prime consumers.

Table 3.1. Aging and Current Account Positions— Global Panel[1]

	OLS	GMM
Prime saver share	0.31 ***	0.42 ***
	(8.25)	(6.32)
Old-age dependency	-0.22 ***	-0.16 ***
	(4.83)	(2.89)
Income level (lagged)	0.01 **	-0.01
	(2.34)	(1.63)
Income growth (lagged)	-0.19 ***	-0.95 ***
	(4.19)	(3.43)
Openness (lagged)	0.03 ***	0.04 ***
	(10.36)	(8.34)
Financial liberalization	-0.07 ***	-0.03 *
	(6.43)	(1.91)
Fiscal balance	0.15 ***	0.27 ***
	(5.20)	(3.00)
Oil balance	0.35 ***	0.29 ***
	(6.77)	(3.81)
Net foreign assets (lagged)	...	0.00 ***
		(3.03)
Asian crisis	...	0.01 ***
		(4.09)
Constant	0.04 ***	-0.01
	(5.48)	(0.77)
R-squared	0.39	0.32
Countries	55	55
Observations	932	561

Source: IMF staff estimates.

[1] Time fixed effects included. Standard errors asymptotically robust to both heteroscedasticity and serial correlation. Robust *t*-statistics in parentheses. ***, **, and * indicate that coefficients are significant at the 1, 5, and 10 percent levels, respectively.

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[24] The applied trading partner weights account for inter-temporal changes in trade patterns.

Projecting current account balances for Asia based on the estimated demographic coefficients yields the following results:

- Hong Kong SAR, Japan, Korea, and Singapore, which are aging faster than their current trading partners, could face significant downward pressures on their savings-investment balances over the next 50 years, up to around 6 percent of GDP (Figure 3.4). These pressures would be driven by a decline in private savings as retirees draw down assets and a deterioration in public savings due to aging-related fiscal pressures. On the other hand, Korea and, to a lesser extent, Hong Kong SAR will still tend to build up savings over the next 15 to 30 years as the share of prime savers increases.

Figure 3.4. Asia: Impact of Aging on Current Account Balances
(Change in percent of GDP)

Sources: United Nations Population Database; World Bank; and IMF staff estimates.
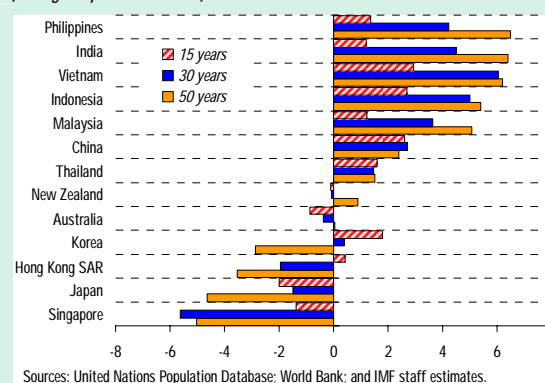
- Countries expected to age more slowly than their trading partners, including India, Malaysia, the Philippines, and Vietnam, could experience a positive impact on their current account over the medium to long term, ranging from 6 to 7 percent of GDP. These countries will have both a relatively higher share of prime savers and a lower share of dissavers (Figure 3.5). The former will boost the current account mostly toward the end of the forecast horizon.

- Australia, China, and New Zealand are likely to experience a less significant impact on their current account positions from demographics, since their aging trends are projected to mirror more broadly those of their trading partners.

Figure 3.5. Current Account Impact from Relative Changes in Age Cohorts
(From changes in share of savers and dissavers; in percent of GDP)

Contribution to 15-year Current Account Change

Contribution to 30-year Current Account Change

Contribution to 50-year Current Account Change
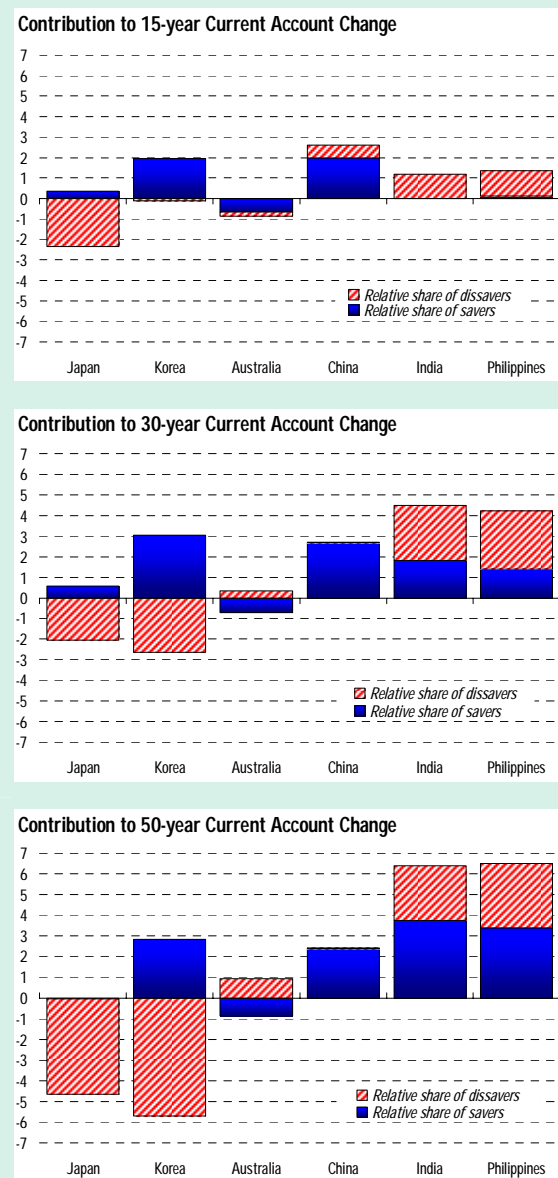
Sources: United Nations Population Database; World Bank; and IMF staff estimates.

