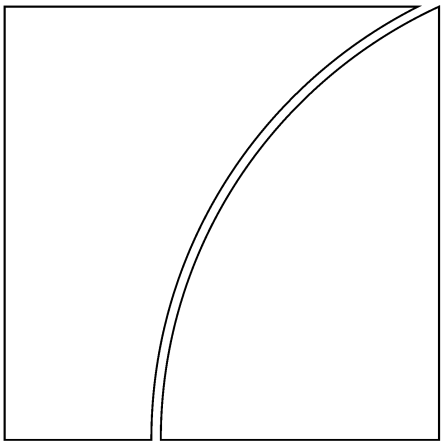
BANK FOR INTERNATIONAL SETTLEMENTS

BIS Quarterly Review

June 2003



International banking and financial market developments

BIS Quarterly Review
Monetary and Economic Department

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Special features

Notations used in this Review

e	estimated
lhs, rhs	left-hand scale, right-hand scale
billion	thousand million
...	not available
.	not applicable
–	nil or negligible
$	US dollar unless specified otherwise

Differences in totals are due to rounding.

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1. Overview: buoyant markets in weak economies

April and May 2003 saw an unusual divergence in market views about global growth prospects. Equity and credit markets rallied during this period even as yield curves flattened. A series of disappointing macroeconomic announcements led investors in swap and government bond markets to revise their expectations of economic growth downwards. By contrast, investors in equity and credit markets discounted the weak macroeconomic data and instead focused on better than expected corporate earnings reports.

Spreads on higher-yielding debt, both corporate and sovereign, fell to levels last seen in the late 1990s, when global growth was significantly stronger than today. Faced with exceptionally low nominal yields, investors appeared willing to take on more credit risk in their search for higher returns. Despite a surge in bond issuance in the first quarter and very weak equity issuance, investors' expectations of a further strengthening of corporate balance sheets seemed to remain intact. Heavily indebted emerging markets such as Brazil and Turkey, which had found themselves shut out of international capital markets as recently as July last year, regained access on relatively favourable terms.

Interest rates fall to historical lows

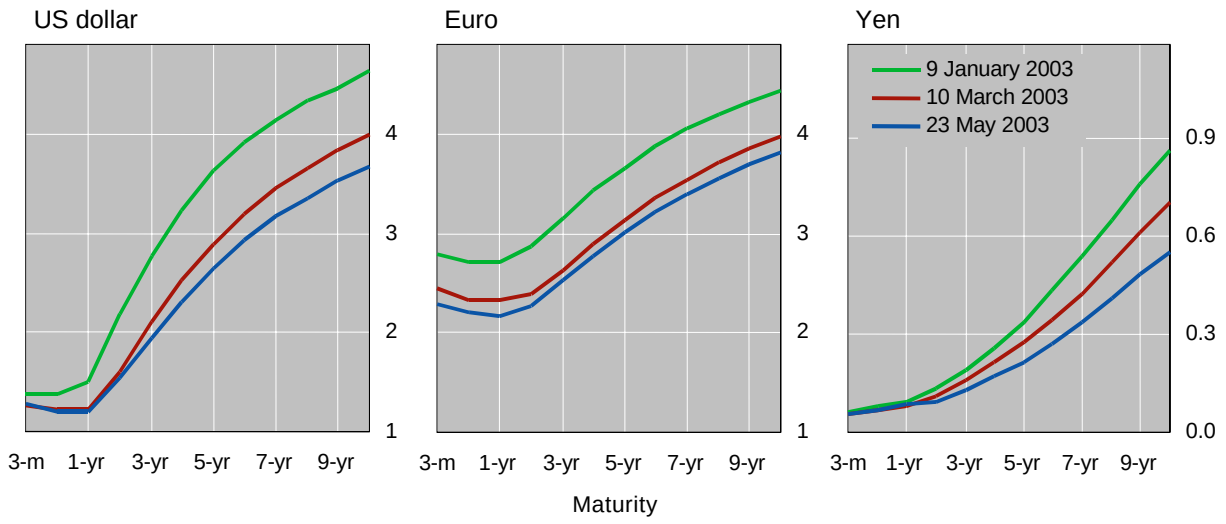
Long-term yields at a 45-year low

Long-term interest rates in the major markets fell to historical lows in May. Yields began to decline in mid-April, after the end of the main offensive in Iraq, and by 22 May the nominal yield on the 10-year US Treasury note stood at 3.31%, its lowest level since 1958 and approximately 50 basis points lower than its end-2002 level. The yield on 10-year German government bonds fell by a similar magnitude to 3.54%, its lowest level in decades. Yields on corresponding Japanese and Swiss government bonds were lower still.

The fall in yields in April and May signalled a return to the pessimism about growth prospects evident in government bond and swap markets earlier in the year. From the beginning of January to mid-March, long-term yields had declined steadily and yield curves had become noticeably flatter on signs of prolonged economic weakness (Graph 1.1). This trend was interrupted in the days immediately before and after the start of the war in Iraq, when yield curves steepened despite the absence of positive macroeconomic data.

Swap yield curves

In percentages



Note: For three-, six- and 12-month US dollar and yen maturities, Libor; for three- and six-month euro maturities, euro deposit rates.

Source: Bloomberg.

Graph 1.1

Indeed, the surprisingly weak US non-farm payroll figures released in March and April – usually regarded as a bellwether indicator – went unnoticed in bond and swap markets.

Weak data flatten yield curves

The plunge in world oil prices in mid-March may have underpinned the new optimism about growth prospects reflected in the steepness of yield curves at the time. Yet this optimism was not shared by most economists, who continued to revise their growth forecasts for the United States and the euro area downwards (Graph 1.2). The accumulation of weak macroeconomic data eventually seemed too much for investors in government bond and swap markets to ignore, and yield curves again flattened beginning in mid-April.

Expressions of concern about deflation by major monetary authorities also contributed to the flattening of yield curves. On 6 May, while deciding to leave its policy rate unchanged, the US Federal Open Market Committee distinguished between an economic climate for which risks seemed to be balanced and a trend in prices for which deflation was a greater risk than inflation. The yield on the 10-year US Treasury note fell by 3 basis points that day. Two days later, the ECB clarified that under its strategy it would aim to maintain an inflation rate "close to 2%" over the medium term so as to guard against the risks of deflation, while at the same time assuring investors that deflation was not a concern for the euro area as a whole. A month earlier, with its economy already beset by deflation, the Bank of Japan had announced that it was reviewing schemes under which it would purchase asset-backed securities. By dealing in such instruments, the bank may be able to bypass the large but weak commercial banks to enhance the monetary transmission mechanism.

Investors search for yield

A sustained rally in corporate bonds …

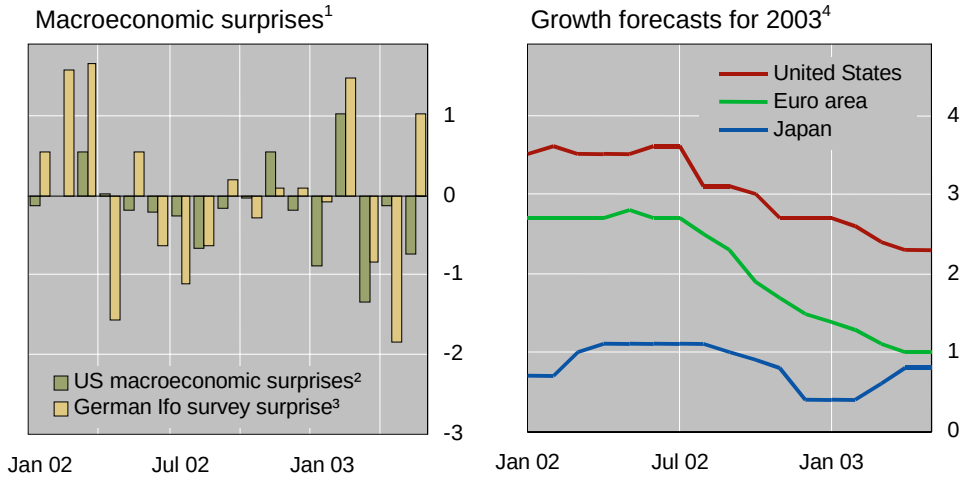
Even as yields fell and yield curves flattened in April and May, credit spreads continued to tighten. The recovery that had begun in credit markets in mid-October 2002 continued more or less uninterrupted over the first five months of 2003. Yields on BBB-rated US corporate bonds tightened by 30 basis points against US Treasury yields in the first quarter of 2003, and by a further 40 basis points in the eight weeks to 23 May. Not since 1993–94, during the US economy's rebound from the recession of the early 1990s, had credit markets experienced such a sustained rally.

To some extent, the tightening of credit spreads was an unanticipated consequence of the fall in interest rates. During the long decline in interest rates, positions in government bonds and other highly rated securities had provided investors with exceptionally high returns through capital gains. Over the 2000–02 period, the average annual return on the Merrill Lynch US government bond index was 11%, and on the euro area government bond index 8%. By 2003, however, yields had fallen so far that it seemed unlikely to many investors that they could decline further. Therefore, ordinarily conservative investors turned to higher-yielding corporate and emerging market bonds as a way of obtaining higher returns. Indeed, mutual funds investing in corporate high-yield and emerging market debt saw record inflows in the early part of 2003 (Graph 1.3).

… supported by a hunt for yield

Emerging markets were among the biggest beneficiaries of this search for yield. The Brazilian real, Argentine peso, South African rand and other higher-yielding currencies appreciated as investors moved into local fixed income

Macroeconomic data and growth forecasts



[1] Normalised announcement surprises, based on the difference between actual numbers and consensus forecasts. The observations are positioned in the month in which the actual numbers were released. [2] Weighted average of normalised surprises of the ISM survey, non-farm payrolls, retail sales and producer price and consumer price announcements. [3] The German Ifo survey is a business climate index derived by the Institut für Wirtschaftsforschung from survey responses. [4] Percentage changes over previous year. Forecasts as published monthly by Consensus Economics. The observations are positioned at the end of the month in which the forecast was made.

Sources: Bloomberg; © Consensus Economics; BIS calculations. Graph 1.2

markets. In addition, spreads on dollar-denominated emerging market bonds tightened by 200 basis points on average between the end of 2002 and late May, to their lowest level since early 1998 (Graph 1.3). Even heavily indebted countries such as Brazil and Turkey, which had found themselves shut out of international capital markets as recently as July last year, regained access on relatively favourable terms.

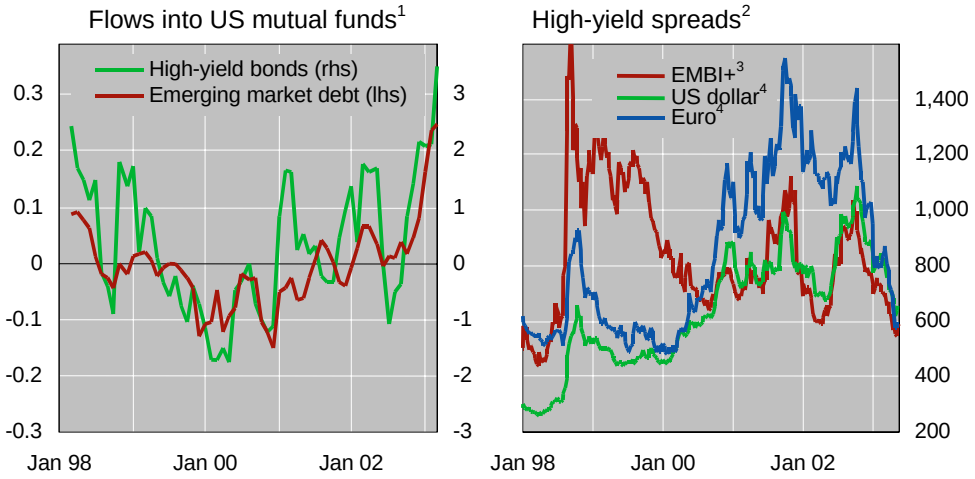
Brazil and Turkey return to the market

Concerns about the underlying fundamentals did at times weigh on spreads, but their impact tended to be limited and quickly reversed. In early March, the announcement of weaker than expected automobile sales in the United States depressed the price of debt issued by Ford and General Motors. Although other sectors continued to rally, corporate bond indices tended to fall during this period because of the large weighting given to the automobile sector. In emerging markets, investors remained sensitive to continued improvements in policies, the maintenance of macroeconomic stability and the disbursement of promised foreign assistance. For example, Turkey saw its sovereign spread soar temporarily in mid-March, from 750 basis points to nearly 1,000 basis points, on news that a multibillion dollar financial package from the United States would be sharply reduced. Meanwhile in Korea, the revelation of accounting irregularities at one of the country's largest conglomerates shook local financial markets (see the box on page 10).

Fundamentals sometimes matter

A surge in bond issuance in the first quarter of 2003 was easily absorbed by credit markets. Gross issuance by corporate borrowers rebounded strongly in domestic and international bond markets (Graph 1.4). Much of this activity was driven by refinancings of maturing debt. Nevertheless, net new issuance in the first quarter was higher than in recent quarters. New borrowing exceeded repayments by $341 billion in the international debt securities market, almost double the net amounts raised in each of the third and fourth quarters of 2002

The search for yield

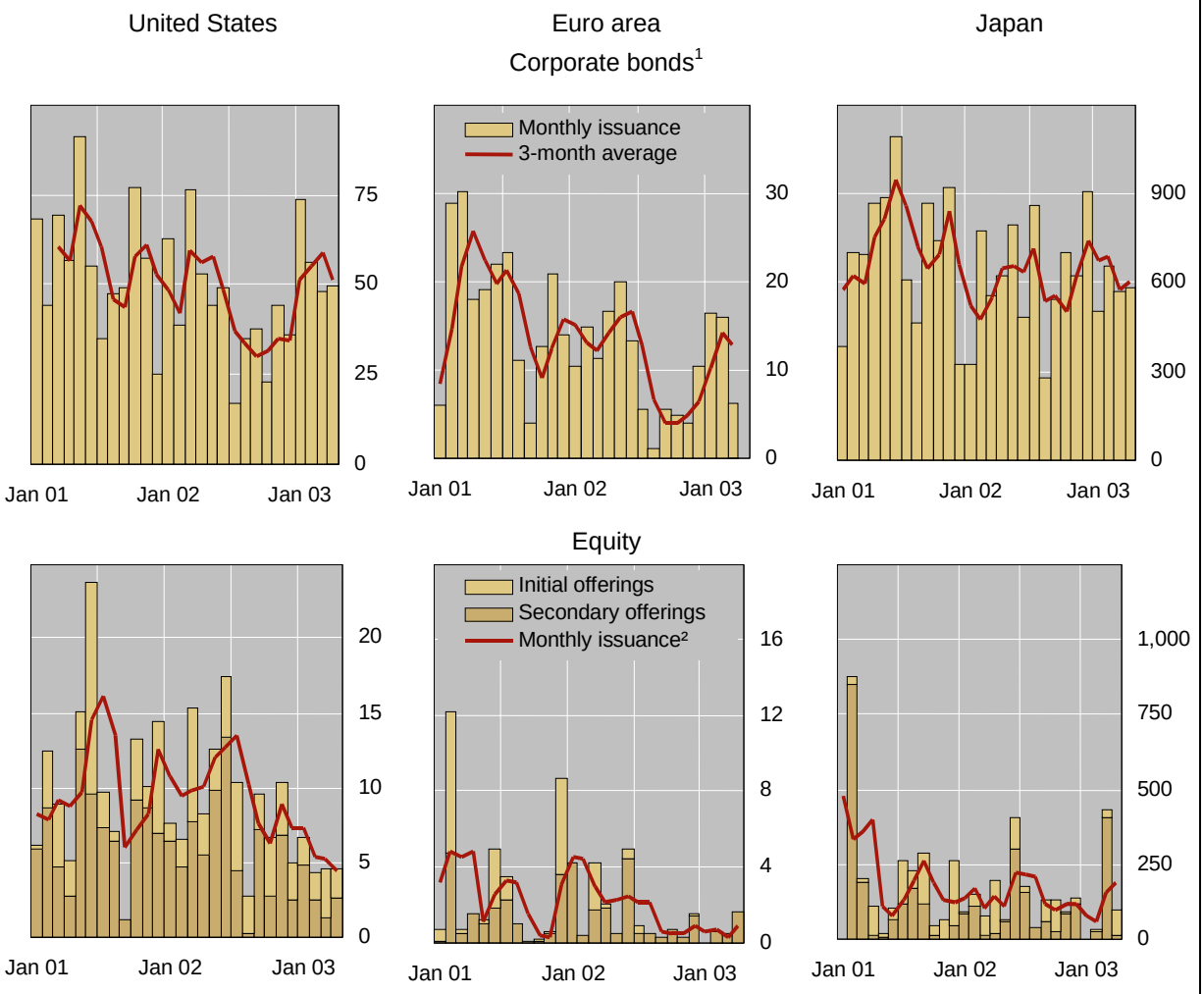


[1] Three-month moving averages, in billions of US dollars. [2] End-week data, in basis points. [3] Weighted spread of sovereign debt instruments over US Treasury securities as calculated by JP Morgan Chase. [4] Option-adjusted spreads over government bonds as calculated by Merrill Lynch for corporate bond indices.

Sources: Bloomberg; Investment Company Institute; JP Morgan Chase; Merrill Lynch. Graph 1.3

Fund-raising in capital markets

Gross issuance; in billions of local currency



[1] Debt securities issued in domestic markets by non-financial corporations. Data for the euro area refer to euro-denominated bonds issued in domestic and international markets. [2] Three-month moving average of total offerings.

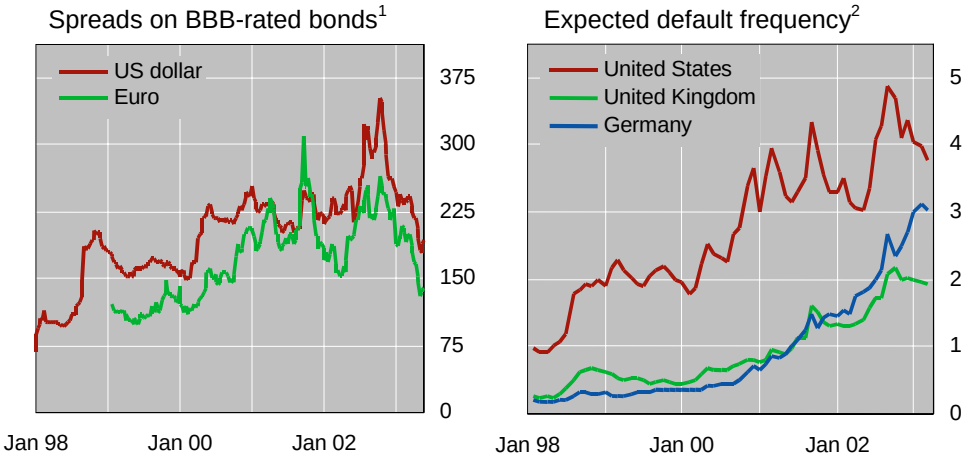
Sources: Bloomberg; European Commission; national data; BIS calculations. Graph 1.4

(see "The international debt securities market" on page 23). While issuance by European financial institutions accounted for much of this increase, net international issuance by corporations was also up.

Prefunding in anticipation of war

The pickup in net issuance in part reflected prefunding in advance of the war in Iraq. Corporations concerned that interest rates might rise once war broke out moved to lock in low borrowing costs. By the end of the first quarter of 2003, many firms had reportedly completed up to half of their borrowing plans for the year. Preliminary data indicate that gross corporate issuance slowed going into the second quarter, suggesting that corporate borrowing returned to the more subdued levels seen in the latter part of 2002. Moreover, bank lending again contracted. Signings of syndicated loans by non-financial corporations were down by 12% in the first quarter from a year earlier (see "International syndicated credits in the first quarter of 2003" on page 21). Lending to US corporations was especially weak.

Credit spreads and default probabilities



[1] Option-adjusted spread over government bonds as calculated by Merrill Lynch for corporate bond indices with seven- to 10-year maturity; end-week data, in basis points. [2] Expected probability that a company will default within one year, as calculated by KMV, in percentages.

Sources: Bloomberg; KMV; Merrill Lynch. Graph 1.5

Corporations continued to rely on asset sales and especially internal cash flow to reduce their borrowing requirements. Many companies reported improved profit margins, achieved by restraining capital spending and further cutting operating costs. In recent months, some firms have also strengthened their balance sheets by issuing mandatory convertible bonds, redeemable only in stock. However, initial and secondary offerings of equity capital have remained at very depressed levels.

Have corporate spreads overshot?

Expectations of further deleveraging, coupled with higher profit margins and a decline in the number of corporate defaults, have to date underpinned the narrowing of credit spreads. Should these expectations prove optimistic, some of the recent gains in credit markets could be reversed. In mid-May, triple-B spreads were equal to their 10-year average of 180 basis points. However, market-based measures of default probabilities, which tracked the widening of spreads reasonably closely over the 1998–2002 period, have yet to fall from the highs reached in late 2002 (Graph 1.5). Moreover, in April and May growth prospects as reflected in yield curves were at odds with the strengthening of fundamentals implied by the tightening of credit spreads. This raises the question of whether investors' search for yield has driven credit spreads down faster than the improvement in credit quality.

Are equity investors getting ahead of themselves?

Earnings numbers engender optimism

Equity investors too appeared unfazed by the flattening of yield curves and weak macroeconomic data in April and May. The decline in global equity prices that began in mid-January came to an abrupt end in the second week of March, on signs that war in Iraq was imminent (Graph 1.6). Coalition successes in the war supported a rally in equity markets in late March and early April. Following the fall of Baghdad, investors turned their attention to corporate earnings

reports and found reason for optimism even as investors in swap and government bond markets turned pessimistic.

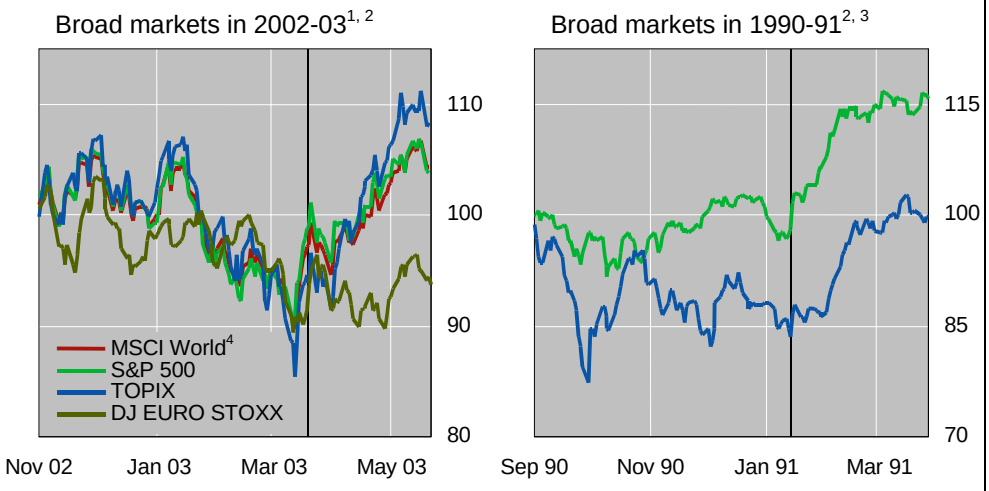
While events related to developments in Iraq had begun affecting investor confidence in December 2002, the possibility of war started to weigh more heavily on markets on 16 January, when UN inspectors found empty Iraqi warheads. This uncertainty evidently commanded a risk premium. Indicators of such a premium, rigorously estimated from prices of options on equity indices, rose sharply during January and February (Graph 1.7). Between 16 January and 12 March, the MSCI World Index fell by 13%, the S&P 500 by 12% and the Dow Jones EURO STOXX by 20% (Graph 1.1, left-hand panel).

Investors buy before hostilities start

The abrupt transformation of eight weeks of anxiety about war into a four-week war rally provides an interesting study of investor sentiment. Suddenly, in the second week of March, when war looked almost inevitable, investors seemed to regain confidence. They may have been looking back to January 1991, when stock markets rallied as soon as the Gulf war began (Graph 1.6, right-hand panel). Perhaps anticipating a similar rally, investors started buying without waiting for hostilities to break out. Stock prices rebounded on 13 March 2003, six days before the war began, and continued to soar in the first days of the war. The rally was interrupted in late March by reports of setbacks suffered by coalition forces but resumed in the first week of April on news that the international airport in Baghdad had been captured. In the four weeks from 17 March to 14 April, the MSCI World Index and the S&P 500 rose by 10% and the Dow Jones EURO STOXX by 16%. During the entire episode, the European market tended to rise and fall by more than the US market. In part this was because of the greater weight in the former of sectors most affected by recent volatility, namely the insurance, technology and financial sectors.

For investors in equity markets, the war in Iraq was a distraction from the usual fundamentals. In the run-up to the conflict and during the fighting

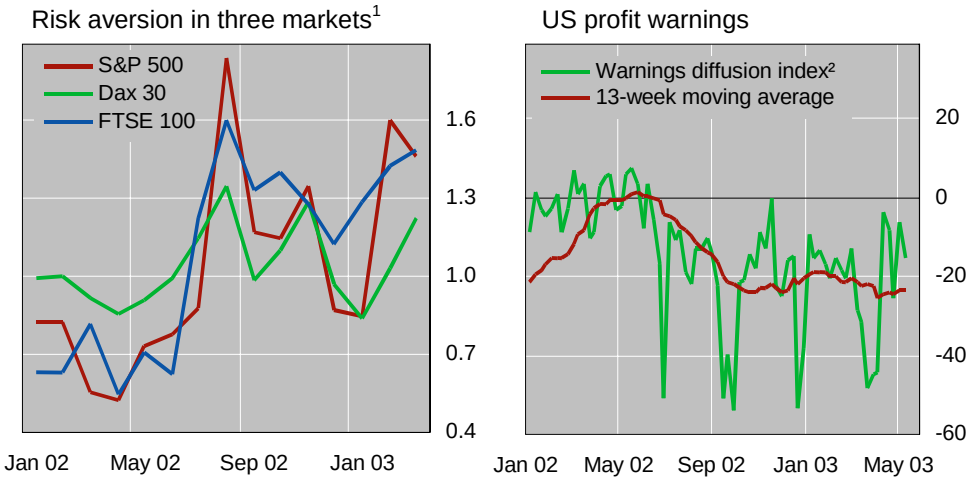
Equity markets around the start of two wars



[1] End-October 2002 = 100. [2] The vertical line indicates the start date of war in the Gulf (19 March 2003 and 16 January 1991 respectively). [3] End-August 1990 =100. [4] Morgan Stanley Capital International (MSCI) World Index.

Sources: Bloomberg; Datastream. Graph 1.6

Indicators of risk premia and profit warnings



[1] Derived by comparing probabilities implied by option prices with probabilities estimated from a time series of realised returns, using the approach of Tarashev et al in "Investors' attitude towards risk: what can we learn from options?", in this issue of the *BIS Quarterly Review*. [2] Number of positive minus negative warnings as a percentage of number of positive plus negative warnings.

Sources: Bloomberg; BIS calculations. Graph 1.7

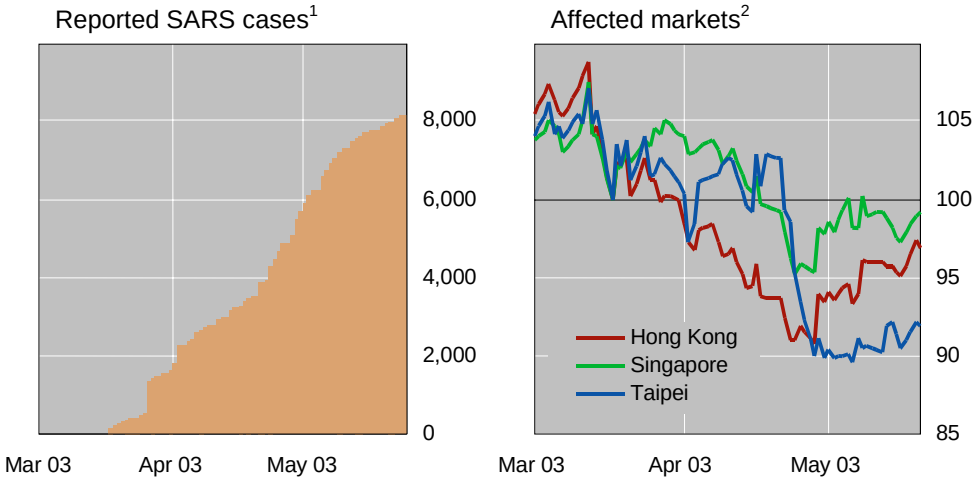
A belated return to fundamentals

itself, these investors seemed to shrug off major macroeconomic announcements. On 4 April, for example, a disconcertingly weak US non-farm payroll figure had little effect on the markets. Yet, once the war was considered to be over, market participants returned to their homework in earnest and evidently liked what they found. While negative profit warnings issued by US corporations continued to outnumber positive ones (Graph 1.7), the bellwether companies tended to deliver good news. For example, AOL, AT&T and Microsoft in the United States and Nokia, Philips and Siemens in Europe exceeded expectations about their earnings. These favourable earnings reports extended the global market rally by five more weeks, with the MSCI World Index rising by 8% between 14 April and 16 May. The most notable exception to this pattern of positive corporate news was an unfavourable earnings report by Sony on 24 April, which provoked a decline of 1.5% in the TOPIX.

Asian markets cope with SARS

In the midst of the upturn in US and European equity markets, investors in Asian markets found themselves facing an unusual threat. The first cases of severe acute respiratory syndrome (SARS) were reported in Asia during the third week of March (Graph 1.8). These reports led to a sharp fall in stock prices in Hong Kong SAR, Singapore and Taiwan (China). For markets that normally track the US market closely, their underperformance after the outbreak of the virus was striking. Between mid-March and the end of April, the Hong Kong market underperformed the MSCI World Index by 8%, the Singapore market by 3.4% and the market in Taipei by 12%. Airline and hotel stocks were especially hard hit, with Cathay Pacific, for example, falling by 15%. On the other side of the globe, prices in the Toronto stock market were unaffected when the World Health Organization (WHO) added the city to its list of locations subject to a travel warning. The losses in equity markets began to abate only on 29 April, when the WHO determined that the number of

SARS and stock prices



[1] Cumulative number of total reported probable cases. [2] Ratio of country index to MSCI World Index; 17 March 2003 = 100.

Sources: Bloomberg; Datastream; World Health Organization; BIS calculations. Graph 1.8

SARS cases had peaked in Hong Kong SAR, Singapore, Toronto and Vietnam. The Hong Kong and Singapore stock markets both gained more than 3.5% in one day. However, the virus remained a serious problem in China, where the stock exchanges were shut down in early May.

The global market rally in March and April lifted equity valuations further above historical norms. Based on a five-year moving average of earnings, the price/earnings ratio for the S&P 500 reached almost 23 in April, significantly above the 1961–95 average of 17. Current valuations appear more reasonable if earnings are not assumed to revert to their five-year average but rather are assumed to rise more strongly in an economy recovering from a recession. Indeed, analysts are forecasting robust earnings growth, and a calculation based on this forecast would bring the price/earnings ratio down to 17. It should be noted, however, that such forecasts have in the past consistently proved to be overly optimistic.

A depositor run in securities markets: the Korean experience

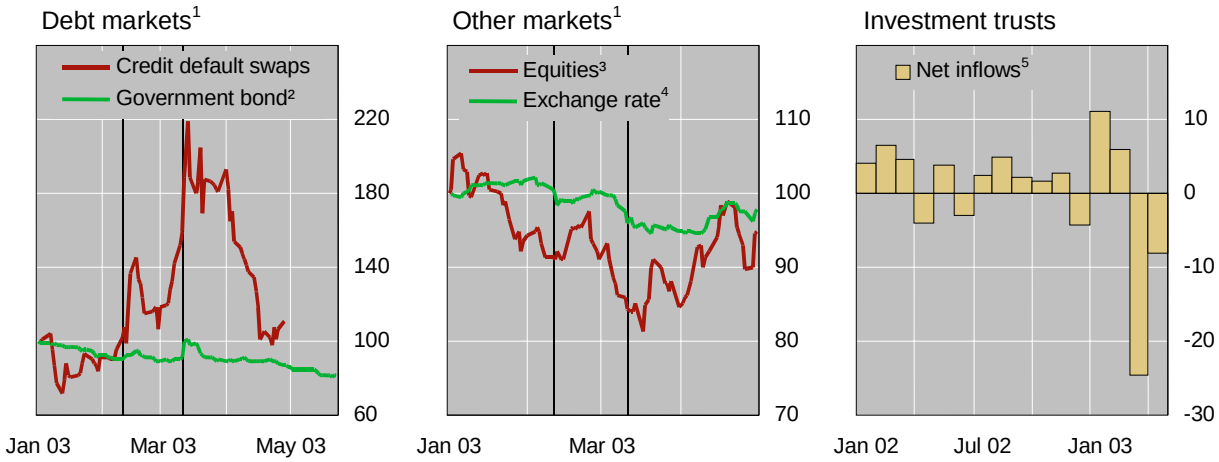
While financial systems dominated by banks are frequently contrasted with systems centred around securities markets, similarities between the two types of system receive less attention. Events in Korean financial markets in March 2003 highlighted one of those similarities: the risks to financial stability posed by a run by investors. Central banks have long been concerned about the possibly systemic consequences of a sudden withdrawal of deposits from banks and have developed tools, such as deposit insurance and lender of last resort facilities, to respond to bank runs. Korea demonstrated that similar runs can occur in securities markets, in the form of mass redemptions of trust funds. The tools for responding to such runs, however, are much less developed.

The problems in Korea began on 11 March, when state prosecutors indicted executives of SK Global, a subsidiary of Korea's third largest conglomerate SK Group, on charges of falsifying financial statements. SK Global was accused of inflating profits by 1.6 trillion won and hiding debt totalling 1.1 trillion won. Similar to the market reaction a month earlier – on 11 February when concerns about North Korea's nuclear weapons programme had led Moody's to change its credit rating outlook on South Korea to negative from positive – equity, fixed income and currency markets all fell immediately after the indictment. However, whereas in February markets had stabilised quickly, in March liquidity problems among non-bank financial intermediaries led to a vicious circle of deterioration in market functioning.

In the days and weeks following the indictment, Korean investors fearing losses redeemed their holdings of investment trusts, especially money market funds. Redemptions in March totalled 24.7 trillion won, or 14% of trusts' assets at the end of February. Given their limited cash holdings and restrictions on borrowing, investment trusts were forced to meet redemptions by selling assets. As a result, corporate and even government bond prices plummeted. Credit default swap (CDS) spreads on the Korean government also soared as liquidity in other segments of the debt market evaporated and investors turned to the CDS market to hedge their exposures.

In the face of such distress selling, financing conditions in Korea's corporate bond market deteriorated to the point where the solvency of some financial institutions was threatened. Credit card companies were the worst affected because of their heavy reliance on investment trusts for funding. Rising delinquency rates had already begun to put upward pressure on card companies' borrowing costs, and as trusts liquidated their assets, card companies faced the prospect of being unable to roll over maturing obligations.

The authorities eventually intervened to ensure that markets continued to function. In mid-March, the central bank helped to stabilise the government debt market by bidding for 2 trillion won, and the government postponed scheduled auctions of government bonds. To avert the possibly systemic consequences of a default by a card company, the Korean authorities brought together a number of key market participants to arrange an orderly refinancing of card companies' maturing debt. In early April, commercial banks agreed to provide a line of credit, and in exchange the card companies committed to raising 4.6 trillion won in equity capital.



[1] 1 January 2003 = 100; vertical lines indicate 11 February 2003 and 11 March 2003. [2] Five-year Korean won-denominated bond yield. [3] KOSPI. [4] US dollar/won exchange rate; a decline indicates a depreciation of the won. [5] Change in deposits with Korean investment trust management companies, in trillions of won.

Sources: Bank of Korea; Bloomberg; CreditTrade; Datastream; BIS calculations.

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2. The international banking market

Banks shifted funds from debt securities into the international interbank market in the fourth quarter of 2002. This shift appeared to constitute a move towards shorter-term maturities. Nevertheless, some banks continued to invest in government debt. In contrast to the robust lending between banks, lending to corporations and other non-bank entities remained flat. Over the course of 2002, the euro gained further ground vis-à-vis the US dollar and other currencies in both cross-border credit and deposits.

Funds flowed out of emerging markets, largely in the form of a sharp contraction in claims. Despite an improvement in credit conditions in the fourth quarter, the outflow from Latin America, particularly from Argentina and Brazil, continued. The Asia-Pacific region also experienced a noticeably large outflow, owing in part to reduced repo activity in a few countries. Banks channelled further funds to emerging Europe, particularly to those countries in accession negotiations with the European Union.

Interbank lending dominates flows in the fourth quarter

Interbank activity drove cross-border bank flows in the fourth quarter of 2002. Virtually all of the growth in total claims was accounted for by lending to other banks, as banks in the BIS reporting area shifted out of longer-term securities. In seasonally unadjusted terms, the outstanding stock of total cross-border claims rose by $371 billion, to $13.4 trillion (Table 2.1). Banks deposited $432 billion in other banks, and moved out of international debt securities, which increased the year-over-year growth in total claims to 6%, from 5% in the third quarter.

Fourth quarter loan flows are driven by lending to banks ...

While credit activity in the global market has long been dominated by lending between banks, interbank loan flows in the fourth quarter were large by historical standards (Graph 2.1). The recycling of funds in the interbank market helps banks to reposition funds geographically during periods of weak corporate demand. Claims on banks, including both claims on unrelated banks and claims on own offices, have ranged between 65% and 77% of total claims since at least 1980. On average, each dollar lent to corporations and other non-bank entities has historically been associated with $1.90 placed in the interbank market. However, each dollar lent to non-banks in the fourth quarter was associated with $20 placed in the interbank market.

Cross-border claims of BIS reporting banks

Exchange rate adjusted changes in amounts outstanding, in billions of US dollars[1]

	2001	2002	2001	2002				Stocks at end-Dec 2002
	Year	Year	Q4	Q1	Q2	Q3	Q4	
Total claims	859.4	794.3	236.8	57.4	225.8	140.0	371.2	13,425.6
By instrument								
Loans and deposits	612.2	540.1	165.5	–0.5	83.6	42.3	414.7	10,103.3
Securities[2]	247.2	254.2	71.3	57.9	142.2	97.6	–43.5	3,322.3
By currency								
US dollar	423.7	335.9	184.5	51.1	185.0	–104.1	204.0	5,618.4
Euro	439.3	488.2	–12.2	44.4	98.3	221.2	124.3	4,478.6
Japanese yen	–65.2	–38.7	6.5	–81.4	5.3	15.8	21.6	740.4
Other currencies[3]	61.6	8.9	58.0	43.3	–62.8	7.1	21.3	2,588.2
By sector of borrower								
Banks	417.3	495.1	142.1	9.5	146.3	–14.3	353.7	8,858.5
Non-banks	442.1	299.2	94.7	47.9	79.5	154.3	17.5	4,567.1
By residency of non-bank borrower								
Advanced economies	384.8	302.5	82.8	44.6	46.6	139.0	72.4	3,528.4
Euro area	139.0	123.0	34.3	51.5	8.4	48.6	14.5	1,542.8
Japan	–3.7	4.1	9.5	–2.3	6.3	–0.4	0.5	123.4
United States	183.4	136.0	34.2	–17.3	40.1	55.5	57.6	1,272.7
Offshore centres	55.0	17.9	8.2	–7.7	36.9	16.8	–28.2	468.3
Emerging economies	2.5	–17.3	3.6	9.4	–4.9	2.4	–24.2	507.2
Unallocated[4]	–0.1	–3.9	0.1	1.5	0.8	–3.9	–2.4	63.2
Memo: Local claims[5]	*76.4*	*37.0*	*–14.1*	*69.8*	*–40.9*	*–25.9*	*33.9*	*1,732.8*

[1] Not adjusted for seasonal effects. [2] Mainly debt securities. Other assets account for less than 5% of total claims outstanding. [3] Including unallocated currencies. [4] Including claims on international organisations. [5] Foreign currency claims on residents of the country in which the reporting bank is domiciled. Table 2.1

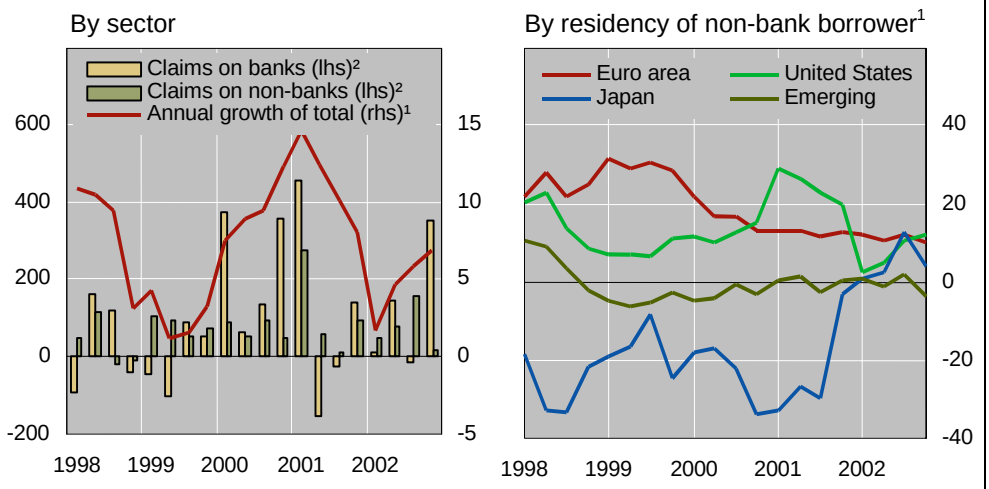
Banks transferred funds out of Europe and into banks in the United States and Japan in the fourth quarter. Much of this reflected inter-office activity. Banks in offshore centres, Switzerland, Germany and France parked funds in the United States, fuelling a $121 billion increase in loans to the US banking sector. Concurrently, banks in the United States repatriated deposits from banks in the United Kingdom, Germany and France, contributing to a $68 billion net flow from banks in the European Union into the US banking system. Banks in Europe also deposited funds in banks in Japan, resulting in the largest increase in new loans ($62 billion) to the Japanese banking sector since the fourth quarter of 2000. Much of this reflected inter-office activity by Japanese banks located in the United Kingdom.

… much of which reflects inter-office transfers out of Europe

At the same time, banks shifted out of international debt securities, which generally carry a greater degree of interest rate risk than short-term bank deposits. The move out of securities and into short-term deposits possibly reflected bank uncertainty over long-term yield movements at a time when government bond yields were at historically low levels. In some developed countries, however, banks continued to purchase government securities, thus

Cross-border claims by sector and residency

Annual percentage changes



[1] Calculated as the sum of exchange rate adjusted changes in amounts outstanding between periods *t*–3 and *t*, divided by the amount outstanding in period *t*–4. [2] Exchange rate adjusted changes in amounts outstanding, in billions of US dollars

Graph 2.1

supporting debt security claims on non-banks. However, debt security claims on banks dropped by $52 billion, pushing the total quarterly change in debt security investment into negative territory for the first time since 1996, when the BIS began tracking these instruments. Banks in offshore centres and in the United Kingdom drove much of this decline by unloading $38.8 billion and $10.8 billion, respectively, in debt security claims on banks. Banks in the euro zone, primarily in France, the Netherlands, Ireland, Italy and Spain, also sold off a combined $7.2 billion in debt security claims on other banks.

Weak lending to non-banks reflects weak corporate demand

Weak demand led to a decline in loans to corporations and other non-bank borrowers in the fourth quarter. Loans to non-banks fell by $17 billion, the first contraction in a year, as a result of reduced lending to non-bank entities in offshore centres and Japan. Claims on US non-bank borrowers actually grew by $58 billion, supported by increased loans from banks in offshore centres and purchases of public sector debt securities. However, lending to corporations and other non-bank entities in the euro zone remained subdued. Total claims on non-banks in the developed European economies rose by $16 billion in the fourth quarter, far below the $46 billion average expansion over the previous four quarters. In particular, claims on French, Swedish, Italian and Swiss non-bank borrowers decreased, while claims on non-bank borrowers in Germany and the United Kingdom rose only modestly. In addition, loans to corporations and other non-bank entities in Japan contracted for the first time in five quarters (by $10 billion), driving the year-over-year growth in claims on non-banks down to 4% from 12% in the previous quarter (Graph 2.1).