However, China's current account impact is still positive, as its share of prime savers rises relative to those of its trading partners. This makes it all the more important for China to undertake public investments in health care, education, and pension systems to lessen precautionary savings and to liberalize the financial system to increase household disposable income and encourage consumption.

These estimated changes in current account balances are meant only to give an idea of the underlying impact of aging-related pressures and should not be interpreted as predictions of final outcomes. To begin with, the framework is not globally consistent, meaning that projected current account balances do not sum to zero. Moreover, policymakers should not be expected to stand by idly as demographic pressures become more intense. For example, in the fast-aging countries, the degree of intergenerational transfer through pay-as-you-go pension systems is likely to be reduced, as the transfer from prime savers (workers) to prime consumers (pensioners) exacerbates the effect of population aging on saving. Moreover, factors other than demographics will affect external positions over the medium term, notably relative productivity growth. The negative growth coefficient in the current account equation is evidence of this alleviating mechanism. Nevertheless, the results suggest that demographics will be an important driver of external balances and capital flows over the longer term.

Demographically induced current account surpluses and deficits broadly offset each other at the regional level. Looking at Asia as a whole (scaled by GDP), the adverse demographic pressures on Japan's current account over the next 30 years are entirely matched by current account improvements elsewhere in the region, including in China, India, and the Philippines (Figure 3.6). Looking at the financing side, this implies that demographics would tend to drive capital flows from less-developed countries to relatively advanced countries, even if the actual capital flows could be intermediated outside the region.

The projected current account developments in Asia mirror broader global patterns. Fast-aging countries in Europe and the United States could face downward pressure on their current account positions from demographics. Emerging economies in Africa, Europe, Latin America, and the Middle East are broadly expected to see an improvement in their external balances, driven by their relatively favorable demographic positions (Figure 3.7).

Compared to these countries, Asian countries fall at each end of the spectrum. The global perspective suggests that demographics will be of little help in correcting today's global imbalances, which are characterized by a large U.S. current account deficit and offsetting current account surpluses in Asia and oil-exporting countries.

Figure 3.6. Aggregate Impact of Aging on Current Account
(Contribution to change in percent of GDP)
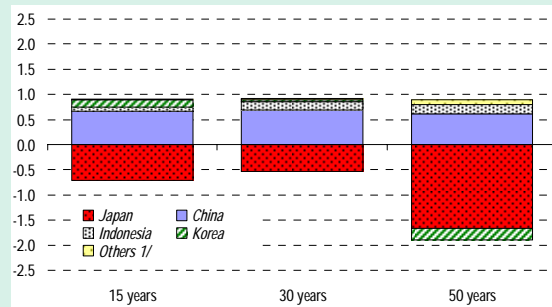
Sources: United Nations Population Database; World Bank; and IMF staff estimates.
[1] Australia, New Zealand, Hong Kong SAR, Singapore, India, Malaysia, Philippines, Thailand, and Vietnam.

Figure 3.7. Impact of Aging on Current Account Balances Outside Asia
*(Change in percent of GDP)*
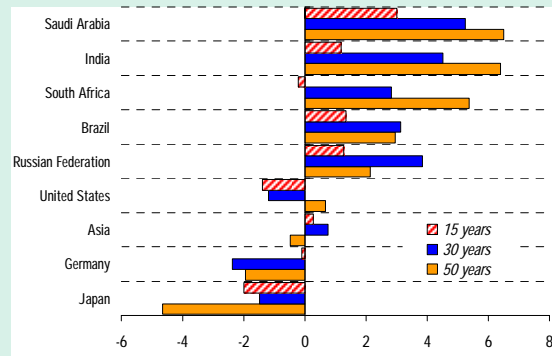
Sources: United Nations Population Database; World Bank; and IMF staff estimates.

Demographics and Financial Markets

The "asset meltdown" hypothesis gained prominence in connection with the 1990s bull market in equities. It proposes that asset prices could decline sharply with population aging as the elderly shed financial assets. A cursory look at the relationship between the S&P 500 and the ratio of prime savers to the rest of the population (the population aged 40–64 over those aged 0–39 and 65+) in the United States seems to support this

hypothesis (Figure 3.8). The weakness in stock prices in the 1970s and early 1980s coincided with a low share of prime savers. However, once baby boomers moved into their prime saving years, stock prices took off and (until recently) remained at unprecedented levels despite a steep correction after the dot.com bubble. While causality is debatable, some have argued that the correlation between demographics and stock indices implies that stock market performance could weaken further over the next 20 years in the United States. By extension, rapidly aging countries in Asia could also see downward pressures on stock prices, potentially threatening the adequacy of retirement savings.

Figure 3.8. Demographics and Asset Prices in the United States
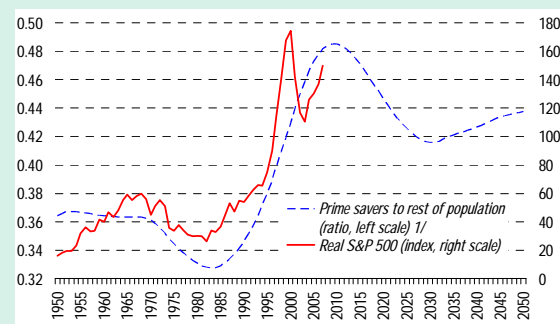
Sources: Shiller (2008); and UN (2007).
[1] U.S. population aged 40-64 over population aged 0-39 and 65 and over.

To investigate the effects of demographic changes on financial markets in the region, an Asia-specific regression was conducted. Panel data techniques with fixed effects were employed, with additional controls such as inflation, per capita income, urbanization, and openness, following authors like Davis (2006). Further, in considering the effect of demographics on asset prices, the exercise moves beyond most previous work by considering more rigorous controls incorporating nondemographic influences.[25] Following the literature, the demographic variables used in the analysis are the share of the total population aged 40–64 (prime

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[25] These include trend and cyclical components of growth, long-term interest rates, and inflation dynamics (see Davis and Li, 2003).

savers) and 65 and above (prime consumers).[26] An openness measure is also included to control for any international effects.

The results suggest that demographic changes have influenced financial market valuations in Asia (Table 3.2). Looking first at asset price data, demographic variables do not appear to affect price-earnings ratios in Asia, while an increase in prime consumers tends to reduce stock price growth, consistent with falling demand for equities as populations age (columns 1–2). Stronger evidence of demographic effects emerges when asset return data are used: a rise in the share of prime savers increases stock returns and decreases bond yields, consistent with an upward effect on prices associated with high demand for financial assets during this stage of the life cycle (columns 3–5).[27] In column 5, most of the additional variables have the expected signs, although lower growth appears to boost bond yields.

Fears of rapid and pronounced declines in prices as suggested by the asset meltdown hypothesis appear largely unfounded. Indeed, the results imply a relatively modest and gradual impact of aging on bond yields and stock returns over long horizons. For the more-advanced economies in Asia, the fall in the share of prime savers could lower demand for financial assets and result in an increase in bond yields of between 100 and 200 basis points over the next half century (Figure 3.9). These trends may be exacerbated as older cohorts divest their assets as they retire and age-related pressures on fiscal positions require larger public bond issuance. At the other end of the spectrum, a rise in the share of prime savers in younger countries, such as India and the ASEAN-5, will tend to push yields down. These interest rate responses will support the potential

redirection of capital flows suggested by the findings in the previous section. Demographic pressures on stock returns are similarly varied, ranging from a 10 percent decline in Japan to a 30 percent increase in Vietnam over the same extended period (Figure 3.10).
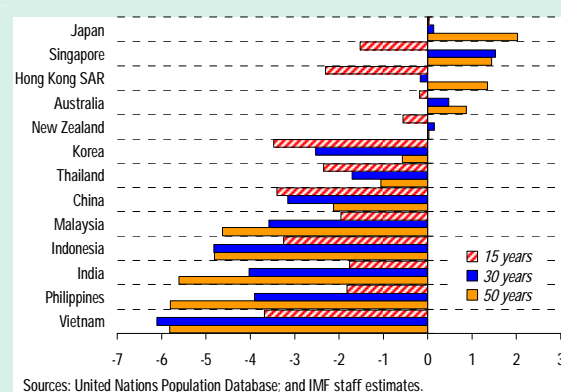
Table 3.2. Demography and Asset Prices and Returns[1]