Banks continue to favour government securities over loans

Banks in some developed countries, particularly Japan, continued to shift into government securities in the fourth quarter. The BIS consolidated statistics,

which net out inter-office positions, indicate that claims on the public sector accounted for 14% of international claims of banks in developed countries in the fourth quarter of 2002, up from 12% in the first quarter. Reporting area banks' consolidated claims on the public sector totalled $1.2 trillion in the fourth quarter, and were boosted by purchases of Italian, Spanish, Japanese and German government securities.

Japanese banks continue to invest in government securities

Japanese banks' overall credit activity was again driven by purchases of US and European government securities, and accounted for much of the expansion in total consolidated claims on the public sector. Japanese banks' consolidated international claims rose to $964 billion in the fourth quarter of 2002, with claims on governments reaching 35% of this total, up from 27% a year earlier. In particular, claims on the US public sector increased to $172 billion, or 45% of Japanese banks' consolidated international claims on the United States. Japanese banks also stepped up lending to euro area governments, particularly to the French, Italian, Spanish and Belgian public sectors. Claims on euro area public sectors reached 51% of Japanese banks' consolidated international claims on the euro area, up from 43% a year earlier.

A similar but less pronounced shift remained evident in other countries as well. Canadian banks purchased $2.9 billion in government securities in the fourth quarter, boosting total consolidated claims on the public sector to $22.4 billion. As a result, claims on the public sector accounted for 15% of Canadian banks' consolidated international claims (up from 12% a year earlier). Likewise, weak lending by US banks over the course of 2002 resulted in an increase in the share of total US international credit flowing to the public sector. US banks reduced their exposure to the non-bank private sector in the fourth quarter of 2002, primarily vis-à-vis offshore centres, Japan and China. As a result, the share of claims on the public sector in US banks' consolidated international claims remained at the relatively elevated 27% level evident since the second quarter, up from 24% a year earlier.

The euro continues to be the currency of choice

The euro continued to gain market share vis-à-vis other major currencies in both the loan and deposit markets over the course of 2002. The stock of euro-denominated claims increased by 15% in 2002 following an equally rapid expansion in 2001. In contrast, the year-over-year growth in US dollar-denominated claims fell to 6% from 9% over the same period. Claims denominated in Japanese yen and Swiss francs continued to contract throughout 2002, at average annual rates of 11% and 7%, respectively, while sterling-denominated claims grew modestly.

The euro captures market share in developed economies ...

Reflecting the rapid growth, the share of euro-denominated claims in total international claims has risen since 1999 (Graph 2.2). On a constant exchange rate basis (which corrects for the appreciation of the euro), euro-denominated claims made up 36% of total claims in the fourth quarter of 2002, up from 30% at the beginning of 1999. Conversely, the share of US dollar-denominated claims fell slightly, from 46% to 45%, and that of yen-denominated claims

declined from 10% to 6% over this same period. The use of the pound sterling and the Swiss franc has remained relatively stable at 5% and 3%, respectively.

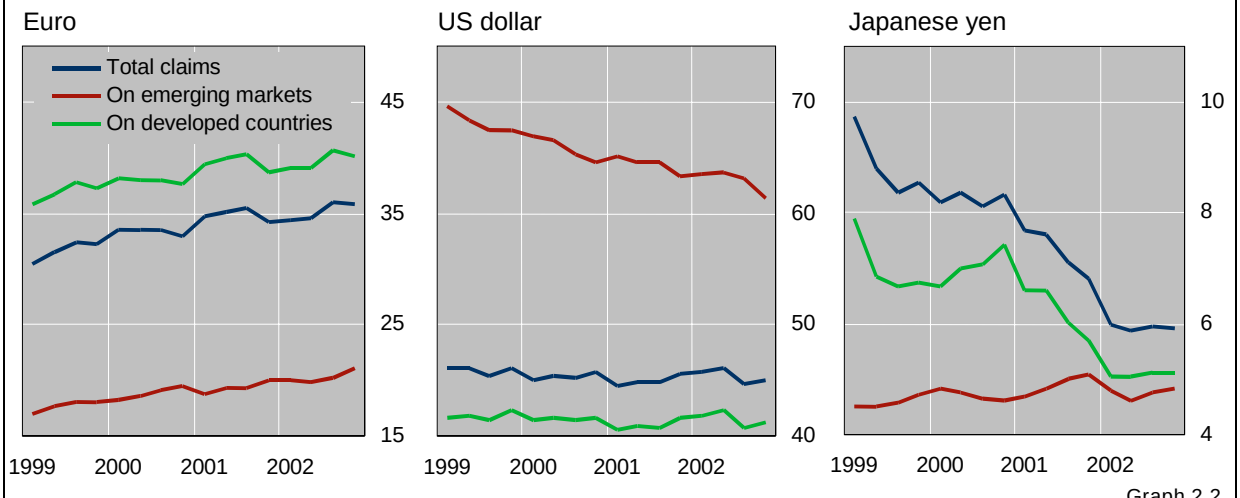
Not surprisingly, the rise in the use of the euro has been significant in the euro area. The year-over-year growth in the stock of US dollar-denominated claims on euro area borrowers was negative throughout 2002, contracting by 1.5%, even as that in euro-denominated claims reached 13% in the fourth quarter. In addition, almost 90% of all syndicated loan signings arranged in 2002 for euro area borrowers were denominated in euros, compared with an average of 75% in 2000 and 2001. On a constant exchange rate basis, US dollar-denominated claims on euro area borrowers fell to 19% of total claims from a peak of 21% a year earlier, while euro-denominated claims rose from 68% to 71% over this same period. This was not driven exclusively by intra-euro area lending; the share of euro-denominated claims in total claims on the euro area by banks located outside the euro area increased to 48% from 45% a year earlier.

... as well as in emerging markets ...

The shift to euro-denominated claims has not been confined to the developed countries, as several emerging market regions have increasingly moved away from the US dollar. On a constant exchange rate basis, US dollar claims sank to 61% of total claims on emerging markets in the fourth quarter of 2002, down from 70% at the beginning of 1999. Over the same period, euro-denominated claims rose from 17% to 21%. Even in Latin America, where the US dollar has long been the currency of choice, claims denominated in euros increased from 5% to 7% of total claims over the past year. This same trend is evident in the Middle East and Africa, as well as in the emerging European economies. US dollar-denominated claims fell from an average of 42% of total claims on emerging Europe in 2000 to 39% in 2002, while euro-denominated claims have risen from an average of 42% in 2000 to 45% over the same period. In addition, the share of euro-denominated syndicated loan signings for

Claims of BIS reporting banks by currency

As a percentage of total claims, at end-December 2002 constant exchange rates



Graph 2.2

emerging European economies has increased to approximately 40% of all facilities arranged for the region in 2001 and 2002, compared with 25% in 1999 and 2000.

... in both claims and liabilities

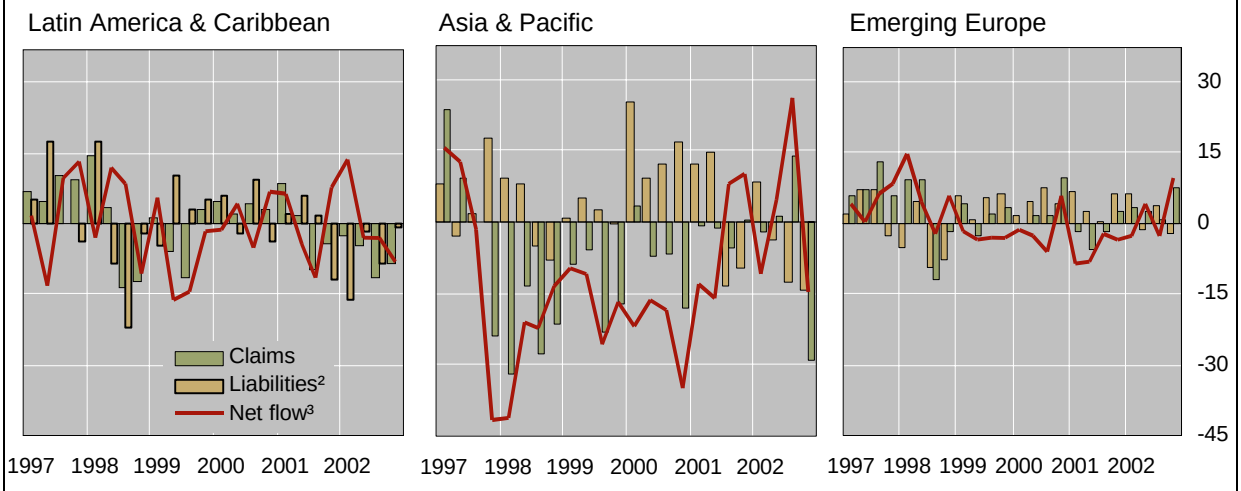
There has also been a noticeable shift in the currency denomination of BIS reporting banks' cross-border liabilities, almost 90% of which are deposits. On a constant exchange rate basis, 49% of reporting banks' liabilities were denominated in US dollars in the fourth quarter of 2002, down from 50% two years earlier, while euro-denominated liabilities rose from 27% to 30% over the same period. This trend has been evident for depositors in the developed countries as well as in most emerging market regions. While the US dollar is still the most widely used currency by depositors in emerging markets, it has been gradually losing ground to the euro. Euro-denominated liabilities vis-à-vis emerging markets rose to 15% of total liabilities in the fourth quarter, up from an average of 13% in 2000 and 2001.

Emerging markets shoulder repayments

The net flow of funds into emerging markets from banks in the BIS reporting area was negative in the fourth quarter, although regional differences were apparent (Graph 2.3). Total claims on emerging markets fell by $37 billion, the largest contraction since the third quarter of 1998. Claims on emerging markets fell to 6.5% of total claims, down from an average of 8% in 2001 and 10% in 1999. Claims on Latin America continued to contract, while a drop in claims on Asia reflected an unwinding of repo positions in a few countries. Conversely, funds flowed into the EU accession countries, driven by both an increase in claims on the region and deposit repatriations (Table 2.2).

Net bank flows to emerging economies[1]

Exchange rate adjusted changes in amounts outstanding, in billions of US dollars



[1] A positive value represents an inflow to emerging economies from banks in the BIS reporting area, and a negative value an outflow from emerging economies. [2] A positive value indicates a decrease in BIS reporting banks' liabilities vis-à-vis emerging economies, and a negative value an increase. [3] Changes in claims minus changes in liabilities. Graph 2.3

Cross-border bank flows to emerging economies

Exchange rate adjusted changes in amounts outstanding, in billions of US dollars

	Banks' position[1]	2001	2002	2001	2002				Stocks at end-Dec 2002
		Year	Year	Q4	Q1	Q2	Q3	Q4	
Total[2]	Claims	–27.0	–37.3	–0.9	–0.7	1.1	–0.3	–37.4	876.8
	Liabilities	20.3	–43.1	–28.4	–7.3	–6.5	–18.4	–10.8	1,074.4
Argentina	Claims	–5.8	–11.8	–3.3	–4.3	–0.8	–4.5	–2.3	31.2
	Liabilities	–16.7	–0.1	–11.1	–1.0	0.5	0.3	0.2	24.9
Brazil	Claims	0.9	–11.3	–2.2	1.0	–2.4	–3.5	–6.4	87.5
	Liabilities	0.4	–8.0	–4.1	1.4	–3.8	–1.4	–4.2	40.5
Chile	Claims	0.2	0.5	0.2	–0.3	–0.5	–0.1	1.3	19.9
	Liabilities	–1.0	–1.1	–0.6	0.2	–0.8	–0.8	0.3	14.1
China	Claims	–3.5	–12.2	–0.6	–7.3	1.0	4.1	–10.0	44.2
	Liabilities	–6.5	–3.6	–4.0	–7.1	6.4	–1.0	–1.9	92.8
Indonesia	Claims	–5.4	–6.0	–0.8	–1.3	–2.1	–1.3	–1.2	31.2
	Liabilities	1.1	–2.4	0.7	–1.4	–0.3	–0.2	–0.5	11.9
Korea	Claims	–0.2	8.2	–2.0	6.4	1.8	6.5	–6.4	73.0
	Liabilities	1.7	0.5	1.7	11.4	–5.6	–0.4	–4.8	30.6
Mexico	Claims	2.0	3.1	0.6	3.3	1.7	–1.9	–0.1	64.3
	Liabilities	8.8	–11.4	0.6	–14.1	1.3	–0.3	1.7	52.1
Russia	Claims	1.3	3.6	2.1	1.4	0.8	–1.1	2.4	35.0
	Liabilities	5.2	9.6	1.7	3.6	0.0	4.0	2.0	39.0
Saudi Arabia	Claims	–2.4	–5.4	1.0	0.0	0.5	–1.8	–4.2	19.3
	Liabilities	–9.7	–2.1	–7.3	–5.4	–0.1	1.4	2.0	51.2
South Africa	Claims	–0.4	–0.4	–1.1	–1.5	0.2	–0.6	1.5	18.4
	Liabilities	2.1	3.0	–0.9	0.3	1.3	–0.4	1.8	20.2
Thailand	Claims	–3.5	–5.0	1.4	–2.2	–0.5	–0.5	–1.8	19.0
	Liabilities	1.3	–4.6	0.5	–0.7	–1.3	–1.4	–1.2	11.3
Turkey	Claims	–12.0	–2.8	–3.7	0.9	–1.5	–2.1	–0.1	36.1
	Liabilities	–2.1	0.0	–2.1	1.6	–1.9	–0.2	0.5	19.6
Memo:									
EU accession countries[3]	*Claims*	*6.3*	*10.1*	*4.1*	*1.4*	*1.9*	*3.4*	*3.3*	*91.4*
	Liabilities	*9.9*	*–6.4*	*4.8*	*–0.2*	*0.5*	*–1.3*	*–5.4*	*61.8*
OPEC members	*Claims*	*–13.7*	*–10.1*	*1.1*	*3.4*	*–0.6*	*–4.4*	*–8.5*	*125.2*
	Liabilities	*–2.9*	*–8.0*	*–8.8*	*–4.9*	*–3.1*	*–1.2*	*1.2*	*249.4*

[1] External on-balance sheet positions of banks in the BIS reporting area. Liabilities mainly comprise deposits. An increase in claims represents an inflow into emerging economies; an increase in liabilities represents an outflow from emerging economies. [2] All emerging economies. For details on additional countries, see Tables 6 and 7 in the Statistical Annex. [3] Countries in accession negotiations with the European Union, ie Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia. Table 2.2

Reduced claims on Latin American banks lead to continuation of net outflows

The net flow of funds to Latin America remained negative for the third consecutive quarter, at $7.8 billion. Total claims fell to $272 billion, pushing the year-over-year rate of contraction in claims to 10% from 8% in the previous quarter. Claims on corporations and other non-bank entities stabilised, and signings of syndicated loans to Latin American countries picked up in the fourth quarter, rising to $4.3 billion from $2.7 billion in the third. However, the rate of contraction in claims on the Latin American banking sector increased to 18%

year over year from 13% in the previous quarter. Claims on banks fell by $9 billion, the largest reduction for this sector since 1998.

Outflow from Latin America reflects reduced lending to non-banks in Argentina ...

The net outflow from Argentina was again the largest in the region, although smaller than that experienced in the third quarter. While liabilities vis-à-vis Argentina remained stable, a sixth consecutive quarterly contraction in claims, primarily on the Argentine non-bank sector, led to a net outflow of $2.5 billion. Banks located in many reporting countries cut back their short-term claims on Argentina, with banks in the United States again reducing exposure the most. Claims on Argentina fell to 11% of all claims on the region in the fourth quarter of 2002, down from 14% a year earlier and 16% in the fourth quarter of 2000. In addition, the share of international consolidated claims maturing in one year or less declined to 47% in the fourth quarter, down from 51% a year earlier. Undisbursed credit commitments to Argentina also continued their slide, contracting for the sixth consecutive quarter to $2 billion.

... and to banks in Brazil

Despite the improvement in investor sentiment towards Brazil in the fourth quarter, interbank activity led to the largest outflow of funds in five quarters. The year-over-year rate of contraction in claims on Brazil rose to 12%, almost double that in the previous quarter. Claims on non-banks remained stable, while claims on the banking sector fell by $6.1 billion, the largest decrease since the second quarter of 2001, as banks in offshore centres, the Netherlands and the United States reduced their exposure. While Brazil remains by far the largest emerging market exposure of banks in the BIS reporting area, claims on Brazil fell to 32% of total claims on the region, down from 34% in the previous three quarters. In addition, new syndicated loan signings totalled $0.6 billion in the fourth quarter, down from $2.4 billion a year earlier. However, possibly reflecting the calming of investors' nerves in the fourth quarter, undisbursed credit commitments to Brazil rose following four consecutive quarterly declines.

Like Argentina and Brazil, Mexico also experienced a net outflow of funds for the second consecutive quarter, this time driven by an increase in deposits with reporting area banks. Total claims on Mexico remained stable from the previous quarter, while liabilities grew by $1.7 billion as banks in Mexico deposited funds in banks in the United States.

Claims on Asia-Pacific contract sharply as banks in the United States cut back

Loan cutbacks by US banks lead to outflow from Asia ...

Following a record inflow in the previous quarter, funds flowed out of the Asia-Pacific region in the fourth quarter of 2002. Relatively large movements in a few countries led to a $29 billion fall in claims, the largest contraction since the first quarter of 1998. Much of this decline reflected reduced repo activity between banks in the United States and non-bank entities in Korea, mainland China and Taiwan, China (hereafter Taiwan). As a result, the share of claims on the Asia-Pacific region in total claims on emerging markets returned to its long-term average of 30%, down from 32% in the previous quarter. In addition, the movement towards shorter-term claims evident since the fourth quarter of 2000 appears to have stopped. Claims with a maturity of one year or less fell to 49% of consolidated international claims on the region, from 52% in the previous quarter.

The fall in claims was partially offset as banks in the region continued to repatriate deposits, this time to the tune of $11 billion. Three consecutive quarters of relatively large deposit repatriations have pushed the share of reporting banks' liabilities vis-à-vis the region to 32% of total liabilities vis-à-vis emerging markets, down from 34% in the first quarter.

Over half the net outflow from the region was attributable to activity vis-à-vis China. Claims on China fell by $10 billion, with a reduction in loans from banks in the United States to the Chinese non-bank sector accounting for over half the amount. Much of this reflected an unwinding of repo positions. Moreover, banks in the United Kingdom and offshore centres cut claims on the Chinese banking sector by $3 billion and $1.9 billion, respectively. Claims on China have consistently declined as a share of total claims on the Asia-Pacific region, falling from 21% of total claims at end-2000 to 17% in the fourth quarter of 2002.

... particularly from China, Korea and Taiwan

Taiwan also experienced a net outflow in the fourth quarter. As with China, this outflow reflected a $5 billion cutback in claims by banks in the United States on the Taiwanese non-bank sector. Reversing their relatively large purchases in the first three quarters of 2002, US banks shed $3.1 billion in Taiwanese public sector debt. While US banks remain Taiwan's largest creditors, this contributed to a 51% reduction in US banks' consolidated international claims on Taiwan, and brought claims on the public sector more into line with their historical average. Excluding banks in the United States, claims on Taiwan increased slightly, as banks in France and the Netherlands extended credit to the Taiwanese banking sector.

Activity vis-à-vis Korea was also dominated by reduced lending from banks in the United States. Korea's $1.6 billion net outflow in the fourth quarter was the result of a $6.3 billion contraction in credit from banks in the United States to Korea's non-bank sector, again reflecting an unwinding of repo positions. Banks in Korea also repatriated $5 billion in deposits, partially offsetting the large reduction in claims.

Net inflow to EU accession countries continues

Emerging Europe experiences largest inflow since 1998 ...

The emerging European economies experienced their largest net inflow of funds since the first quarter of 1998, driven by an increase in claims as well as deposit repatriations. Claims on the region rose by $7.2 billion, as reporting area banks extended credit to both the bank and non-bank sectors. Roughly half of this reflected increased lending to the EU accession countries, while a rise in claims on Russia made up much of the difference. At the same time, banks in the region repatriated $2.8 billion in deposits, leading to a net inflow of $9.7 billion.

Claims on the region have continued to shift towards longer maturities. Longer-term claims made up 50% of all international claims on the region in the fourth quarter, up from 48% a year earlier. On a consolidated basis, which nets out inter-office positions, Austrian banks lent to the region's banking sector, while German banks increased exposure to all sectors. German banks remain the region's largest creditors, but accounted for only 30% of consolidated foreign claims in the fourth quarter, down from 34% a year earlier.

... as banks in Poland and the Czech Republic repatriate deposits

While claims on most of the accession countries remained stable, Hungary experienced its largest expansion in claims in the BIS coverage period. Claims rose by $1.6 billion, reflecting investment by banks in the euro area in debt securities issued by the Hungarian non-bank sector. Elsewhere in the group of accession countries, deposit repatriations led to net inflows in several cases. Claims on Poland fell slightly for the first time in five quarters, but the decline was offset by a relatively large repatriation of deposits by the Polish banking sector. This led to the fifth consecutive net inflow for Poland, this time of $2.1 billion. The Czech Republic also experienced its largest net inflow in the BIS coverage period ($3 billion), driven by deposit repatriations from banks in the European Union, mainly in the United Kingdom.

One third of the increase in claims on the emerging European economies was accounted for by Russia. Claims rose by $2.4 billion, primarily reflecting increased US dollar lending to the Russian non-bank sector, although much of this was offset as banks in Russia repatriated deposits. This resulted in a small but positive net inflow in the fourth quarter, following relatively large net outflows in two of the previous three quarters. Total claims on Russia stood at $35 billion, or 20% of all claims on emerging Europe (but down from 23% a year earlier), making Russia the second largest exposure in the region (behind Turkey) of BIS reporting banks. In addition, syndicated loan signings to Russia remained strong in the fourth quarter at $1.2 billion, over half of which was for the oil sector.

Following two quarters of sharp contractions, claims on Turkey stabilised in the fourth quarter of 2002. The year-over-year decline in claims, which averaged 18% in the previous four quarters, fell to 8% in the fourth quarter as claims on both the bank and non-bank sectors decreased slightly. While Turkey remains the largest borrower in the region, claims on Turkey have fallen to 20% of total claims on emerging Europe, down from 23% a year earlier and 29% in the fourth quarter of 2000.

International syndicated credits in the first quarter of 2003

Blaise Gadanecz

Signings of international syndicated loans declined for the third consecutive quarter. Although lending is traditionally weak in the first quarter, volume still contracted by 7% year on year, to $216 billion. While refinancings remained stable at 39% of total signings, activity related to short-term loans and commercial paper backup lines dropped to historical lows in both absolute and relative terms. Some corporations took advantage of favourable financing conditions to issue large amounts of long-dated bonds (see "The international debt securities market" on page 23). Consistent with the long-term average trend, US borrowers arranged loans worth about twice as much as their European counterparts.

In the United States, healthcare, energy and retail firms were the most active. Some widening of spreads took place, with the weighted average drawn Libor spread on US dollar-denominated facilities rising by more than 40 basis points from the fourth quarter of 2002. More than a third of loans signed by non-first time US borrowers had higher spreads than on the same borrowers' previous financings, especially in the case of energy, telecommunications and electronics firms. This repricing for some US corporations happened just as a Standard & Poor's survey showed a decrease in US credit downgrades relative to upgrades in the first quarter.

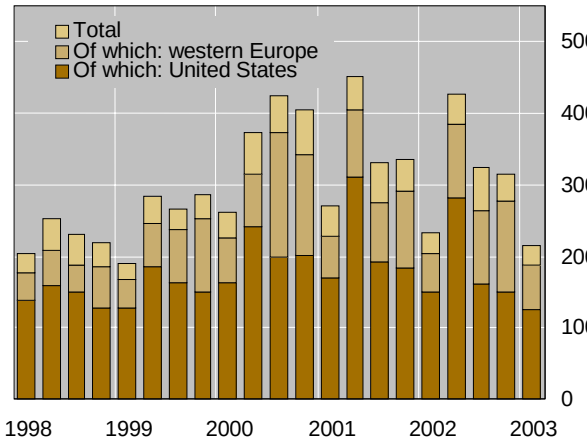
In Europe, activity was dominated by electricity, consumer products and telecommunications firms as well as media conglomerates. The largest borrowers were Electricité de France, which raised €6 billion for working capital and CP support purposes, and Cadbury Schweppes, which borrowed $6.1 billion to fund an acquisition. In addition, France Telecom refinanced a €5 billion revolving credit line. Following lacklustre activity in 2002, there is preliminary evidence of a new wave of international refinancing for telecoms taking place in 2003[①] as more than $50 billion worth of European telecoms facilities are due to mature.

Borrowing by emerging markets was in line with activity in the first quarter of previous years. Of a total of $13 billion of emerging market facilities, Chinese borrowers obtained the largest amounts, including a CNY 25 billion (approx $3 billion) loan for a hydroelectric project – a landmark international deal in that it was denominated in renminbi and arranged and funded entirely by Chinese and Taiwanese banks.[②] Lending to Latin America fell to a historical low of $1.1 billion. Mexican oil, engineering and transport firms were the largest borrowers. Saudi petrochemical and telecoms companies, absent in the previous quarter, raised $0.9 billion. Russian entities, mainly oil, gas and mining companies, arranged $1.1 billion worth of loans. Turkish banks, which had raised $1 billion in the previous quarter, were absent from the market.

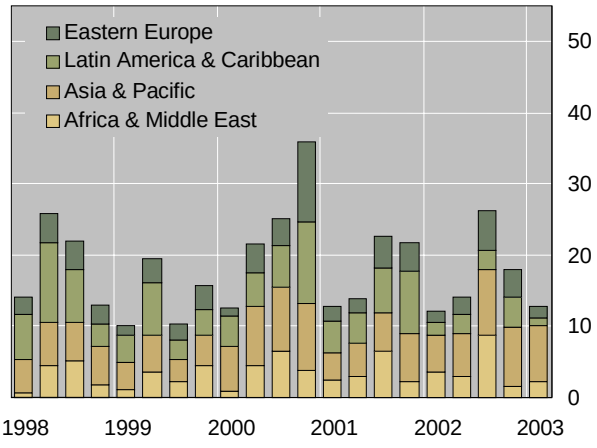
Activity in the international syndicated credit market

In billions of US dollars

Signed facilities



Facilities for emerging economies



Sources: Dealogic Loanware; BIS.

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① In the first quarter of 2003, Telecom Italia launched a €15.5 billion deal to support its merger with Olivetti. However, this facility is not yet included in the data compiled by the BIS as it had not been signed by the end of March 2003. ② In "Integrating the finances of East Asia", *BIS Quarterly Review*, December 2002, McCauley et al show that local currency loan denomination attracts higher local bank participation.

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3. The international debt securities market

Fund-raising activity by euro area financial institutions in the international market surged in the first quarter of 2003. As a result, aggregate net issuance of international debt securities reached $352 billion (Table 3.1), almost double

Main features of net issuance in international debt securities markets

In billions of US dollars

	2001	2002	2002				2003	Stocks at end-Mar 2003
	Year	Year	Q1	Q2	Q3	Q4	Q1	
Total net issues	1,347.6	1,016.0	308.4	342.3	181.6	183.7	351.8	9,698.7
Money market instruments[1]	–78.9	2.3	–7.8	8.3	11.8	–10.0	54.7	500.5
Commercial paper	*26.9*	*23.7*	*5.5*	*1.8*	*19.3*	*–3.0*	*46.7*	*344.2*
Bonds and notes[1]	1,426.5	1,013.7	316.2	334.0	169.8	193.7	297.1	9,198.1
Floating rate issues	*391.4*	*201.1*	*59.7*	*74.1*	*27.5*	*39.8*	*–41.9*	*2,191.5*
Straight fixed rate issues	*996.0*	*801.0*	*253.3*	*246.4*	*145.4*	*155.9*	*338.7*	*6,690.2*
Equity-related issues	*39.1*	*11.6*	*3.2*	*13.5*	*–3.1*	*–2.0*	*0.3*	*316.4*
Developed countries	1,260.6	950.4	284.4	325.9	166.7	173.3	327.1	8,571.7
United States	*597.0*	*337.2*	*137.3*	*115.7*	*35.7*	*48.5*	*59.7*	*2,813.8*
Euro area	*551.0*	*473.0*	*128.4*	*153.6*	*91.4*	*99.6*	*212.2*	*3,904.4*
Japan	*–10.1*	*–21.4*	*–10.2*	*3.2*	*–4.2*	*–10.2*	*–4.0*	*255.8*
Offshore centres	28.2	8.3	4.4	0.3	–1.1	4.7	2.3	113.8
Developing countries	42.6	36.5	11.6	9.3	6.8	8.7	13.2	561.6
Financial institutions	1,038.3	837.8	236.0	278.9	153.9	169.0	269.8	6,991.3
Private	*956.6*	*717.4*	*215.8*	*242.3*	*118.1*	*141.3*	*199.7*	*5,956.6*
Public	*81.7*	*120.5*	*20.2*	*36.6*	*35.8*	*27.8*	*70.1*	*1,034.7*
Corporate issuers	207.6	58.1	13.0	40.9	1.0	3.2	16.3	1,301.3
Private	*171.2*	*56.2*	*19.2*	*40.7*	*–1.5*	*–2.2*	*10.6*	*1,074.1*
Public	*36.4*	*2.0*	*–6.2*	*0.3*	*2.5*	*5.4*	*5.7*	*227.2*
Governments	85.5	99.2	51.4	15.7	17.6	14.5	56.5	954.5
International organisations	16.3	20.9	8.0	6.8	9.1	–3.0	9.2	451.6
Memo: Domestic CP[2]	*–142.5*	*–105.6*	*–69.6*	*–69.6*	*6.8*	*26.8*	*–23.8*	*1,880.3*
of which: US	*–161.2*	*–98.0*	*–63.3*	*–57.0*	*0.2*	*22.1*	*–16.6*	*1,326.3*

[1] Excluding notes issued by non-residents in the domestic market. [2] Data for the first quarter of 2003 are partly estimated.

Sources: Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; national authorities; BIS. Table 3.1

Gross issuance in the international bond and note markets

In billions of US dollars

	2001	2002	2002				2003
	Year	Year	Q1	Q2	Q3	Q4	Q1
Total announced issues	2,306.1	2,104.6	606.2	570.2	437.4	490.8	774.3
Bond issues	1,349.5	1,169.2	375.1	314.9	212.6	266.6	452.9
Note issues	956.5	935.4	231.1	255.3	224.8	224.3	321.4
Floating rate issues	643.4	605.4	142.0	160.2	146.3	157.0	130.1
Straight fixed rate issues	1,590.4	1,455.4	454.8	389.0	286.1	325.6	627.2
Equity-related issues[1]	72.2	43.8	9.5	21.0	5.0	8.2	17.0
US dollar	1,131.6	987.1	310.2	257.5	200.6	218.9	335.0
Euro	841.6	807.1	228.8	229.3	164.1	185.0	342.5
Yen	125.3	90.4	16.3	25.9	23.7	24.6	23.6
Other currencies	207.5	219.9	50.9	57.5	49.1	62.4	73.2
Financial institutions	1,708.9	1,635.3	447.9	430.3	355.1	401.9	592.6
Private	*1,472.8*	*1,378.7*	*390.9*	*362.9*	*295.7*	*329.1*	*469.8*
Public	*236.1*	*256.6*	*57.0*	*67.4*	*59.4*	*72.8*	*122.8*
Corporate issuers	348.2	212.1	63.7	74.5	34.0	39.9	55.0
of which: telecoms	*135.6*	*45.8*	*12.0*	*16.1*	*7.8*	*10.0*	*23.0*
Private	*287.1*	*187.5*	*57.1*	*70.9*	*28.4*	*31.1*	*39.6*
Public	*61.1*	*24.6*	*6.6*	*3.6*	*5.6*	*8.7*	*15.4*
Governments	174.2	173.0	68.6	44.9	28.3	31.2	87.0
International organisations	74.8	84.3	26.0	20.5	20.0	17.9	39.8
Completed issues	2,305.8	2,105.5	587.9	577.8	443.8	496.0	713.4
Memo: Repayments	*879.3*	*1,091.8*	*271.7*	*243.8*	*274.0*	*302.3*	*416.3*

[1] Convertible bonds and bonds with equity warrants.

Sources: Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; BIS. Table 3.2

the previous quarter's amount. Gross issuance rose by 58% to an all-time high of $774 billion, boosting net issuance in the face of a record amount of repayments (Table 3.2). Corporate borrowing outside the United States recovered somewhat from very low levels.

Demand engenders supply

The rebound in net issuance during the first quarter of 2003 was accompanied by a fall in long-term government yields in January and February. As discussed in the Overview, the declines in default-free interest rates whetted the appetite of global investors for higher-yielding assets, pushing credit and sovereign spreads lower. The greater demand for credit products engendered an increased supply. Net issuance of straight fixed rate bonds and notes soared, as financial institutions and corporate issuers moved to lock in low borrowing costs, in part because of concerns that such costs would rise once war broke out in Iraq. Emerging market borrowers also took advantage of lower funding costs, brought about in part by increased investor demand for higher-yielding assets, and stepped up their net issuance for the second quarter in a row.

Fund-raising by financial institutions leads to a surge in straight fixed rate issuance

The upsurge in net borrowing through the international debt securities market between the fourth quarter of 2002 and the first quarter of 2003 can be traced mainly to the activities of financial institutions. Net issuance by these institutions increased by 60% to $270 billion. There was a particularly sharp rise in fund-raising by euro area financial institutions that helped push net euro-denominated issuance to an all-time high.

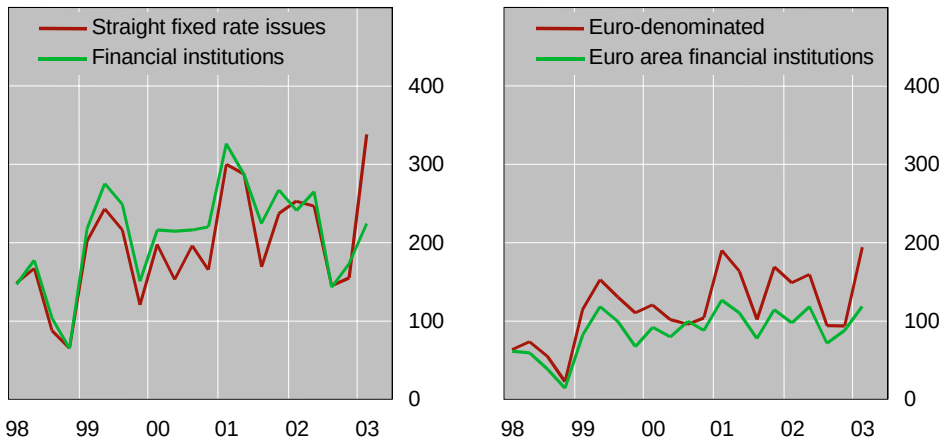
Straight fixed rate issuance surges ...

Greater borrowing by financial institutions was also associated with a surge in the net issuance of straight fixed rate bonds and notes. Because a high proportion of net issuance by financial institutions is in the form of straight fixed rate bonds and notes, it is perhaps not surprising that net issuance of these instruments increased. However, the magnitude of the rise is greater than might have been expected (Graph 3.1). Issuance more than doubled between the fourth quarter of 2002 and the first quarter of 2003 to $339 billion, a record amount, whereas the estimated elasticity of 0.88 would have predicted an increase of only 25%. Apparently, financial institutions were trying to lock in low borrowing costs by issuing relatively more straight fixed rate securities than would have been expected on the basis of their historical behaviour. A rise in net issuance of straight fixed rate securities by non-financial corporates also played a role (see below). Early repayments by financial institutions rose from $7 billion to $17 billion between the fourth quarter of 2002 and the first quarter of 2003, suggesting that at least some of the new funds raised were used to pay off existing, and presumably more costly, debt. Total repayments by financial institutions surged from $232 billion to $323 billion, helping to bring total repayments of bonds and notes to a record $416 billion.

Net issuance by euro area financial institutions was particularly strong. It grew by 66% to $145 billion between the fourth quarter of 2002 and the first quarter of 2003, while that of North American financial institutions increased by

Net issuance in the international bond and note markets

In billions of US dollars



Sources: Dealogic; Euroclear; Thomson Financial Securities Data; BIS. Graph 3.1

only 27% to $60 billion. For the euro area as a whole, the expansion was the result of more net borrowing by both public and private financial institutions. In the case of the latter, net issuance rose by 63% to $109 billion. Private financial institutions in Germany stepped up their net borrowing the most, by about $20 billion. Amongst the largest issues by euro area financial institutions in the first quarter of 2003 was a €4 billion bond from the German DEPFA ACS Bank. The increase in net borrowing by public financial institutions was also concentrated in Germany. Both the Landesbanken and the Kreditanstalt für Wiederaufbau showed record levels of borrowing through the international debt securities market. Part of the increase in the net borrowing of financial institutions was the result of an upsurge in the issuance of Pfandbriefe placed in the international market. In the first quarter of 2003, spreads on these products declined, causing issuance to rise from €10 billion in the fourth quarter of 2002 to €27 billion in the first quarter of 2003. Eurohypo AG and Banco Bilbao Vizcaya Argentaria SA were among the largest issuers, with €3 billion each.

... as does net issuance by euro area financial institutions

Rising issuance by euro area financial institutions helped to push net issuance of euro-denominated debt securities to a record $226 billion, more than doubling the previous quarter's amount (Table 3.3). This reflects in part the tendency of euro area financial institutions to issue in their home currency (Graph 3.1). Yet the magnitude of the rise is larger than would be expected on the basis of past behaviour. Net issuance of euro-denominated bonds and

Net euro-denominated issuance more than doubles

Net issuance of international debt securities by region and currency[1]

In billions of US dollars

Region/currency		2001	2002	2002				2003
		Year	Year	Q1	Q2	Q3	Q4	Q1
North America	US dollar	524.9	304.0	125.6	93.5	35.7	49.3	39.7
	Euro	65.1	40.0	18.3	14.7	7.3	–0.4	15.9
	Yen	19.1	–7.2	–4.1	1.0	–1.5	–2.5	0.0
	Other currencies	7.2	12.5	3.5	6.0	–0.8	3.8	2.5
Europe	US dollar	56.3	73.7	6.6	43.6	4.8	18.8	39.1
	Euro	520.1	468.9	137.4	134.1	101.5	96.0	206.2
	Yen	–2.9	–26.1	–12.6	–4.0	–7.0	–2.5	–3.9
	Other currencies	72.4	89.0	17.0	31.3	23.9	16.8	26.5
Others	US dollar	70.6	44.0	23.0	11.5	4.6	5.0	16.8
	Euro	12.0	14.4	3.1	7.1	5.5	–1.2	4.3
	Yen	0.5	–8.3	–12.5	6.0	2.1	–3.9	–2.2
	Other currencies	2.2	11.0	3.2	–2.3	5.5	4.6	6.9
Total	US dollar	651.9	421.8	155.1	148.5	45.1	73.0	95.6
	Euro	597.3	523.4	158.8	155.9	114.3	94.4	226.3
	Yen	16.7	–41.6	–29.3	3.0	–6.4	–8.9	–6.0
	Other currencies	81.8	112.5	23.7	35.0	28.6	25.2	35.9

[1] Based on the nationality of the borrower.

Sources: Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; BIS. Table 3.3

notes more than doubled to $194 billion while the estimated elasticity between euro-denominated net issuance and that of euro area financial institutions of 1.18 would have predicted an increase of only 43%. A rise in euro-denominated issuance by North American nationals, from –$0.4 billion in the fourth quarter of 2002 to $15.9 billion in the first quarter of 2003, also played a role. The two largest issues in this category were a €4 billion note floated by Freddie Mac and a €1.75 billion note from General Electric Capital Corporation.

Rising issuance by euro area financial institutions also helped to push net issuance of commercial paper (CP) in the international debt securities market to a record $47 billion in the first quarter of 2003. However, this increase in short-term borrowing through the international market did not carry over to the much larger domestic CP market. The stock of domestic CP contracted by $24 billion, albeit at a much slower rate than that witnessed in the first two quarters of 2002.

Corporate borrowing strengthens as equity-related issuance rises

Non-financial corporate borrowing through the international debt securities market rose somewhat during the first quarter of 2003 from very depressed levels. After two quarters of almost zero net issuance, net borrowing by these entities increased to $16 billion. The rise was almost entirely due to greater net issuance by private borrowers, which, at $11 billion, turned positive again after two quarters of negative values. Gross issuance by non-financial corporates also increased in the first quarter of 2003, to $55 billion from $40 billion in the previous quarter. Most of the issuance was by European companies, while issuance by US companies remained more or less flat. There are indications that corporate borrowers were taking advantage of lower financing costs. Some of the new borrowing was used to pay off existing floating rate obligations, as net issuance of these securities by non-financial corporates remained negative for the sixth quarter in a row. In contrast, net issuance of straight fixed rate bonds and notes by non-financial corporates rose from $10 billion to $20 billion.

European corporates are locking in low yields ...

Low borrowing costs also apparently led non-financial corporates to lengthen the maturity of their debt. The average maturity of the bonds issued by non-financial corporates increased from 9.9 years to 11.3 years. This is the highest average maturity since the first quarter of 1999. Indeed, some of the largest new issues took place at very long maturities. France Telecom, for example, raised a total of €1.5 billion with two 30-year issues, and Electricité de France raised €850 million with a similarly dated offering.

... and lengthening maturities

Gross announcements of equity-related issues rose to $17 billion in the first quarter of 2003 from relatively low levels in the second half of 2002. Nearly all of the new equity-related issues were convertible bonds. In the first quarter of 2003, gross issuance of convertible bonds exceeded gross issuance of international equities for the first time since the third quarter of 1999. However, the issuance of international equities was very low. Furthermore, the increase in equity-related issues was not high enough to bring the total of equity-related and straight equity issuance back to the levels seen in 2000 and 2001.

Convertible bond issuance rises substantially ...

For convertible bonds, credit, interest and equity risk play connected roles in the bond's intrinsic value, because investors have the option to convert the bond into a specific number of shares of equity. This optionality may make convertibles attractive to some investors in the current market conditions. The rising volatility of equity markets during the first quarter increased the value of the embedded option. Moreover, investors moving away from the depressed equity markets could buy an asset with the credit risk of a fixed income instrument and the upside potential of equities. Issuers are attracted by the lower yields usually paid on convertibles compared with normal fixed income instruments, due to the compensation for the embedded option. Finally, high demand for convertibles, mainly by hedge funds, had a downward influence on spreads, leading to increased issuance. This quarter the total sum of assets held by hedge funds using convertible bond arbitrage strategies was at its highest level.

... reflecting in large part an increase in mandatory convertibles

A relatively large proportion of convertibles are currently issued as mandatory convertibles. A mandatory convertible is automatically converted into equity at a specific maturity date, thus removing the optionality for the buyer of the convertible. The transfer of risk to the buyer is usually compensated by a higher yield. Companies want to issue mandatory convertibles in order to avoid their experiences of 1999 and 2000, when many telecoms companies issued convertibles in the expectation that they would be converted into equity at the time of redemption. In most cases the conversion did not take place due to the sharp decline in equity prices, leaving them with much higher than expected debt/equity ratios. Another attractive feature for the issuer of mandatory convertibles is that they are in general not treated by the rating agencies as pure debt. The biggest mandatory convertible issues in the first quarter of 2003 were a €2.3 billion offering by Deutsche Telekom and one of ¥345 billion ($2.9 billion) by Sumitomo Mitsui Financial Group.

Developing country borrowing recovers further

Developing country borrowers tapped the international debt securities market for an increased volume of funds in the first quarter of 2003, as sovereign spreads narrowed further (see the Overview). After growing by 28% between the third and fourth quarters of 2002, net issuance by developing country nationals rose by an additional 52% to $13.2 billion in the first quarter of 2003 (Table 3.1). However, issuance is still below the $17 billion average net quarterly issuance in the three years preceding the Asian financial crisis of 1997. The largest issue to be placed in the international debt securities market by a developing country borrower in the first quarter of 2003 was a $2 billion fixed rate bond floated by the United Mexican States that had a maturity of 10 years and was priced at a spread of 246 basis points over the 10-year US Treasury yield.