	Stock Prices		Returns		
	P/E Ratios	Growth	Stocks	Bonds	
	(1)	(2)	(3)	(4)	(5)
Prime savers (40-64)	3.313	-0.010	2.148 *	-0.269 **	-0.602 **
	(1.40)	(0.74)	(1.74)	(2.35)	(3.06)
Prime consumers (65+)	2.086	-0.022 **	2.931	-0.216	-0.053
	(0.70)	(2.55)	(1.31)	(1.02)	(0.30)
Real per capita GDP	-0.017		-0.932	-0.045	
	(0.01)		(1.08)	(0.24)	
Real GDP growth	-1.552		2.179 *	-0.115	
	(0.45)		(1.81)	(1.27)	
Inflation	-0.857		-0.883 *	-0.506 **	
	(0.76)		(1.86)	(4.38)	
Urbanization rate	1.847		0.417	-0.300 **	
	(1.02)		(0.91)	(3.85)	
Openness	-0.059		-0.017	0.007	
	(0.37)		(0.19)	(0.28)	
Trend real GDP growth		0.159 *			-1.333 **
		(1.79)			(4.27)
Cyclical GDP growth		0.055 **			-0.092 **
		(8.21)			(3.33)
Real long-term interest rate		-0.012			
		(1.23)			
Lagged inflation					-0.594 **
					(5.23)
Change in inflation					-0.790 **
					(10.77)
R-squared	0.109	0.529	0.426	0.681	0.854
Countries	12	7	14	10	11
Observations	206	140	284	271	270

Source: IMF staff estimates.
[1] Time fixed effects included. t-statistics in parentheses, asymptotically robust to both heteroscedasticity and serial correlation. ** and * indicate that coefficients are significant at the 5 and 10 percent levels, respectively.

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[26] These demographic variables are similar to those used in Yoo (1994) and Davis and Li (2003) to capture age-dependent demand for financial assets. Unlike in the previous section, the case for scaling these relative to trading partners is less compelling, with domestic factors likely to be preeminent during the sample period considered, as reflected in persistent home bias and far from complete capital account liberalization.

[27] In the case of stocks, returns reflect both changes in prices and dividend payments as well.

Figure 3.9. Age-Related Pressures on Real Bond Yields
(Change in percentage points)

Sources: United Nations Population Database; and IMF staff estimates.

Figure 3.10. Age-Related Pressures on Real Stock Returns
(Change in percentage points)

Sources: United Nations Population Database; and IMF staff estimates.

Table 3.3. Demography and Financial Structure[1]

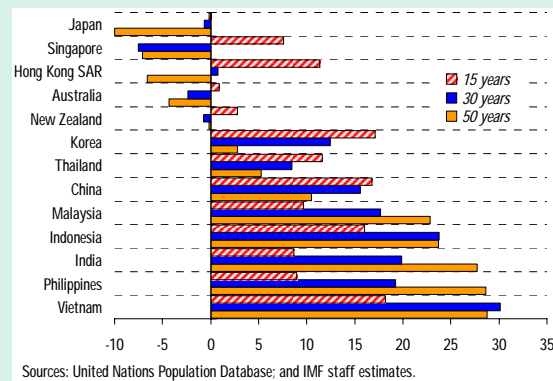|	Loans/GDP (1)	Equities/GDP (2)	Bonds/GDP (3)	Total size/GDP (4)
Prime savers (40-64)	0.020 **	-0.018	-0.002	0.048
	(2.21)	(0.87)	(0.17)	(0.79)
Prime consumers (65+)	-0.037 **	-0.129 **	0.153 **	-0.059
	(3.82)	(3.36)	(7.70)	(0.98)
Real per capita GDP	0.006	0.145 **	-0.014 **	0.184 **
	(1.10)	(3.07)	(2.24)	(2.52)
Inflation	0.000	-0.004	0.000	-0.010
	(1.04)	(1.12)	(0.11)	(1.46)
Urbanization rate	0.005	-0.020	0.017 **	0.057 **
	(1.42)	(1.52)	(2.78)	(2.16)
Openness	-0.001 **	0.010 **	0.000	0.004
	(2.66)	(4.68)	(0.06)	(1.21)
Lagged bank credit to GDP	0.843 **	-0.133	-0.085	0.377 **
	(15.14)	(0.90)	(0.90)	(2.20)
R-squared	0.920	0.596	0.206	0.366
Countries	21	16	10	10
Observations	578	300	136	136

Source: IMF staff estimates.

[1] Time fixed effects included. *t*-statistics in parentheses, asymptotically robust to both heteroscedasticity and serial correlation. ** and * indicate that coefficients are significant at the 5 and 10 percent levels, respectively.