Developing countries' access to capital markets improves

The rise in developing country net new financing was highly concentrated. Indeed, almost two thirds of the expansion was the result of increased Brazilian borrowing alone. Brazilian nationals took advantage of reduced risk aversion amongst global investors and the easing of political uncertainty in Brazil in the

first quarter of 2003, and borrowed heavily. Their net issuance was $1.5 billion, compared to –$1.3 billion in the previous quarter. In the main, the borrowing was at the short end of the yield curve. Net issuance of money market instruments increased to $2.3 billion in the first quarter of 2003 from $0.6 billion in the previous quarter while net issuance of bonds and notes, at –$0.9 billion, remained negative for the second quarter in a row.

Even though Turkish spreads soared in mid-March on news that a multibillion dollar financial package from the United States would be drastically reduced, a generalised easing of political uncertainty allowed issuers from Turkey to again tap the international debt securities market for new funds. After three quarters of negative net issuance, they raised $0.2 billion in net new financing in the first quarter of 2003.

Collective action clauses in bonds are an important development

A significant development concerning emerging market borrowing was the incorporation of collective action clauses (CACs) in four sovereign bonds. CACs are provisions that allow a bond restructuring with the approval of a qualified majority of bondholders instead of their unanimous consent. These provisions are viewed as an alternative to international bankruptcy proceedings for dealing with potential sovereign defaults. The issuance of bonds with these clauses followed a long debate on how to improve procedures for sovereign debt restructuring. Prior to this, issuers had initially thought that the inclusion of CACs might increase their spreads.[1] At the same time, some investors had feared that CACs might be an indication of the likelihood the issuer attached to the probability of default.

Mexico and Brazil take the lead

One Mexican bond in the first quarter of 2003 and two Mexican bonds and one Brazilian bond at the beginning of the second quarter were issued with CACs. In some jurisdictions, such as under English law, CACs are generally included. The Mexican bonds were the first emerging market bonds with CACs from a major borrower on the international capital market issued under New York State law. The Brazilian bond was the first non-investment grade bond from a major borrower with CACs. In these four cases, the inclusion of the CACs did not seem to require any additional premium.

No harmonisation of CACs yet

By issuing bonds with CACs, Mexico tried to set a new benchmark, but there are several differences in the legal documentation between the bonds issued by Mexico and Brazil and the recently announced issuance of Uruguayan bonds. For example, there was much discussion on the actual threshold for a change in payments; Mexico set the percentage of bondholders who have to consent at 75%, while some investors proposed a higher figure. Uruguay announced that the same threshold would be used for the new bonds to be issued as result of the restructuring of its debt. However, a higher threshold of 85% was adopted for the Brazilian bond.

[1] Tsatsaronis (1999) finds evidence of such an effect but one that is not systematic (see K Tsatsaronis "The effect of collective action clauses on sovereign spreads", *BIS Quarterly Review*, November 1999, pp 22–23).

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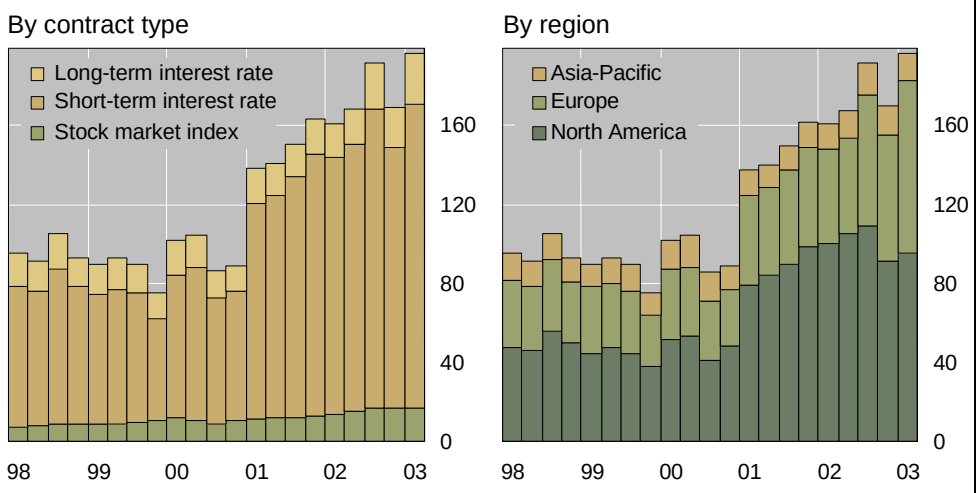
4. Derivatives markets

The aggregate turnover of exchange-traded financial derivatives contracts monitored by the BIS rebounded in the first quarter of 2003. The combined value of trading in interest rate, stock index and currency contracts increased by 16% to $197 trillion (Graph 4.1). Activity was uneven across the major market risk groups, with turnover in fixed income contracts rising appreciably and business in stock index contracts declining marginally. Trading in European fixed income products was exceptionally buoyant. Exchanges continued to introduce a variety of new contracts, including futures on euro overnight index average (EONIA) rates (see the box on page 34).

The latest BIS semiannual data on aggregate positions in global over-the-counter (OTC) derivatives markets show a remarkable rise in gross market values in the second half of 2002 (Graph 4.5 and Table 4.1). Values rose by 43% and stood at $6.4 trillion at the end of the year. Interest rate swaps accounted for the bulk of the increase, which evidently resulted from the sharp drop in swap yields over the review period (see the Overview). Market participants paying fixed interest on swap contracts would have suffered losses, probably leading some of them to reverse their positions through the writing of new swaps. Such unwinding activity is suggested by the rapid growth

Turnover of exchange-traded futures and options

Quarterly data, in trillions of US dollars



Sources: FOW TRADEdata; Futures Industry Association; BIS calculations. Graph 4.1

in the notional amounts of swap contracts during the period. For OTC markets as a whole, the notional amount of contracts rose by 11% to $142 trillion.

The new OTC numbers also show that, in contrast to 2001, OTC business accelerated relative to that on exchanges in 2002. Further development of measures to reduce counterparty credit risk in OTC markets may have helped to maintain their competitiveness.

Upswing in exchange-traded interest rate contracts

Money market contracts account for much of the upswing ...

Aggregate trading in exchange-traded interest rate contracts, the largest of the broad market risk categories, rebounded strongly in the first quarter of 2003. Transactions expanded by 18% to $179.8 trillion, compared with a decline of 13% in the fourth quarter of last year. Contracts on short-term interest rates, including eurodollar, Euribor and euroyen, accounted for much of the absolute increase in activity, with turnover rising by 17% to $153.8 trillion. However, contracts on government bonds, including 10-year US Treasury notes, 10-year German government bonds and 10-year Japanese government bonds, rose at a more rapid pace, with business up by 29% to $26 trillion (Graph 4.2).

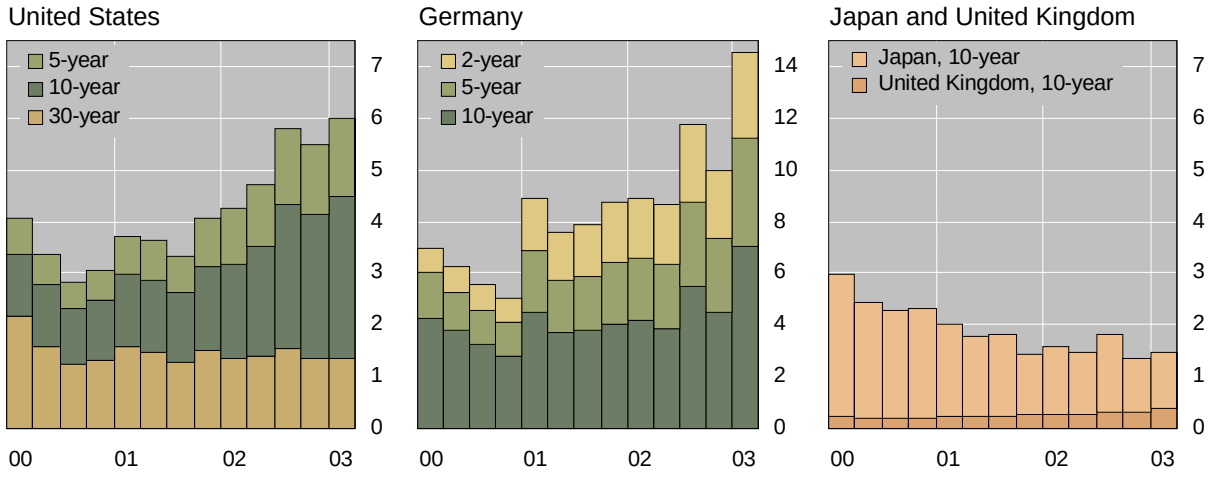
... with a surprisingly strong increase in Europe

The most notable feature of activity in interest rate products was a surprisingly pronounced increase in trading in Europe, where turnover expanded by 37% to $83.7 trillion. Transactions in European money market contracts (largely on Euribor) rose by 35% to $67.1 trillion, while those in European government bond contracts (mainly on German government bonds) were up by 46% to $16.6 trillion. Options on all types of fixed income futures contracts grew by nearly 60%.

Trading in European interest rate contracts proceeded at an uneven pace during the course of the quarter. In January, turnover recovered strongly from its usual seasonal slowdown in December 2002; in February business expanded modestly and in March transactions reached new monthly records.

Turnover in government bond contracts

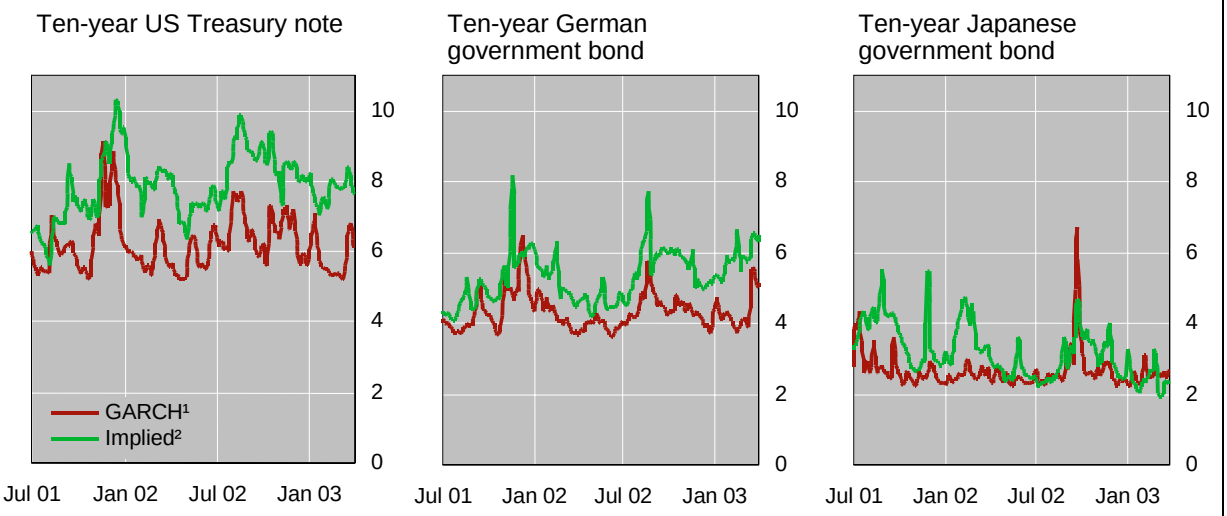
Quarterly futures contract turnover, in trillions of US dollars



Sources: FOW TRADEdata; Futures Industry Association; BIS calculations. Graph 4.2

Volatility of major bond markets

Five-day moving averages



[1] Annualised conditional variance of daily changes in bond yields from a GARCH(1,1) model. [2] Volatility implied by the prices of at-the-money call options.

Sources: Bloomberg; national data; BIS calculations. Graph 4.3

Robust growth in European bond contracts

Various factors could explain the particularly robust increase in German government bond contracts during the review period. First, European equity markets were more volatile than US markets (see the Overview). Investors were reported to have shifted some of their funds from euro area stock markets to euro area government bond markets as stock markets faced repeated bouts of downward pressure. Such investment flows into government bonds may have been associated with increased use of German government bond futures to manage the market risk of the newly acquired securities. Futures may also have been used to fix the price of anticipated purchases of government bonds. Second, as illustrated by the appreciation of the euro, investor sentiment towards euro area financial assets improved considerably during the course of the quarter. Expectations of further declines in ECB policy rates, given the weakness of euro area economies, may have encouraged investors to take additional long positions in German government bond futures in anticipation of their outperformance relative to other major government bond futures markets. Moreover, the lower implied volatility observed in the German bond market compared to that of US bond markets (Graph 4.3) led some investment banks to recommend the taking of long positions in call options on German government bond futures to benefit from their outperformance. Such positioning may have accounted for the particularly strong expansion of interest rate options during the quarter. Third, traders may also have taken advantage of the unusually low yields in the cash market in late February and early March by taking short positions in German government bond futures. Such positions would have generated high returns given that bond market yields rose sharply in the second and third weeks of March.

Modest expansion in North American rate contracts

The increase in the aggregate trading of interest rate products on North American exchanges was comparatively modest. Turnover rose by 5% to

Exchanges introduce new contracts on EONIA rates

The BIS began to follow 117 new contracts in the first quarter of 2003, including 68 stock index and single equity contracts, 30 commodity contracts, 10 currency contracts and nine interest rate contracts.

The introduction of EONIA futures by Eurex in late January and by Euronext.liffe in early February caught the market's attention. The new EONIA futures are based on the monthly average of the reference rate computed daily by the ECB from a panel of banks conducting overnight transactions in the euro-denominated interbank market.[①] The new contracts have a notional size of €3 million and a minimum price movement of 0.005 percentage points. The contracts have monthly maturity dates and several delivery months (nine on Euronext.liffe and 12 on Eurex). They are aimed at financial institutions wanting to conduct a more precise hedging of their very short-term interest rate risks. Overnight interest rates are closely influenced by changing expectations of monetary policy in the euro area. They are also affected by month-end funding pressures, including those resulting from the need for banks to maintain minimum reserve requirements on the 23rd calendar day of each month. EONIA rates have achieved benchmark status in the euro area money market and interest rate swap market since their introduction in early January 1999. Overnight index swaps, which involve an exchange of fixed for floating interest rates with a floating leg tied to daily EONIA rates, have become particularly popular hedging and positioning vehicles.[②] Indeed, the short-dated euro area interest swap market is now based almost exclusively on EONIA as a reference rate.

[①] To be more precise, the EONIA rate is a weighted average of interest rates contracted on unsecured overnight loans in the euro area interbank market. [②] For a more extensive treatment of the development of the euro swap market, see E M Remolona and P D Wooldridge, "The euro swap market", *BIS Quarterly Review*, March 2003, pp 47–56.

$86.8 trillion, with money market contracts up by 5% to $79.1 trillion and government bond contracts up by 8% to $7.7 trillion. US mortgage refinancing reached a new record at the end of the first quarter, which presumably supported transactions aimed at hedging mortgage prepayment risk.

Trading in interest rate products in the Asia-Pacific region rose by 7% to $8.7 trillion. Interest rate business in Singapore, the largest Asian market for such products, rose by 6% to $4.8 trillion, while that in Australia jumped by 43% to $2 trillion. Activity in Japan declined for the second consecutive quarter, by 12% to $1.7 trillion, largely due to a lower turnover of Japanese money market instruments.

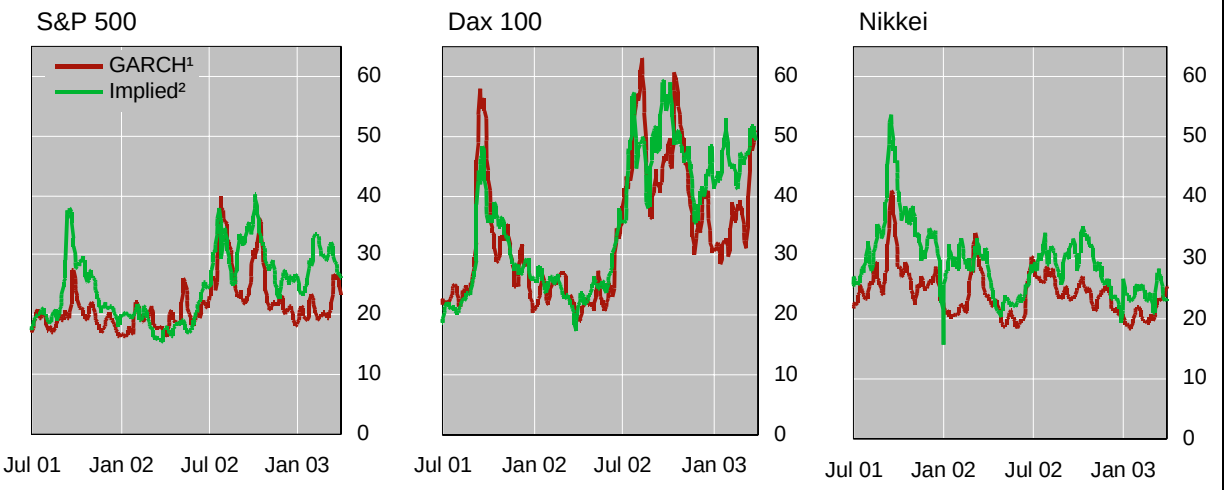
War-related uncertainty hampers stock index contracts

Activity in stock index contracts declined slightly in the first quarter of 2003. The 3% reduction in turnover to $16.7 trillion resulted from a contrasting pattern of trading across regions, with turnover in North America and the Asia-Pacific region dropping by 5% and 9% respectively, and business in Europe expanding by 13%.

The turnover of stock index contracts did not rise significantly when global equity markets faced downward pressure in January and February. This may

Volatility of major equity markets

Five-day moving averages



[1] Annualised conditional variance of daily stock returns from a GARCH(1,1) model. [2] Volatility implied by the prices of at-the-money call options.

Sources: Bloomberg; national data; BIS calculations. Graph 4.4

Geopolitical tensions lead to retrenchment

have reflected a retrenchment from risk-taking as rising geopolitical tensions exacerbated market volatility (Graph 4.4) by overshadowing macroeconomic and corporate earnings announcements.[1] Such a pullback would appear to have been in line with weak activity in some underlying cash markets, with investors showing a reluctance to commit funds before a resolution of the situation in the Middle East. However, a rally in stock markets from the second week of March led to a burst of activity across all major regions. Market reversals are often associated with an increased use of stock index futures as new information or revised expectations lead market participants to adjust their positions.

Rise in gross market values fuels activity in global OTC derivatives markets

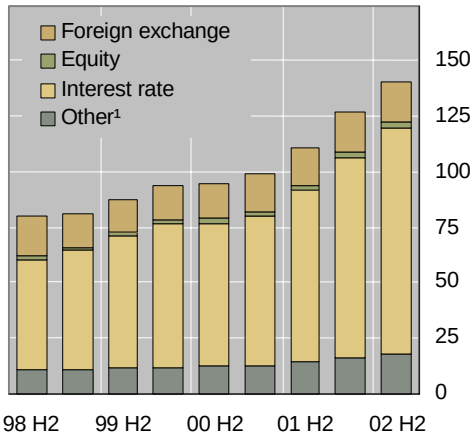
Exceptional rise in gross market values

Data from the semiannual BIS survey on positions in global OTC derivatives markets at the end of December 2002 show that there was an exceptionally sharp increase in gross market values, up by 43% to $6.4 trillion (Graph 4.5). This latest rise brought the overall ratio of gross market values to notional amounts to 4.5%, the highest since the BIS began collecting data on OTC derivatives markets. Although part of the increase resulted from an expansion of notional amounts (see below), it was nevertheless larger than what would have been expected solely from the growth in notional amounts outstanding.

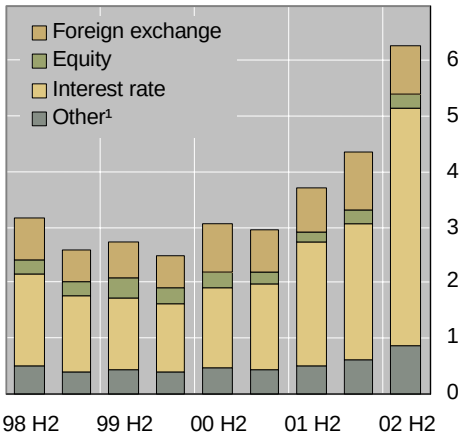
[1] Higher market volatility does not always lead to more active trading in derivatives markets. Indeed, sufficiently high levels of volatility could lead to a retrenchment by information-based traders. Such a retrenchment would offset some of the mechanical increase in hedging-related transactions. See S Jeanneau and M Micu, "Volatility and derivatives turnover: a tenuous relationship", *BIS Quarterly Review*, March 2003, pp 57–65.

Global OTC derivatives

Notional amounts outstanding by broad risk category ($ trillions)



Gross market values by broad risk category ($ trillions)



[1] Estimated positions of non-regular reporting institutions.

Source: BIS. Graph 4.5

Given that much of the rise was accounted for by interest rate products, particularly swaps, it probably reflected the impact of a rally in swap markets between July and early October.

Participants facing losses on swaps ...

Gross market values measure the replacement cost of all outstanding contracts had they been settled on the last day of a given reporting period (31 December 2002 in the most recent survey). As such, they are a more accurate indicator of counterparty credit risk than notional amounts. The gross market value of forward-type contracts, such as swaps, is generally zero at the initiation of the contract. However, subsequent changes in the prices of underlying assets lead to the emergence of symmetric marked to market gains and losses between counterparties. Hence, gross market values tend to reflect changes in the price of financial assets. The downward trend of swap yields over the review period is likely to have generated valuation losses for fixed rate payers, since the lower market rates would have implied lower fixed rate payments on new swaps than on those contracted in earlier periods. In order to cut their losses in forthcoming periods, some market participants may have attempted to reverse their outstanding swap exposures. Such a reversal would have required the writing of new contracts, boosting the stock of outstanding contracts. The increase in gross market values could thus have had a positive feedback effect on the size of the OTC market.

... attempt to reverse their exposures

Indeed, OTC derivatives markets continued to grow rapidly in the second half of 2002, with the total estimated notional amount of outstanding contracts rising by 11% over the end-June 2002 figure, to stand at almost $142 trillion. This compares with a rise of 15% in the previous half-year period. Such a robust expansion is in line with data reported by other market sources.[2]

[2] Data released in their respective market surveys by other sources, such as the International Swaps and Derivatives Association (ISDA) and the US Office of the Comptroller of the Currency (OCC), have confirmed the rapid expansion of the OTC market. ISDA reported a 21% increase in the global stock of OTC contracts in the second half of 2002, while the OCC

OTC derivatives markets driven by interest rate contracts

Market expansion in OTC derivatives continued to be driven by interest rate instruments, the largest of the broad market risk categories (Graph 4.5 and Table 4.1), with outstanding contracts growing by 13%. By contrast, activity in foreign exchange products, the second largest broad market risk category, was subdued, with the stock of contracts expanding by 2%. The pace of activity in equity-linked instruments was also moderate, with a 4% increase in outstanding amounts. Lastly, business in commodity contracts, the smallest of the major groups of instrument, remained strong, with outstanding amounts up by nearly 20%.[3]

Global over-the-counter (OTC) derivatives market[1]

Amounts outstanding, in billions of US dollars

	Notional amounts				Gross market values			
	End-Jun 2001	End-Dec 2001	End-Jun 2002	End-Dec 2002	End-Jun 2001	End-Dec 2001	End-Jun 2002	End-Dec 2002
Grand total	99,755	111,178	127,564	141,737	3,045	3,788	4,450	6,361
A. Foreign exchange contracts	16,910	16,748	18,075	18,469	773	779	1,052	881
Outright forwards and forex swaps	10,582	10,336	10,427	10,723	395	374	615	468
Currency swaps	3,832	3,942	4,220	4,509	314	335	340	337
Options	2,496	2,470	3,427	3,238	63	70	97	76
B. Interest rate contracts[2]	67,465	77,568	89,995	101,699	1,573	2,210	2,468	4,267
FRAs	6,537	7,737	9,146	8,792	15	19	19	22
Swaps	51,407	58,897	68,274	79,161	1,404	1,969	2,214	3,864
Options	9,521	10,933	12,575	13,746	154	222	235	381
C. Equity-linked contracts	1,884	1,881	2,214	2,309	199	205	243	255
Forwards and swaps	329	320	386	364	49	58	62	61
Options	1,556	1,561	1,828	1,944	150	147	181	194
D. Commodity contracts[3]	590	598	777	923	83	75	78	85
Gold	203	231	279	315	21	20	28	28
Other	387	367	498	608	62	55	51	57
Forwards and swaps	229	217	290	402	...	...	...	...
Options	158	150	208	206	...	...	...	...
E. Other[4]	12,906	14,384	16,503	18,337	417	519	609	871
Gross credit exposure[5]	.	.	.	.	1,019	1,171	1,316	1,511

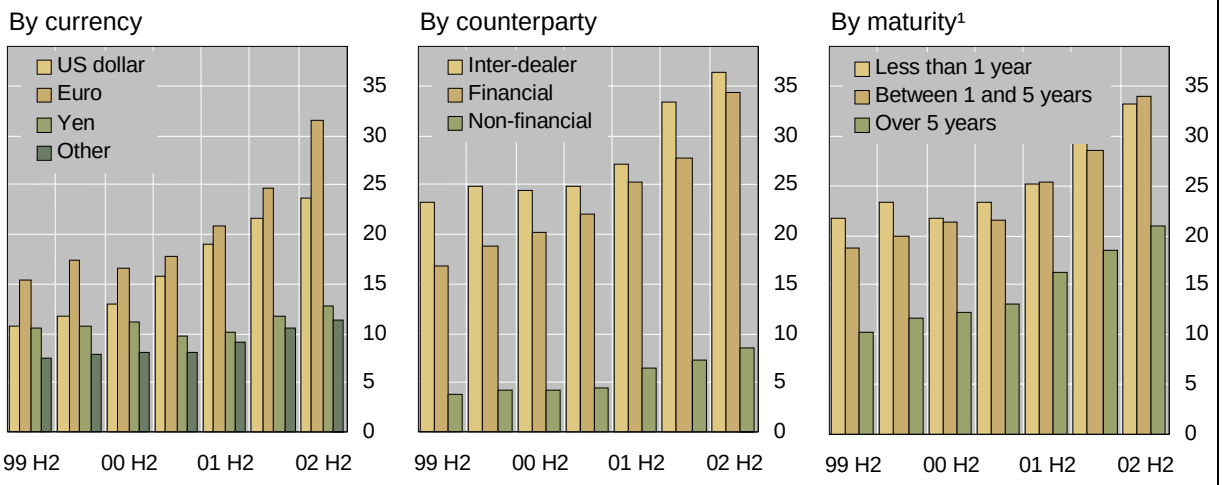
[1] All figures are adjusted for double-counting. Notional amounts outstanding have been adjusted by halving positions vis-à-vis other reporting dealers. Gross market values have been calculated as the sum of the total gross positive market value of contracts and the gross negative market value of contracts with non-reporting counterparties. [2] Single currency contracts only. [3] Adjustments for double-counting estimated. [4] Estimated positions of non-regular reporting institutions. [5] Gross market values after taking into account legally enforceable bilateral netting agreements. Table 4.1

reported a 12% rise in commercial bank holdings of derivative contracts (most of which are OTC). Further information is available at www.isda.org and www.occ.treas.gov.

[3] Credit derivatives, which according to market sources have recently grown rapidly, are not included in the semiannual BIS survey of OTC derivatives market activity.

Interest rate swaps

Notional amounts outstanding, in trillions of US dollars



[1] Includes FRAs, which in December 2002 accounted for approximately 6% of the total notional amount outstanding.

Source: BIS. Graph 4.6

The 13% rise in interest rate contracts brought the outstanding amount of such contracts to $101.7 trillion. Interest rate swaps grew by 16% to $79.2 trillion, while interest rate options expanded by 9% to $13.7 trillion. Forward rate agreements (FRAs) declined by 4% to $8.8 trillion, following an unusually pronounced increase in the previous half-year period.

Euro-denominated swaps grow rapidly ...

The euro-denominated interest rate swap market grew particularly rapidly, with the value of outstanding contracts rising by 28% to $31.5 trillion (Graph 4.6). This compared with an 18% expansion in the previous half-year. Although part of this growth reflected an appreciation of nearly 8% in the value of the euro relative to the US dollar (the currency of reference of the BIS semiannual survey) between the two year-end periods, the underlying currency-adjusted increase was nevertheless robust at 20%.

... after uneven pace in recent years

The market for euro-denominated swaps has expanded at an uneven pace in recent years. It grew rapidly in the wake of the introduction of the single European currency as such instruments became new benchmarks for European fixed income markets, paused between the second half of 1999 and the first half of 2001 on completion of the stock adjustment process to the new integrated market, and returned to rapid growth from the second half of 2001. This upswing appears to have been related to two major factors. First, a surge in the issuance of euro-denominated bonds boosted arbitrage and hedging activity by issuers and dealers. Second, the emergence of squeezes in the German government bond market and related exchange-traded derivatives encouraged market participants to switch to more reliable hedging and position-taking instruments for non-government liabilities.[4]

[4] The factors underlying the expansion of the euro interest rate swap market are discussed by Remolona and Wooldridge (see the reference in footnote 2 of the box on page 34). The issue of market squeezes in German government bond futures is discussed in a box published on pages 32–33 of the June 2002 *BIS Quarterly Review*.

Less buoyant business in other swap markets

Activity in the other major interest rate swap markets was somewhat less buoyant than in the euro-denominated segment. The notional amount of US dollar swaps expanded by 10% to $23.7 trillion. This represented a slowdown relative to the 14% recorded in the previous half-year period. The spike in US mortgage refinancing observed in early October continued to support the use of swaps to hedge prepayment risk. However, this increase in hedging transactions was probably followed by a moderation in position-taking in the wake of the Federal Reserve's surprisingly large cut in policy rates in early November. Following the cut, market participants expected fixed income markets to remain stable for the forthcoming months.

Meanwhile, the US dollar value of yen-denominated swaps rose by 9% to $12.8 trillion. Much of the rise resulted from higher positions held by non-dealers.

OTC business accelerates relative to that on exchanges

The most recent numbers also show that OTC business expanded once again relative to that on exchanges. The 11% increase in outstanding OTC contracts in the second half of 2002 compares with a decline of 1% in open positions in exchange-traded contracts over the same period. This pattern of activity contrasts with that observed in 2001, when exchange-traded business outpaced OTC market transactions. This earlier shift to exchanges was attributed by market analysts to potential concerns about counterparty credit risk in OTC markets resulting from the downgrading of some large market participants and increasing concentration of the inter-dealer market. Such concerns reportedly encouraged market participants to shift part of their transactions to exchanges to benefit from their clearing house guarantee.

Measures to maintain the competitiveness of OTC markets

However, OTC market participants have taken a variety of measures to better manage counterparty credit exposures, including a growing use of collateral and bilateral netting agreements.[5] These measures may have helped to maintain the competitiveness of OTC markets.

OTC markets show less erratic growth

It should also be noted that both types of market have expanded at a fairly similar pace since the first half of 1998 (the year in which the BIS initiated its survey of OTC derivatives markets) but that OTC markets have shown less erratic growth. In part, this reflects the fact that hedging or trading in OTC markets involves the writing of new contracts, which leads to a gradual build-up of notional amounts outstanding. In exchange-traded markets, traders prefer to avoid delivery of the underlying by reversing their positions before the maturity of a contract. Such a reversal leads to a decline in open positions because of the offsetting of contracts through the exchange.

[5] ISDA reported the results of a survey conducted in 2003 showing that the amount of collateral used in privately negotiated derivatives transactions had increased by 70% relative to a similar survey conducted in 2002. It noted that collateral covered 55% of fixed income derivatives transactions and 51% of counterparty credit exposures. The OCC also reported that the amount of gross exposure in US banks' holdings of derivatives eliminated through bilateral netting had risen to as much as 81% in the fourth quarter of 2002. Further information is available at www.isda.org and www.occ.treas.gov.

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Capital flows in East Asia since the 1997 crisis[1]

Since the crisis hit East Asia six years ago, flows of capital between the region and the rest of the world have changed in significant ways. These changes have responded to altered economic conditions within the region and outside it. However, certain features of the new pattern of flows raise some important policy questions.

First, East Asia is exporting capital on a net basis to the rest of the world in very substantial amounts. The external demand that has generated an export surplus has undoubtedly facilitated recovery from the Asian crisis. Moreover, the United States has also benefited from the related capital inflows to finance its current account deficit. Nonetheless, it is hard to believe that the region should be such a large exporter of savings in the long term, or that the US deficit can be sustained indefinitely.

Second, East Asia is engaged in an international exchange of risk that is restoring and strengthening national and corporate balance sheets in the region and rendering the region's economies more resilient. The region is doing so by exporting relatively safe capital while importing risky capital. That is, East Asia is buying high-quality US, European and Japanese government and agency securities, while selling real assets, equities, and medium- and low-quality bonds. This pattern has drawn the criticism that it has impeded the development of East Asia's own bond markets.

This special feature first reviews the *net* flows of capital from East Asia to the rest of the world. It then turns to the *gross* flows of capital, highlighting the region's import of higher-risk capital and export of safer capital. In a third section, the criticisms that have been levelled against these patterns of capital flows are considered. The role of gross capital flows in some of the recent rapid increases in official foreign exchange reserves is emphasised. Finally, this special feature discusses policies to address the possible shortcomings in the current pattern of capital flows. These include East Asia's finishing the restructuring of its banking and corporate sectors, developing both long-term investing institutions and bond markets, and relying less on exports to lead economic growth. A constructive response to these challenges would permit

[1] The views expressed in this article are those of the author and do not necessarily reflect those of the BIS.

the global economy to move towards a more sustainable pattern of current account surpluses and deficits and associated capital flows.

Trends in net capital flows

East Asia's current account swings by over $100 billion …

In retrospect, the East Asian crisis can be seen as the result of an abrupt withdrawal of funds by the rest of the world in the face of mounting evidence of falling asset prices and strained finances of firms and banks. This forced an end to the current account deficits and a start to the repayment of the stock of debt of East Asia. In 1995–96, before the crisis, East Asia excluding China and Japan ran a collective current account deficit of $28.5 billion, ranging from the wide deficits of Malaysia and Thailand, through the moderate ones of Hong Kong SAR, Indonesia, Korea and the Philippines, to the surpluses of Singapore and Taiwan, China (hereafter referred to as Taiwan). By 1999–2000, the current account had swung to a surplus of $88 billion. In 2001–02, it remained at about the same level. Adding the surpluses of China and Japan, the region is running a current account surplus of over $200 billion (Table 1). In several East Asian countries, current account surpluses in 2002 remained quite large in relation to domestic product (Graph 1). As a result of the cumulating current account surpluses, some economies in the region have graduated from net international debtors to net international creditors. The rapidity of this turnaround underscores the fact that the region did not suffer from excessive external debt before the crisis.

… as business investment declines

In general, the decline of business investment, set against the backdrop of high household saving rates, accounted for East Asia's shift from external deficits to external surpluses. Changes in fiscal balances generally only served

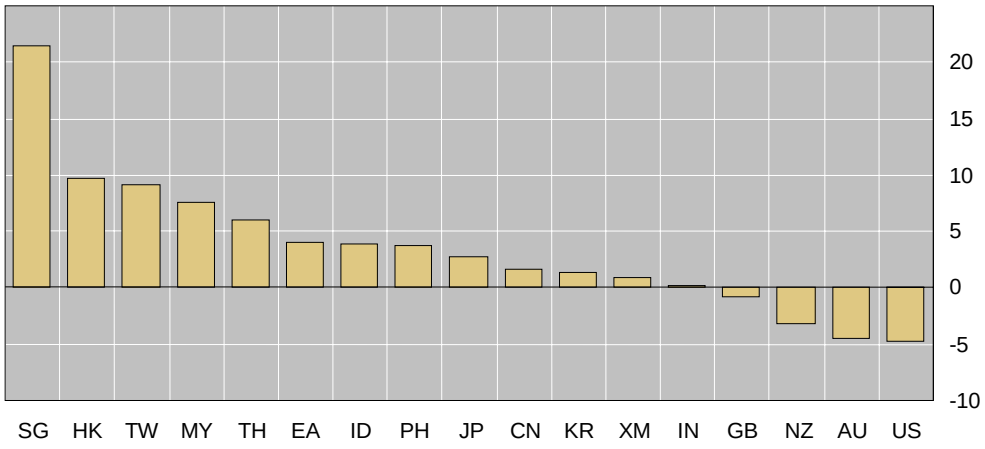
Current account balances

	1995–96	1999–2000	2001–02
	In billions of US dollars		
Japan	87.7	117.4	100.6
East Asia (excluding Japan)	–24.1	108.8	111.4
Euro area	50.5	–52.4	21.3
China	4.4	20.8	26.4
Taiwan, China	8.3	8.6	21.8
Singapore	13.7	16.2	18.3
Hong Kong SAR	–4.1	8.2	12.1
Korea	–15.8	18.4	7.2
Malaysia	–6.6	10.5	7.3
Indonesia	–7.0	6.9	7.1
Thailand	–14.1	10.9	6.9
Philippines	–3.0	8.2	4.4
India	–5.8	–3.7	2.5
New Zealand	–3.5	–3.1	–1.6
Australia	–17.5	–18.7	–13.2
United Kingdom	–13.9	–30.4	–18.0
United States	–111.8	–351.6	–448.4

Sources: © Consensus Economics; JP Morgan; national data. Table 1

Current account balances in 2002

As a percentage of GDP



AU = Australia; CN = China; EA = East Asia (excl Japan); GB = United Kingdom; HK = Hong Kong SAR; ID = Indonesia; IN = India; JP = Japan; KR = Korea; MY = Malaysia; NZ = New Zealand; PH = Philippines; SG = Singapore; TH = Thailand; TW = Taiwan, China; US = United States; XM = euro area.

Source: National data. Graph 1

to moderate these swings. In the first instance, corporate investment was cut back as East Asian firms coped with a sharp decline in the availability of external funds. As time passed, the continuing financial surpluses of the corporate sector tended to reflect weak demand for investment in the face of an overhang of capacity and the efforts by firms to rebuild their balance sheets.

A deterioration in the US deficit accommodates East Asia's current account swing ...

The regional current account surplus has as its counterpart a net flow of capital out of East Asia. The main user of this capital is the United States. Of course, the United States was already running a substantial current account deficit before the crisis, at a time when East Asia was running an aggregate deficit. Between 1995–96 and 1999–2000, however, the US current account deficit widened by $240 billion, accommodating the $116 billion increase in the net exports of East Asia excluding China and Japan.[2]

From the regional perspective, the export-led growth that improved the current account surplus provided a welcome stimulus, offsetting to varying extents the headwinds from financial and corporate restructuring. Likewise, the widening of the current account deficit in the late 1990s was not on balance an unwelcome development for the United States. It coincided with rapid domestic growth that was putting pressure on US price stability by late 1996. Thus, increased net imports from East Asia coincided with strong US growth and incipient price pressures, and limited the degree of monetary tightening required.

... leaving the US economy with a large external imbalance

Today, the US economy finds itself in quite a different position. Although the recession of 2001 was neither long nor deep, questions remain about the sustainability of household demand and the conditions for a recovery of

[2] Some regional analysts contend that China also absorbed some of the increase in East Asia's exports, with uncounted imports narrowing China's current account surplus despite the contrary indication of the official statistics.

business fixed investment. Inflation has receded as an issue. Perhaps of lesser significance, but not to be entirely overlooked, is the sheer size of the US current account deficit. This has now reached some 5% of GDP, almost 10% of the rest of the world's gross savings. The US net international debt position has risen to almost $2 trillion, over a fifth of output and almost twice exports at end-2001. While higher returns on US foreign assets than on US liabilities (as in part discussed below) have thus far limited the impact on debt servicing requirements, the US economy began in 2002 to experience a net servicing drain on income. Under these circumstances, East Asian policymakers cannot safely assume that the trade developments that were welcomed by the United States in the late 1990s can continue indefinitely.

Trends in gross capital flows

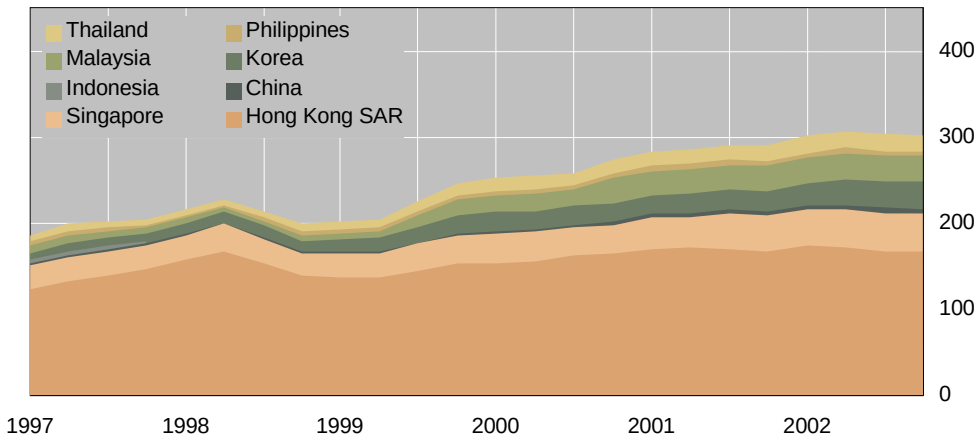
Underlying East Asia's export of capital on a net basis has been an international trade in risk through substantial two-way capital flows. In particular, East Asia has been importing riskier capital while exporting safer capital. In the process, East Asian economies have, in aggregate, been strengthening their balance sheets. In particular, in attracting equity and subordinated debt flows, while paying back debts and accumulating liquid assets, East Asia has used global financial markets to deleverage and to improve liquidity.

Inflows of risk capital help recapitalise failed banks …

Foreign direct investment into East Asia has been the largest of the inflows of risk capital. While there has been much discussion of whether direct investment in China was coming at the expense of direct investment elsewhere, Korea experienced a sharp increase in flows after the Asian crisis. Private equity has flowed into recapitalising failed banks and at times into purchases of portfolios of bad loans. An infusion of risk capital that is often

Foreign banks' domestic currency claims[1, 2]

In billions of US dollars

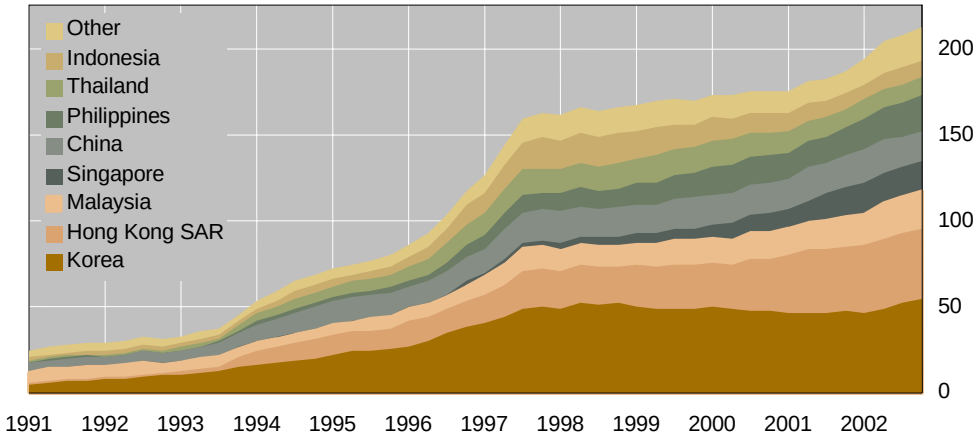


[1] Locally booked claims of BIS reporting banks' foreign offices denominated in local currency. US-based banks include dollar-denominated claims funded locally. [2] For 1997–99, quarterly data are linear interpolations of semiannual data.

Source: BIS. Graph 2

Outstanding international bonds of Asian issuers

In billions of US dollars



Note: Includes convertible and floating rate notes.