Figure 3.11. Financial Market Structures in Asia, 2005
(In percent of GDP)

Source: Beck, Demirgüç-Kunt, and Levine (2007).
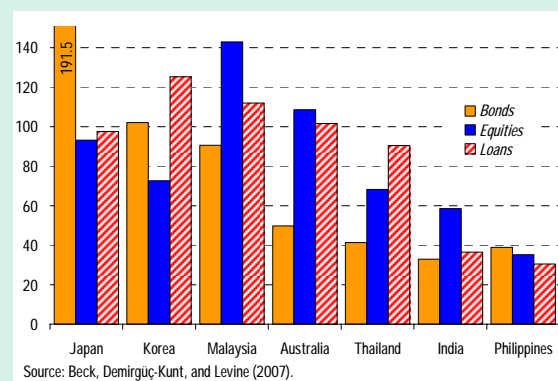
Figure 3.12. Age-Related Pressures on Representative Market Structures
(As percent of total financial sector)

Sources: Beck, Demirgüç-Kunt, and Levine (2007).

Demographics also affect the structure of financial markets in Asia (Table 3.3). Using data drawn from the World Bank's Financial Structure Database (Beck, Demirgüç-Kunt, and Levine, 2007) (Figure 3.11), equations relating the GDP shares of bank loans, equity market capitalization, bond market capitalization, and the overall size of the financial sector in Asian economies to demographic variables were estimated. The specifications include a number of controls, including lagged bank credit to GDP as a proxy for financial development. The results point to substitution between asset classes of the kind suggested by the life cycle hypothesis. A rise in the elderly share tends to decrease the role of the banking sector in the economy, reflecting lower demand for consumer borrowing during old age (column 1 in the table), and reduces the size of the equity market while increasing bond market capitalization, consistent with a substitution toward safer assets in old age (columns 2 and 3). However, demographics do not affect the overall size of the financial sector (column 4), but only the structure. In this way, demographics would tend to support changes already under way in the region, by promoting securitization in less-developed economies, while spurring bond market development in more-advanced economies (Figure 3.12).

Overall, our results point to plausible effects of demographic variables on asset prices and composition in Asia, but the actual impacts may turn out to be more limited. For instance, more fully

integrated global capital markets could change the picture in coming decades: in particular, capital flows from younger economies in the region could help support asset demand and prices in rapidly aging countries. Equally, firms in fast-aging countries could diversify their operations toward faster-growing and younger economies to offset declines in their valuation. Moreover, other determinants of asset values, such as productivity gains and fiscal and monetary policy, may offset demographic influences.

Potential Policy Implications

Although the impact of aging is more pronounced over the long term, it is a relevant policy concern now. Given that age-related pressures are still some decades away, it may be tempting to delay reform until they begin to manifest themselves more visibly. However, such a strategy would be significantly more costly and distorting. Some of the required policy measures will have an effect only with significant lags, and it may take time to build consensus on politically sensitive reforms, possibly requiring a more gradualist approach. Importantly, deferring policy action would likely require drastic reforms to ensure "catch-up," which would be more disruptive economically and politically. It is important to note, as well, that many policy reforms that are positive in their own right—such as prudent macroeconomic policies and structural reform aimed at providing an enabling business environment—become increasingly important in the context of large demographic shifts.

For countries at an advanced stage of aging, it will be important to address downward pressures on savings. It will be key to make progress on fiscal consolidation through tax and pension reform, including by stepping up prefunding of existing pay-as-you-go pension systems. This could be complemented by steps to promote privately funded pension schemes that invest savings abroad and whose returns are largely independent of demographic factors. There is also scope to press on with structural reforms to encourage labor force participation, raise mandatory retirement ages in line with life expectancies, and boost productivity.

For fast-aging economies that are projected to remain capital exporters for some time, increased openness and regional financial integration would bring great advantages. Demographic changes suggest that Hong Kong SAR and Korea will tend to run current account surpluses over the next 15 to 30 years. Maximizing returns on the associated savings and capital outflows during this window of opportunity will be important to prepare for the fiscal and external pressures these two countries will face over the longer term. Increased regional financial integration could help during this phase by channeling these flows towards younger and more productive economies in Asia. More generally, increased openness could enable a more efficient allocation of savings and better risk diversification. In this context, raising the ceiling on pension funds' foreign investments would also be important, but should go hand in hand with measures to reform governance and management structures of such funds (Box 3.1).

For younger economies in Asia, the demographic transition puts a premium on ongoing efforts to raise the risk-adjusted rate of return and improve financial intermediation. The analysis suggests that, other things equal, younger and less-developed countries would tend to see capital outflows as a result of demographic transition. Hence, efforts to boost productivity and raise risk-adjusted rates of return could gain further urgency. While the projected rise in domestic saving is good news for young and developing countries, it will be important to improve financial intermediation to translate this into higher domestic investment. In this vein, it will also be important to ensure that the labor markets can absorb the growing workforces.