Source: *BIS Quarterly Review*, Table 15B. Graph 3

overlooked has been implied by the substantial increase in domestic currency intermediation by foreign-based banks (Graph 2). While the measured contribution to foreign direct investment may depend on whether this intermediation takes place in the legal form of local subsidiaries or branches, in effect foreign banks have in either case injected capital to support expanded local currency lending (McCauley, Ruud and Wooldridge (2002)).

… and add to portfolio equity flows …

Portfolio equity, another form of risk capital, has on balance also flowed into the region since the crisis, although it has waxed and waned with equity market performance in the major international centres. Despite these fluctuations, the medium-term trend may well be upwards. Since the crisis, the correlation of local equity markets (other than China's) with the major international equity markets has tended to increase. This has been ascribed to the tighter linkage to the major markets of regional exports, regional industrial production and overall economic growth in East Asia.

… and portfolio debt flows

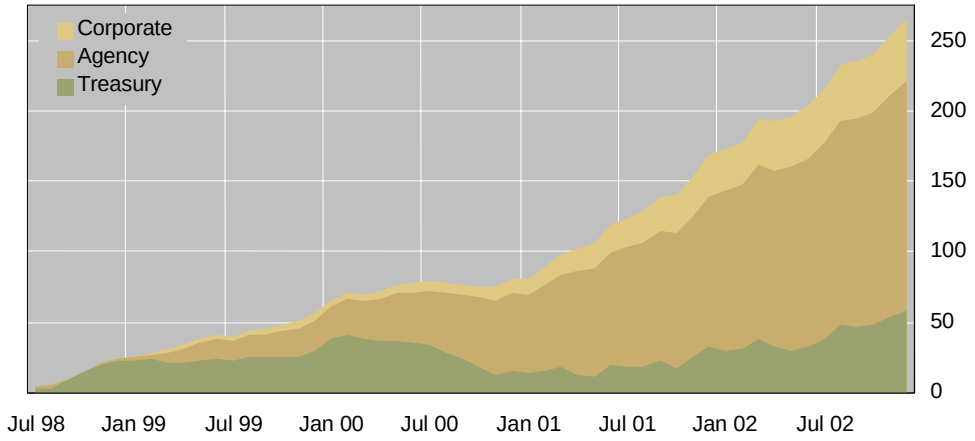
Other forms of risk capital have also flowed into East Asia since the crisis. East Asian banks have also sold subordinated debts to investors in New York. Both sub-investment grade and investment grade bonds, issued by sovereign and corporate borrowers, have been marketed internationally (Graph 3).

Capital outflows favour low-risk instruments

In the other direction, capital has flowed out of East Asia into low-risk securities and through interbank channels. Prominent among the securities acquired have been US Treasuries, US agencies, European sovereign debt and Japanese government debt. Judging by the composition of net purchases of US bonds by East Asia, the average spread over Treasury securities is unlikely to have much exceeded 20 basis points (Graph 4). Banks and central banks have also built up deposits in major international banks. The very substantial paydown by regional corporations of their debts in dollars has led to a flow that combines risk capital and low-risk funds. That is, the repayment of some $300 billion since the crisis has freed up bank capital of about a tenth of

Net purchases of long-term US debt securities by East Asia

Cumulative, in billions of US dollars



Source: US Treasury.

Graph 4

that amount, while the funds actually repaid have flowed into global banking markets in the form of low-risk interbank funds (Graph 5). In this sense, East Asia has been providing the rest of the world with safe capital.

East Asia's capital inflows and outflows not only differ in risk profile but also involve different counterparties. Capital inflows into East Asia have generally featured private parties buying private (sometimes privatised) assets. In contrast, the outflow side features public sector officials investing the proceeds of foreign exchange market intervention in official or quasi-official instruments, such as US agency securities.[3] While in 1999–2001 the Chinese banking system exported more funds than did Chinese official reserve managers, the instrument choice seems to have been quite similar (Ma and McCauley (2002)).

East Asia pays a risk premium …

The beneficial effects of these gross flows of capital in strengthening financial structures in East Asia have not come without cost. This cost can be conceived of as a credit spread or as some version of the equity premium. For instance, dollar-denominated subordinated bonds issued by Indonesian or Korean banks have yielded at issue 3 to 4 percentage points over the safer yields earned by the investment of reserves. Taking 234 dollar or euro bonds issued by East Asian borrowers between 1997 and 2002 (aggregating to $84 billion), the average spread paid over the yield on US Treasury or other government benchmark bonds amounted to 233 basis points (Graph 6).

… which may be understandable in view of the risks to which the region is exposed

How good a bargain this is for East Asia is not easy to say. The asymmetry of the risk exchange between East Asia and the rest of the world runs counter to the conventional wisdom about global capital markets. In this view, investors are expected to use global markets to diversify their holdings of risky claims. In contrast, East Asian economies are grossing up their balance sheets systematically to transfer risk to the rest of the world and to build up

[3] Of course, this generalisation does not hold across all countries and at all times. In Thailand, companies' repayment of their dollar-denominated debt (a private-private transaction) has generally exceeded the Bank of Thailand's investment of new official reserves.

liquidity. This may make sense to some extent if East Asian economies are highly geared to global demand ("high beta" economies), in part because of heavy exposure to technology production. Not only may the benefits of diversification be limited (as evidenced by fairly strong equity market correlations), but also the value of liquidity protection against sharp downswings in the technology business may be high.

The US economy benefits from its absorption of East Asian risk and liquidity

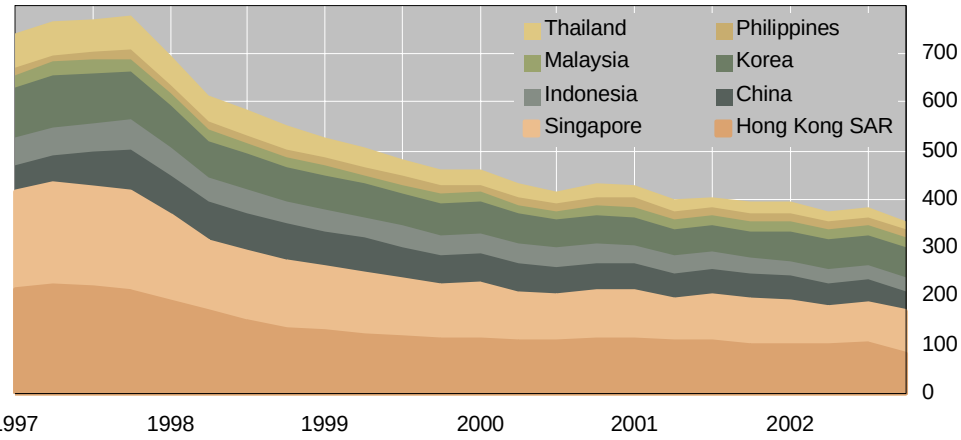
Looked at from the perspective of the United States, its provision of risk capital to East Asia adds to the gross flows that are needed to finance its current account deficit. Over time, of course, such risk intermediation vis-à-vis East Asia and other regions provides income to the US economy (the other side of the equity risk premium), which shows up as the excess in the long-term average rate of return on its assets over the corresponding rate of return on its liabilities.[4]

Such global intermediation requires a healthy balance sheet

Thus, by financing risky East Asian assets with safer liabilities, the US economy has been serving the region as an international financial intermediary or bank. Over the long run, however, a bank cannot expand on the basis of a shrinking capital base. In the case of a country providing international risk absorption and maturity transformation, the capital base can be interpreted as the net international investment position.[5] The decline of the US net international investment position means a reduction in the international net worth available to sustain losses on the higher-risk, less liquid assets without

Consolidated international bank claims[1, 2]

In billions of US dollars



[1] Cross-border claims of BIS reporting banks in all currencies plus local claims of their foreign offices denominated in foreign currencies. US-based banks exclude dollar-denominated claims funded locally. [2] For 1997–99, quarterly data are linear interpolations of semiannual data.

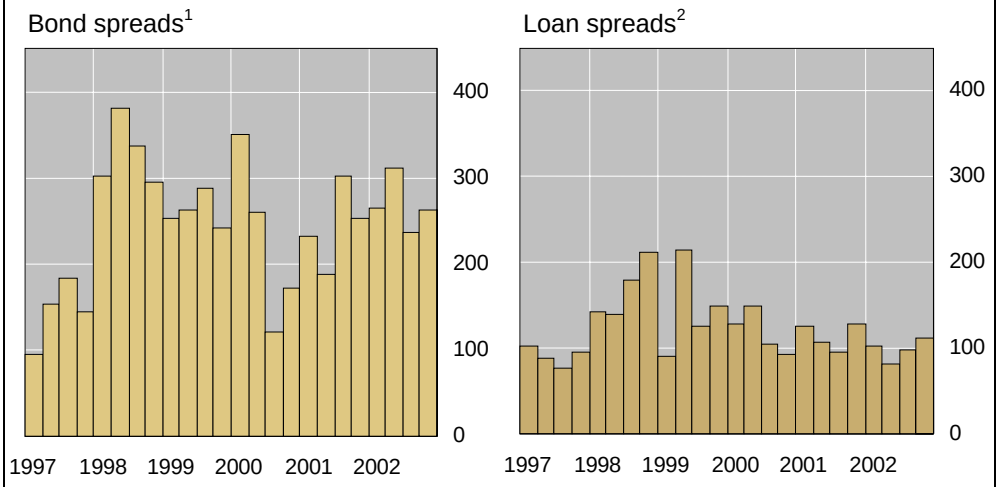
Source: BIS. Graph 5

[4] The exchange of risk between the United States and the euro area in the late 1990s, by contrast, showed the euro area absorbing risk, issuing relatively short and low-risk liabilities in order to buy risky equities and whole companies.

[5] A broader, and more benign, interpretation of the capital base is the underlying capital stock of the entire economy, although this interpretation assumes a very strong capacity to transform production of non-tradables into production of tradables.

Credit spreads on bonds and loans of East Asian borrowers

In basis points



[1] Over benchmark government yields. [2] Over Libor.

Sources: *Asiamoney*; Dealogic Bondware; Dealogic Loanware; *FinanceAsia*; *International Financing Review*. Graph 6

disturbance to the low-risk liquid liabilities. The similar concern of Robert Triffin (1969) over 30 years ago, when the US current account was still in balance, was debatable; but the chronic US current account deficit now makes the debate moot. There is indeed a latent, if currently far from pressing, conflict between the deteriorating net international investment position of the United States and the role it plays in international financial risk intermediation.

Criticisms of the patterns of capital flows

Should a fast-growing region export capital to a mature economy?

Two criticisms have been levelled at the patterns of capital flows just described. First, some observers have questioned, on welfare and even moral grounds, a flow of capital *from* East Asia *to* the United States. After all, this means that funds are generally flowing *from* relatively poor economies catching up in productivity, with relatively young populations and capable of growth in the range of 5–10%, *to* a mature economy, albeit one enjoying a recent increase in productivity growth. From a different perspective, the same current account surpluses are criticised as suggesting an unhealthy dependence on external demand by economies in the region. Moreover, there is a concern that the longer the US deficits continue, the greater the chance of an eventual disorderly adjustment of exchange rates.

Should East Asia depend on the rest of the world for risk intermediation?

Second, there is concern that the gross flows from Asia to major financial centres and back to East Asia represent a missed opportunity for greater financial intermediation within Asia. That is, flows from East Asia are said to be helping simply to deepen the US bond market, rather than contributing to the development of East Asian bond markets. There is some truth in both criticisms, but each can be overstated. What follows takes up each criticism in turn.

Net flows

Official foreign exchange reserves have risen sharply …

Criticism of the net capital flows from East Asia to the rest of the world often focuses on the build-up of official foreign exchange reserves in the region. East Asia's accumulation of official foreign exchange reserves has indeed been remarkable and has raised the region's share of global reserves to over 50% (Table 2). Particular gains in 2002 were recorded by China, India, Japan, Korea and Taiwan (Graph 7).[6] As noted, criticism of the net capital flows comes from two perspectives. From a perspective that assumes continuous full employment, the view is taken that current account surpluses are being run in order to build reserves, and that this represents a wasteful investment of real resources. From a more Keynesian perspective, the current account surpluses represent a means to maintain demand, which is in effect redistributed from the rest of the world.

… leading to criticisms from two perspectives

One perspective sees the build-up of reserves as a wasteful deployment of real resources …

From the first perspective, the authorities seek to raise official foreign exchange reserves, and intervene in the market to absorb and to maintain current account surpluses. The perceived cost, and potential wastefulness, of this policy arises from the gap between the benefits of retaining the resources, namely the marginal productivity of capital in the economy, and the yield on the reserves, namely the international risk-free rate. In other words, the claim is that real resources are being absorbed, through the balance of payments, to acquire financial assets in mature economies abroad that yield less than alternative investments at home. This echoes criticisms that were made of colonial currency board systems, that they forced colonies to run current account surpluses to back their money. In this interpretation, reserve growth is less than fully rational. Some critical observers even go so far as to see the reserve build-up as a competitive activity, less dangerous but no less costly than an arms race, wherein the use of real resources is forgone trying to top neighbours' holdings.

Official foreign exchange reserve holdings

	1998		2002	
	In billions of US dollars	In percentages	In billions of US dollars	In percentages
East Asia excl Japan[1]	562.9	34.6	908.8	40.0
Japan	203.2	12.5	443.1	19.5
Pacific[2]	17.2	1.1	19.9	0.9
World total	1,627.8	100.0	2,274.2	100.0

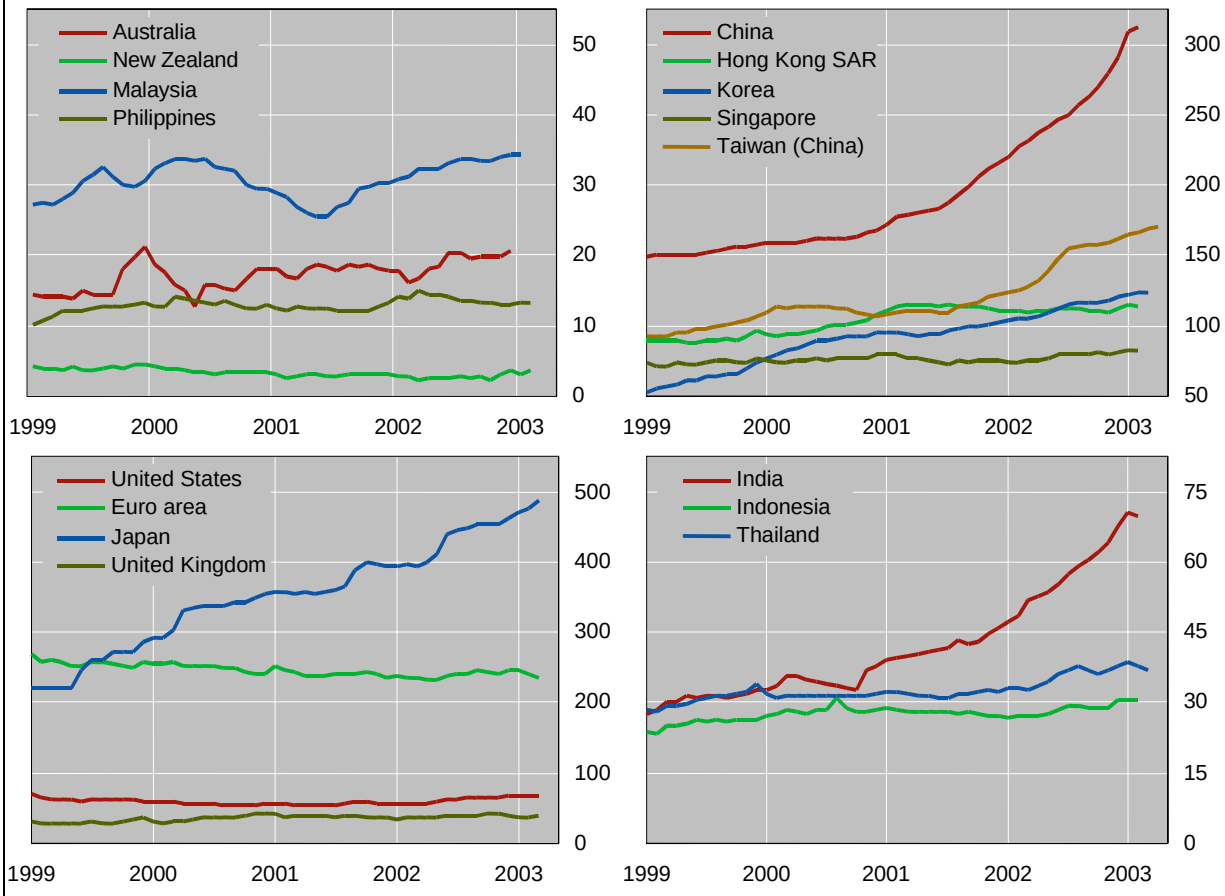
[1] China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan (China) and Thailand. [2] Australia and New Zealand.

Sources: IMF, *International Financial Statistics*; national data. Table 2

[6] This abundance of reserves no doubt made it easier for central banks in the region to agree to make some of their reserves available to each other under the Chiang Mai initiative. See Park and Wang (2003).

Foreign exchange reserves

In billions of US dollars



Sources: IMF, *International Financial Statistics*; national data. Graph 7

Much of the variation in foreign exchange reserves in the region, however, must be ascribed to capital flows rather than current accounts. Indeed, in the years since the crisis, the relationship between the growth of reserves and current account surpluses in the region has become looser. Admittedly, the relationship seems well founded in aggregate: the Asian economies excluding Japan ran current account surpluses of $440 billion in 1999–2002 (Table 1) and their reserves rose by $346 billion (Table 2). Nevertheless, while reserve growth approximated the current account surplus in 1999–2000 in Taiwan, Korea and Hong Kong SAR, China's reserves grew by only half of the current account during that period, while those of Singapore hardly budged (Graph 8).[7] In 2001–02, however, with US dollar yields falling in relation to local currency yields, reserve growth outpaced the current account in China, Taiwan and Korea.[8] China's $72 billion rise in foreign exchange reserves in

… although the link between exchange reserves and current accounts is weak

[7] In China, shifts into dollar bank accounts drawn by higher US dollar yields resulted in private capital outflows and limited reserve growth; see Ma and McCauley (2003).

[8] In Hong Kong SAR, fiscal deficits were funded by the drawdown of fiscal reserves held in foreign currency, so that current account surpluses were not associated with much of a rise in reserves. The depreciation of the euro against the dollar in the earlier period and its appreciation in the latter period held down the growth of reserves as measured in dollars in

2002 can hardly be reduced to its $35 billion current account surplus. For that matter, India's $40 billion rise in foreign exchange reserves over the last four years owes little to a current account surplus that only appeared in late 2001. Thus, what was true in aggregate held far from uniformly across economies and time.

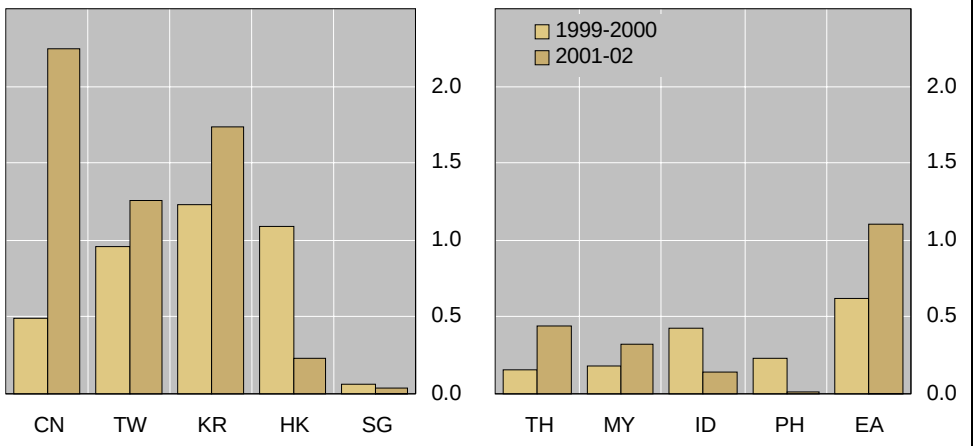
The long-standing critique of the colonial currency board arrangements cited above was partial in that it overlooked international borrowing, or more generally capital flows, as the source of the foreign assets needed to back the currency.[9] So, too, the identification of the growth of foreign exchange reserves in East Asia with current account surpluses is at best partial.

The criticism has limitations other than factual. It overlooks that, within limits, there have been in-country externalities from reserve holding, via the impact on a country's perceived international credit standing. If reserves make less likely a crisis that could cost 5% of GDP, their running cost may be justified. Nor can it be readily assumed that less reserve accumulation would have been balanced by more domestic investment yielding relatively high rates of return.

Reserve growth is also criticised as pointing to over-reliance on external demand

From this, more Keynesian, perspective, the growth of reserves is seen as a by-product of foreign exchange market intervention intended to prevent currency appreciation and the consequent loss of foreign demand. The aim is the maintenance of overall demand, rather than higher reserves per se. On this view, the current account surpluses and foreign exchange reserve build-up in East Asia point not to strength but rather to some extent to domestic economic

Ratio of foreign exchange reserve growth to current account surplus



Note: For an explanation of the country abbreviations, see Graph 1; East Asia is defined as the countries shown and India.

Sources: IMF, *International Financial Statistics*; national data; BIS calculations. Graph 8

the earlier period and boosted it in the second period. The magnitude of this effect, however, cannot account for the difference between the two two-year periods.

[9] The possibility that long-term foreign borrowing, rather than current account surpluses, provides the foreign assets to back a currency board, however, leaves open the spread between the borrowing rate and the deposit rate that is earned on placements of the foreign assets in international financial centres. See De Cecco (1974).

weakness. In particular, weak domestic demand may reflect an investment overhang or firms' diversion of cash flow to debt repayment. At the same time, where banking systems are burdened with bad loans, domestic firms serving the home market may have difficulty obtaining credit. Were domestic private spending, either consumption or investment, to strengthen, regional authorities could reduce intervention, accept some currency appreciation and experience a narrowing of their current account surplus. Some of the possible policies described below, including the strengthening of banks' ability to extend credit, could also raise investment relative to saving.