Financial product structures will need to adapt in response to aging. Increasingly, aging societies will demand financial products that allow the drawdown of accumulated wealth, such as annuities and reverse mortgages. However, markets in such products remain underdeveloped owing, in part, to systematic risks that cannot be diversified away. The government may have a role to play in the development of such markets:

- *Duration risks.* Pension funds and annuity providers routinely stress the need for bonds with maturities of 20 or more years, to match the maturity of their liabilities. The private sector provides some long-dated bonds (e.g., those for capital-intensive industries, utilities, and financial institutions), but issuance is insufficient and hampered by a number of factors, including lack of publicly traded benchmarks, tax disincentives, and—more cyclically—strong corporate earnings, until recently (Groome, Blancher, and Ramlogan, 2006).

- *Inflation risks.* Annuities without inflation protection are risky, since retirees live for many years after leaving work, while annuities with inflation protection are expensive. The government could take on the inflation risks by issuing inflation-indexed bonds, which private companies could use to back inflation-protected annuities. Japan and Korea have started issuing inflation-indexed bonds, but markets are still very thin, with inflation-indexed bonds amounting to only 5 percent of global pension fund assets in 2005.

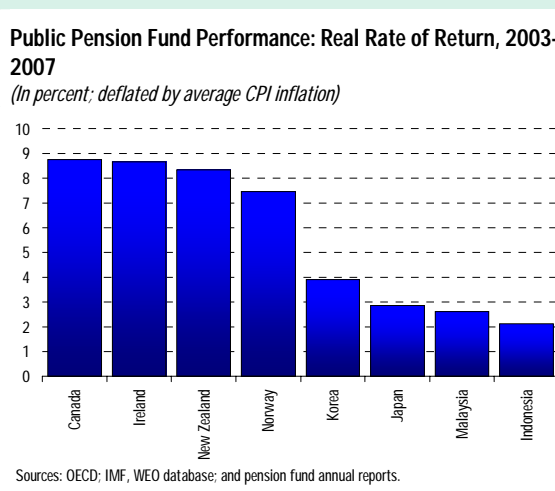## Box 3.1. Public Pension Funds in Asia: Maximizing Returns through Investment and Governance Reform

Asia is home to some of the largest public pension funds in the world. Asia's 10 largest public pension funds are estimated to hold nearly US$1.8 trillion in assets. In addition to Japan's Government Pension Investment Fund, whose assets of over $1 trillion make it the global leader, schemes in Korea, Taiwan Province of China, Singapore, Malaysia, and China rank among the world's largest public pension funds. Looking ahead, the region's public pension fund assets could increase threefold by 2015 (Allianz Global Investors, 2007) and even more over the medium term, mainly reflecting expanded coverage, rising income levels, and favorable return assumptions.

Sovereign Pension Funds in Asia

Global Rank	Fund	Economy	Assets US$ billions	Percent of GDP
1	Government Pension Investment Fund	Japan	1,072	24
3	National Pension Fund	Korea	232	24
4	Postal Savings Fund	Taiwan POC	130	34
7	Central Provident Fund	Singapore	95	59
8	Employees Provident Fund	Malaysia	95	51
9	National Social Security Fund	China	71	2
12	Future Fund	Australia	44	5
13	Employees' Provident Fund	India	43	4
24	Government Pension Fund	Thailand	13	5
26	New Zealand Superannuation	New Zealand	10	8

Source: Watson Wyatt.

Raising returns on the region's considerable pension fund assets will be important for accommodating age-related pressures. Historically, most public pension schemes in the region do not appear to have maximized risk-adjusted returns. Over the last five years, for instance, real rates of return in Indonesia, Korea, and Malaysia have averaged only between 2 and 4 percent, at best barely keeping up with the growth in real per capita incomes in those countries. Over longer horizons, too, returns have generally been low (Iglesias and Palacios, 2000). By contrast, returns for a number of public pension funds in OECD countries—including Canada, Ireland, Norway, and, within Asia, New Zealand—have been two to three times higher.

Public Pension Fund Performance: Real Rate of Return, 2003–2007
(In percent; deflated by average CPI inflation)

Sources: OECD; IMF, WEO database; and pension fund annual reports.

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Note: The main authors of this box are Shigeto Hiki and Murtaza Syed.

Box 3.1 *(continued)*

Two key factors help explain this gap: investment strategies and governance structures.
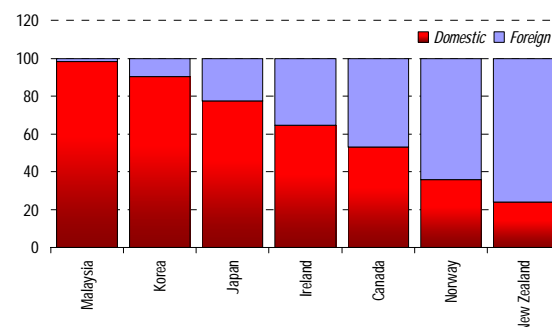
Investment portfolios of most public pension funds in emerging Asia are not very well diversified, in terms either of asset class or of geographic allocation. In much of emerging Asia, domestic government bonds, deposits in state-owned banks, housing loans, or infrastructure projects historically account for the lion's share. In 2007, public pension schemes in Korea, Malaysia, and Thailand allocated only 10 to 20 percent of their portfolios to equity investments, and less than 10 percent of their investments were made abroad. These allocation patterns—and the low associated rates of return—broadly mirror those observed in emerging markets (Hess and Impavido, 2003). While much better diversified in recent years, Japan's portfolio also displayed similar biases prior to reforms in 2001.

By contrast, pension funds in the four aforementioned OECD economies invest a much higher proportion of their assets in equities (50 to 75 percent) and outside their home countries (35 to 75 percent). As current global events demonstrate, this search for higher return comes with greater short-term risk, but pension funds typically have long investment horizons, allowing them to ride out limited periods of financial market turbulence. However, it is critical that before investment restrictions are loosened and allocations broadened, risk management and governance structures be strengthened.

Geographic Allocation of Public Pension Funds[1]
(In percent of total assets)

Sources: OECD; CEIC Data Company Ltd; and pension fund annual reports.
[1] 2007 data for Japan, Canada, and Malaysia; 2006 data for others.

Asset Allocation of Public Pension Funds
(In percent of total assets)

Sources: OECD; CEIC Data Company Ltd; and pension fund annual reports.

The governance and management of pension funds in emerging Asia generally lag best international practice. Over the last decade, some OECD countries—notably Canada (1997), Ireland (2000), Sweden (2000), New Zealand (2001), and Norway (2003)—have undertaken major reforms of their pension frameworks, with a view to raising rates of return in response to pressures resulting from aging. These experiences suggest several broad reform directions that, together with the guidelines for pension fund governance set out by Yermo (2008) and the ISSA (2005), help define best practices, notably (i) selecting professional board members through a process that maintains an arm's-length relationship with the government, (ii) adopting explicit risk-adjusted return targets, (iii) allowing commercial investment policies to achieve targets and avoiding public policy considerations not justified by returns, (iv) making greater use of external fund managers, selected using objective criteria, (v) avoiding strict portfolio limits, especially on foreign investment, and (vi) ensuring high standards of transparency and disclosure. While progress is being made, the general structure of most public pension funds in the region does not adhere to these principles.
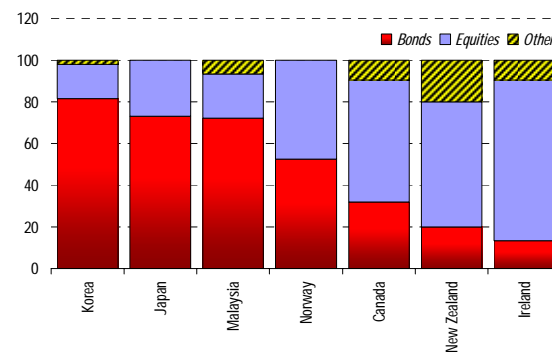
Across Asia, governments are taking steps to deregulate pension fund management, remove restrictions directing investment toward low-yielding domestic assets, ease pressures for policy-based investment, open up investment in

equity and foreign assets, and outsource funds to external professional asset managers.[1] In particular, Japan and Korea are leading the way, and their experiences could be helpful for the rest of Asia:

- *Japan.* Until 2001, pension fund reserves were entrusted to the Fiscal Investment and Loan Programs (FILPs) under the Ministry of Finance. FILPs provided long-term financing for public purposes and contributed to the rapid economic growth of the 1960s and 1970s. However, as the Japanese economy matured, the effectiveness of some of the FILP operations came into question, particularly in areas where returns were low and positive spillovers had become less significant. In 2001, the Japanese government decided to discontinue its direct management of pension reserves and to set up the Government Pension Investment Fund (GPIF). In 2006, the GPIF was reorganized and made more independent of the government. The GPIF is externally audited by the Independent Administrative Corporation Evaluation Committee, consisting of financial and pension experts. Reserve funds have been progressively entrusted from the FILPs to the GPIF (2001–2008). The GPIF is mandated to conduct investments within a "basic management policy" framework, issued by the Ministry of Health, Labor, and Welfare. Within this framework, the GPIF investment committee, consisting of independent experts in finance and economics, draws up a more concrete and diversified "principal portfolio" to obtain the targeted rate of return and minimize risks. Pension funds are invested mainly in long-term, passive, and indexed financial products to avoid excessive risks and are entrusted to trust banks, insurance companies, and investment advisory firms.

- *Korea.* The Korean government is reviewing the governance and management structure of the National Pension Fund (NPF). Currently falling under the Ministry of Health and Welfare, the pension fund's investment decisions are not insulated from public policy considerations. The authorities are exploring ways to bring the fund's governance closer to international practice, notably ensuring greater accountability and independence of the governing board and increased reliance on private expert management. Such reforms are welcome and could be complemented by simple and transparent investment objectives, focused on maximizing risk-adjusted returns; replacing strict portfolio restrictions with a transparent structure and sound prudential requirements; and increasing the role of external specialists—including auditors, actuaries, and asset managers. Concurrently with these changes in the governance framework, the authorities are pursuing a reform to diversify the investment portfolio of the NPF further in terms of both asset class and geographic allocation.

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[1] For example, in the last two years, China's National Social Security Fund has outsourced US$1 billion to 10 asset management companies, and the Government Service Insurance System of the Philippines has appointed global firms as custodians for its US$1.6 billion overseas investment program.

Appendix

Where possible, data were obtained from the April 2008 vintage of the World Economic Outlook database maintained by the IMF. Where necessary, data were retrieved from other databases maintained by the IMF or the World Bank Group. In particular, net foreign asset position data were retrieved from the International Investment Position database, and population share data were extracted from the World Development Indicators database. The projected demographic data were based on United Nations population data (2006 revision, medium variant).

Demographics and the External Position

The panel data set consists of annual observations on several macroeconomic variables for 55 developed and emerging market economies over the period 1973 through 2007, building on a data set prepared by Francis Vitek (Brooks, Edison, and Vitek, forthcoming). This panel data set is unbalanced, in the sense that the number of observations varies across macroeconomic variables along both the cross-sectional and time-series

dimensions. The economies considered are Algeria, Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Croatia, the Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong SAR, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Malaysia, Mexico, Morocco, the Netherlands, New Zealand, Norway, Pakistan, Peru, the Philippines, Poland, Portugal, Russia, Saudi Arabia, Singapore, the Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan Province of China, Thailand, Tunisia, Turkey, the United Kingdom, the United States, and Venezuela.

The empirical approach applies the so-called macroeconomic balance approach (see Lee and others, 2008). The dependent variable is the ratio of the current account balance to output, while the explanatory variables considered are the ratio of the retirement-age population (65+) to the working-age population (15–64), expressed as a deviation from an arithmetic trade-weighted average across trading partners; the ratio of the prime saving population (40–64) to the working-age population (15–64), expressed as a deviation from an arithmetic trade-weighted average across trading partners; the logarithm of income per capita expressed in terms of purchasing power, expressed as a deviation from a geometric trade-weighted average across trading partners; the growth rate of income per capita expressed in terms of purchasing power, expressed as a deviation from an arithmetic trade-weighted average across trading partners; the ratio of the oil trade balance to output; the ratio of the fiscal balance to output, expressed as a deviation from an arithmetic trade-weighted average across trading partners; the ratio of external trade (exports plus imports) to output; the lagged ratio of the net foreign asset position to output; and a financial liberalization index that combines information on interest rate controls, credit controls, competition restrictions, state ownership, quality of banking supervision and regulation, policies to encourage capital market development, and capital account openness (access to domestic stock market for

foreigners). The index is from Abiad, Detragiache, and Tressel (forthcoming).

The equations do not include country fixed effects and retain the cross-sectional information. Time fixed effects are included to capture developments that affect all countries similarly in a given year. The models are estimated using unrestricted panel regressions by ordinary least squares as well as restricted panel regressions by the generalized method of moments, both with heteroscedasticity-robust standard errors.

Demographics and Financial Markets

The empirical analysis of the effects of aging on financial market valuations relied on monthly share price and returns data and annual long-term government bond yields drawn from CEIC Data Company, Ltd, and Bloomberg. The additional control variables were drawn from the WEO database, with openness defined as the ratio of the sum of imports and exports to GDP. Trend GDP growth was estimated using a Hodrick-Prescott filter, with the cyclical component defined as the deviation of actual growth from this trend. The specifications are based on the framework for asset valuation suggested by Davis and Li (2003), which relates stock prices and bond yields to economic fundamentals. The full panel data set was unbalanced, consisting of annual observations on 14 Asian economies over the period 1975 to 2006. The economies considered are Australia, Bangladesh, China, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore, Sri Lanka, and Thailand. In some specifications, data unavailability limited the regressions to a subsample of this data set.

The empirical analysis of the effects of aging on financial market structure relied on the World Bank's Financial Structure Database (Beck, Demirgüç-Kunt, and Levine, 2007), which provides data on volumes of equities, bonds, and bank assets for a wide set of economies. The full panel data set was unbalanced, consisting of annual observations on 22 Asian economies over the period 1975 to 2006. The economies considered are Australia,

Bangladesh, Bhutan, Cambodia, China, Hong Kong SAR, India, Indonesia, Japan, Korea, Lao PDR, Malaysia, Maldives, Mongolia, Nepal, New Zealand, Papua New Guinea, the Philippines, Singapore, Sri Lanka, Thailand, and Vietnam. In some specifications, data unavailability again limited the regressions to a subsample of this data set.

In both sets of empirical work, the equations include country fixed effects and year dummies. The models are estimated using fixed-effects regressions, with heteroscedasticity-robust standard errors.

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