This perspective, too, suffers from its identification of foreign exchange reserve growth with the current account surplus. But those who recognise the two-way flow of capital between the region and the rest of the world have levelled criticisms as well.

Gross flows

Gross flows could be usefully short-circuited ...

The pattern of gross flows between East Asia and the rest of the world has come in for the criticism that it represents a missed opportunity for financial integration within East Asia. Wearing their policy hats, central bankers in the region discuss how to develop bond markets in the region (APEC (1999)). Wearing their reserve manager hats, they have helped develop the market for US agency securities (McCauley and Fung (2003)).

... although dollar credit markets already show substantial regional integration

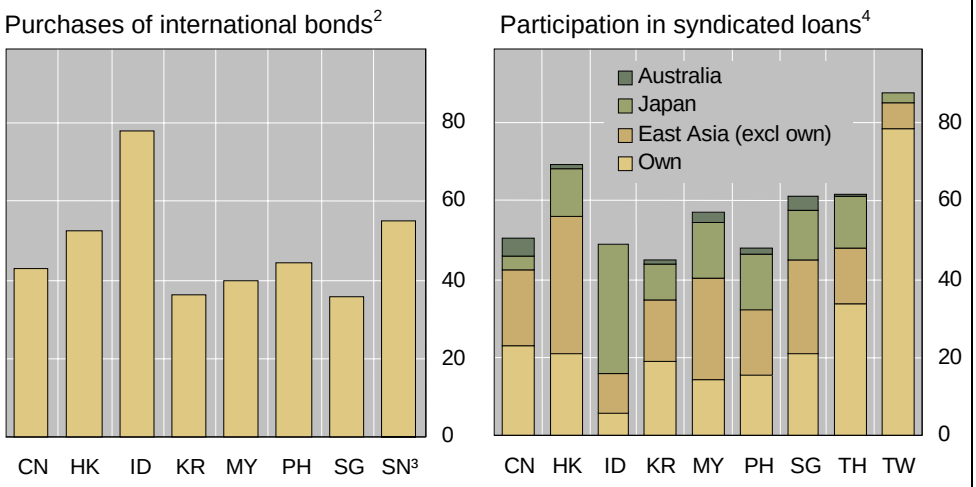
In the mostly dollar-denominated markets for international bonds and internationally syndicated loans arranged on behalf of East Asian and Pacific borrowers, there is more integration in East Asia than is generally recognised.[10] It is easy to conclude that there is little integration from an examination of the topmost firms among bond underwriters (so-called bookrunners). For international bonds issued by East Asian borrowers between April 1999 and August 2002, for instance, shares of bookrunners headquartered in North America and Europe were respectively 54% and 29%, while the share from Asia was 17%.[11] The picture is different, however, if one looks at the initial providers of funds, whether primary-market buyers of bonds or lower-ranking members of loan syndicates. When it is recalled that underwriting spreads represent only a very small fraction of total proceeds of any international bond or internationally syndicated loan, the providers of funds serve as a more telling measure of integration. Among the buyers of international bonds issued by East Asian borrowers, East Asian accounts take almost half of the issues, and absorb an even higher share of issues of the shorter maturity suitable for the portfolios of commercial and central banks (Graph 9). Subsequent trading in bonds issued by East Asian names almost surely moves more of the paper back into East Asian portfolios. In the primary market for loans, including a significant fraction denominated in local

[10] See McCauley, Fung and Gadanecz (2002).

[11] These figures include HSBC and Standard Chartered as Hong Kong banks. Between 1999 and 2002, these two groups' combined share as bookrunners was 10% of the bonds issued.

Regional distribution of bonds and loans of East Asian borrowers

Borrower residence along x-axes[1]



[1] For an explanation of the country abbreviations, see Graph 1. [2] Regional purchases of international bonds issued by East Asian borrowers, April 1999 to August 2002; percentage of amounts issued by residence of issuer. [3] Supranational (eg Asian Development Bank). [4] Supply of funds by nationality of banks. Nationality breakdown by ultimate ownership of banks. HSBC and Standard Chartered were considered Hong Kong groups for this exercise. Deals where banks of only one nationality provided funds were excluded from the sample.

Sources: Dealogic Bondware; Dealogic Loanware. Graph 9

currencies, East Asian banks represent a substantial share of syndicate lenders to East Asian borrowers.

This degree of integration in the international bond and loan markets, however, by no means characterises the domestic bond markets. Discussions with market participants suggest that there is little investment by investors from one East Asian economy in the bonds of other economies in the region. Indeed, domestic bond markets, unlike the equity markets of East Asia, remain generally insular, with limited international investment other than occasionally from speculative accounts.

Local currency markets for risky debt can be developed

East Asia would no doubt benefit from more financial integration and, in particular, from more development of its domestic bond markets. Thus, the region shares an interest in short-circuiting some of the gross flows of capital just described. The finances of the region would be significantly improved if local borrowers could issue local currency bonds rather than dollar or euro bonds, either to secure longer-duration liabilities or to tap the risk appetite of potential investors. Equally, institutional investors with long-duration liabilities would benefit from being able to buy longer-duration bonds in their home currencies. As an example of what can be done, Australian banks, which formerly depended on US pension funds and insurance companies for hybrid (so-called upper Tier 1) equity, now sell such paper denominated in Australian dollars to local investors, including retail clients keen to earn higher yields in a low-inflation environment. Singaporean banks have also recently marketed capital instruments in Singapore dollars to their domestic customer base. In general, given the advantages to both borrowers and lenders, and given Asia's

broadly favourable history of price stability, the potential for bond market development is strong.

Central banks are interested in broader, deeper and more liquid bond markets for operational as well as other reasons. Increasingly, there is a recognition of the opportunity afforded by prudent but strategic management of foreign exchange reserves to further the goal of developing regional bond markets. Reserve managers in the region see potential in investing in the securities of East Asian borrowers.[12] This would presumably start with issues denominated in major currencies but, in the longer term, investment vehicles involving local currency paper cannot be excluded.

The policy challenges

Three policy objectives could complement each other to bring better balance to both capital flows and economic structures in East Asia. 1) Lessening reliance on exports as the leading sector in economic development, thus reducing exposure to export cycles. Along with healthier domestic balance sheets, this should attenuate the risks of exchange rate fluctuations. 2) Strengthening the banking systems to help support domestic demand in the face of any export weakness. Financial strengthening may need to be complemented with restructuring of overindebted and loss-making firms. 3) Developing long-term investing institutions and markets for bonds denominated in domestic currency. This would enhance the borrowing capacity of firms producing for the domestic market without introducing the financial fragility that comes with currency mismatches.

An economy weans itself off exports …

Korea's recent experience gives some idea of the potential impact of this policy orientation. Measures to recapitalise its banks, to reorient them to making profits, and to improve their governance have been noteworthy. Admittedly, with the government still a major shareholder of most of the banks, the process remains to be completed. Reforming corporate governance in Korea is a work in progress. For its part, the Korean bond market has, with interruptions, developed away from dependence on bank guarantees. These financial improvements have played a role in two significant and related macroeconomic developments. First, in 2001, despite a sharp drop in exports, the strength of domestic demand enabled the Korean economy to grow at a rate well above that of other economies with similar exposure to the technology cycle. Second, since the crisis, Korea's household saving rate and the current account surplus have both decreased substantially.

Significant developments elsewhere point to the same conclusions. How robust would domestic demand have been in China had not the Chinese banks promoted the rapid growth of mortgage and personal lending over the past few years? And how deep a recession would Malaysia have experienced had banks not competed vigorously to make home mortgage loans?

[12] Of course, to the extent that a central bank invests in an investment pool that is in turn invested in the bonds of the same central bank's government, then a fraction of the investment would be excluded from reported reserves.

... but there are risks to wider access to credit

Of course, the risks of financial restructuring that increases access to credit should not be ignored. The Korean authorities took strong measures to check the rate of growth of household borrowing and the rise of asset prices. Elsewhere, both in industrial countries and in emerging market economies, we have witnessed the potential for a "stock adjustment" of household debt levels to get out of hand. It is important, therefore, that policymakers remain vigilant to the risk that financial restructuring could lead to excesses of credit. Nonetheless, the conclusion is already inescapable that financial reform can serve the greater purpose of better balancing international capital flows and domestic economic growth alike.

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Investors' attitude towards risk: what can we learn from options?[1]

Market commentators often cite changes in investors' attitude towards risk as a possible explanation for swings in asset prices. Indeed, episodes of financial turmoil coincide with anecdotal evidence of abrupt shifts in market sentiment from risk tolerance to risk avoidance. While these shifts may be potentially driven by changes in the fundamental disposition of individual investors towards risk, they are more likely to reflect the *effective risk attitude* as manifested through the behaviour of currently active investors. In particular, behaviour similar to that induced by shifts in the fundamental preferences of investors over risk and return can also reflect changes in the composition of active market players or tactical trading patterns, induced by the interaction of prevailing market conditions with institutional features. Tools that track the dynamics of investors' willingness to take risks can lead to a better understanding of the functioning of financial markets. In particular, they can contribute not only to more effective risk management from the point of view of individual institutions, but also to improved monitoring of market conditions by policymakers.

This article constructs an indicator of investors' effective aversion to risk. The indicator is obtained by comparing the statistical likelihood of future asset returns, which is estimated on the basis of historical patterns in spot prices, with an assessment of the same likelihood filtered through market participants' effective risk preferences, which are derived from option prices. In particular, we argue that the *relative* size of downside risk, as assessed from the preference-weighted and the statistical vantage points, co-moves with the prevailing effective attitude of market participants towards risk. Remarkably, we find that indicators of risk attitude derived from different equity markets have a significant common component, indicating that investor sentiment transcends national boundaries.

In the next two sections we first describe and motivate the methodology and then discuss the time patterns displayed by the indicator of effective risk aversion for three equity market indices. In the last section we analyse the

[1] The views expressed in this article are those of the authors and do not necessarily reflect those of the BIS. The authors would like to thank Marian Micu for his help with computer programming.

statistical behaviour of asset prices, conditional on whether the indicator signals a high or low investor aversion to risk. The observed patterns are consistent with accounts suggesting that periods of investor retrenchment from risk-taking are also characterised by higher equity price volatility and subdued co-movement between bond and equity markets.

An indicator of investors' risk aversion

An indicator that compares ...

The price of an asset reflects investors' preferences with regard to possible future payoffs as well as their assessment of the likelihood of those payoffs. The incremental value to an investor of a future payoff decreases with the level of the investor's wealth. Hence, everything else constant, assets that tend to produce higher payoffs in situations when wealth is lower are valued more highly. Based on this premise, modern finance theory models asset prices as the expectation of future payoffs, calculated not on the basis of their objective *statistical* likelihood, but rather on the basis of a *preference-weighted* likelihood measure that filters statistical probabilities by investors' preferences with regard to risk.

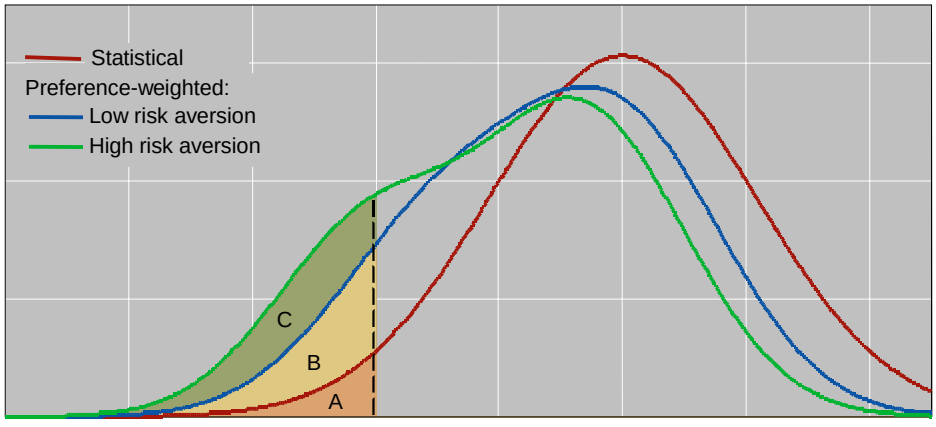
... the statistical likelihood of a payoff ...

Graph 1 provides an illustration of the difference between the two likelihood measures, taking as an example an investor whose only source of wealth is a single security. The red curve plots the statistical likelihood of the security's possible future payoffs. The blue curve depicts instead the assessment of payoffs from the point of view of the investor and weights the statistical probabilities according to the investor's risk preferences. This probability distribution, which is filtered by the investor's subjective preferences, assigns greater weight to lower payoffs that coincide with low wealth. According to theory, the value of the security to the hypothetical investor equals the average payoff calculated using this preference-weighted probability distribution.

... with a preference-filtered likelihood ...

The ratio of downside risk measured under the two probability distributions is related to the investor's risk aversion. In terms of the labelled areas in

Statistical versus risk preference-weighted probability density functions of payoffs



Graph 1

Graph 1, this ratio is equal to $(A+B)/A$. If the hypothetical investor is less willing to bear risk or, in other words, attaches less value to the possibility of receiving high payoffs than to the avoidance of low payoffs, then his valuation will be based on a distribution such as the one depicted in green. Clearly, for such an investor the security is less valuable and the indicator of risk aversion, $(A+B+C)/A$, has a higher score.

... derived from options

Our derivation of the indicator of investors' risk aversion follows the above logic closely and is detailed in the box on the next page. We use option prices for the estimation of market participants' preference-weighted assessment of the likelihood of future returns.[2] Option prices provide a unique insight into investor assessments of future payoffs. This is due to the fact that an array of option contracts, based on different strike prices of the same underlying asset, is observed simultaneously on each trading date. This cross section of option prices makes it possible to estimate the subjective probability that investors ascribe to future payoffs, represented by the option strikes.

Effective risk aversion may reflect preferences ...

There are reasons to believe that the indicator of risk attitude may change over time. For instance, there is the possibility that different periods might be characterised by a different collective disposition of investors vis-à-vis risk-taking. Arguably, the component of our indicator that is based on such fundamental determinants of risk aversion can evolve only gradually, if at all.

... the identity of active players ...

Alternatively, one could argue that the indicator measures the *effective* risk aversion of those investors that actively participate in the market. In this respect, a possible source of time variation can be changes in the composition of the set of active investors. Our calculations are based on observed prices in the cash and derivatives markets and, as such, reflect the collective views of the active participants at the time. For a variety of institutional and regulatory reasons, different types of market participants have a different tolerance of risk. For example, pension funds and foundations are typically more conservative investors that put high priority on capital preservation. In contrast, hedge funds are more aggressive in their pursuit of high returns. Even if neither type of investor changes its attitude towards risk and return, the effective choices between risk and return reflected in the spot and option prices will be sensitive to the identity of the active participants at any given juncture.

... or responses to changing conditions

Finally, the risk aversion indicator we construct might also be viewed as reflecting the insurance value of an option that can also be time-varying. At times, risk management systems may impose mechanical trading behaviour that is effectively similar to that implied by heightened risk aversion.[3] For instance, when the predetermined floor for a portfolio's value is reached, or an operation's risk budget is exceeded, the systems prescribe the sale of risky assets. Thus, the value of an option with a sufficiently high payoff in such situations would offer valuable protection to investors against reaching their

[2] Hayes and Shin (2002) construct a similar indicator of risk aversion.

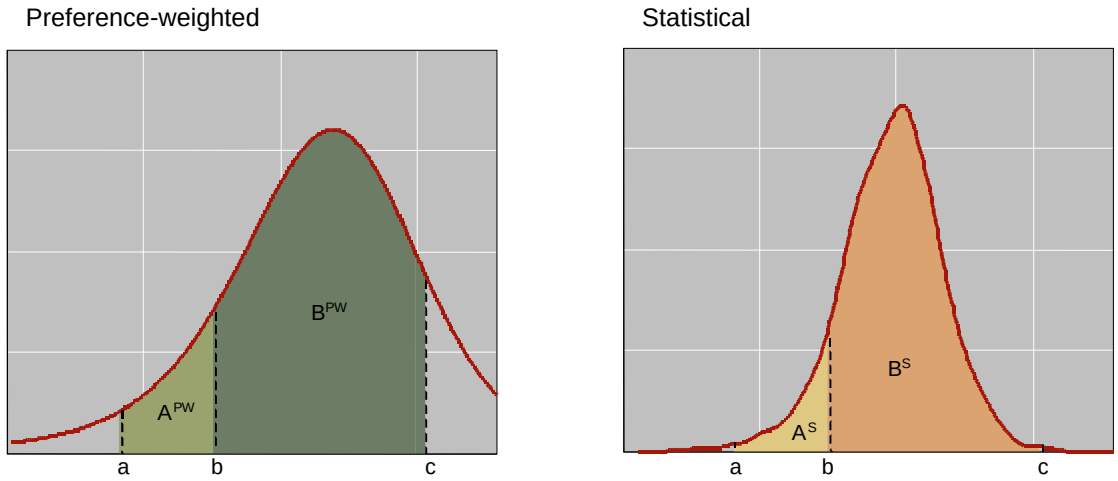
[3] A theoretical treatment of this issue is provided in Danielsson et al (2002).

Calculation details

In this box, we outline the methodology for deriving a numerical indicator of aversion to downside risk. The indicator is calculated as the ratio of two measures of downside risk: one based on the preference-weighted probability density function (PDF), derived from option contracts on a specific security, and the other on the statistical PDF, which is calculated on the basis of the historical behaviour of returns on the asset underlying the option contracts. In the finance literature, the preference-weighted PDF is often referred to as the "risk neutral" PDF.

The derivation of the *preference-weighted* PDF is based on the non-arbitrage argument of Breeden and Litzenberger (1978), who show that such a PDF is equal to the second derivative of the option price with respect to the option strike. Unfortunately, option contracts are traded only for a set of discrete strike prices of the underlying security. To overcome this difficulty, we follow Shimko (1993) by first estimating a continuous, "smooth" implied volatility function that is consistent with the option prices for the range of observed strikes. More specifically, we estimate a quadratic volatility "smile" by minimising the sum of the weighted squared differences between it and the volatility implied by the observed prices for the range of traded contracts. We use option prices from contracts with 45 days to maturity. We then derive the corresponding continuous option price function based on this implied volatility function and calculate its second derivative numerically.

Preference-weighted and statistical PDFs



The estimate of the *statistical* distribution is based on an asymmetric GARCH model first suggested by Glosten et al (1993). It incorporates two established characteristics of asset returns: the persistence of volatility, and the tendency of volatility to rise as returns fall. The model is estimated each month on the date we observe the option prices, using information available up to that point in time. We then simulate the estimated model 5,000 times, generating a distribution of the asset's returns 45 days into the future in order to match the date of expiration of the option contracts.

The graph above shows the two distributions for a typical day in our sample. The preference-weighted distribution (left-hand panel) is truncated between points b and c, reflecting the range of strikes for which we observe option prices on that particular day. Because our indicator of risk aversion is sensitive to the probability mass in the left tail of the distribution, we do not extrapolate beyond the bounds of observed strikes. Hence, the indicator is expressed as the ratio of (i) the preference-weighted conditional probability of a 10% or larger decline in the underlying asset to (ii) the corresponding statistical probability. In terms of the labelled areas in the graph above, our indicator is equal to:

$$\left(\frac{A^{PW}}{A^{PW}+B^{PW}}\right)\Big/\left(\frac{A^{S}}{A^{S}+B^{S}}\right)$$

This formulation comes as close to the one presented in Graph 1 as the objective limitations of the data permit.[①] Note that our methodology is qualitatively similar to the estimation of risk premia as the difference between futures prices, which account for investors' risk preferences, and statistical expectations of the same underlying asset's returns.

[①] It is conceivable that the truncation bounds of the preference-weighted PDF change over time for reasons unrelated to our analysis and may, in principle, affect the value of the indicator. Inspection of the movement of these bounds suggests, however, that it cannot be at the root of the empirical regularities found in this special feature.

risk limits and, consequently, against being forced to liquidate positions under stress. The indicator of risk aversion will increase in situations when such considerations are expected to dominate the behaviour of market participants.

Analysis of risk aversion indicators

Indicators for three equity markets ...

We apply the basic idea outlined in the previous section, and detailed in the box, in order to calculate monthly indicators of market participants' effective risk attitude using information from option prices and cash returns on the S&P 500, FTSE 100 and Dax 30 equity indices. The data cover the period from December 1995 to December 2002. We calculate the risk preference-weighted likelihood of index returns as implied by option prices observed 45 days prior to each option contract's expiry date. On average, there are 37 strikes for the S&P 500 options, 25 for the FTSE options and 29 for the Dax options.

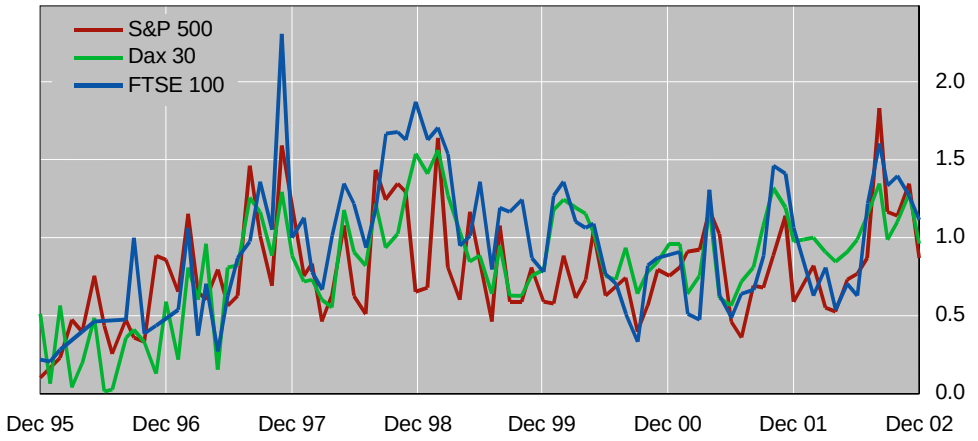
Graph 2 plots the derived indicators for the three equity markets. Higher values of the indicators are associated with lower investor tolerance of risk. The three indicators exhibit a fair degree of variation over time. There is an upward shift timed around the second half of 1997, during the period when currency crises spread widely in the Southeast Asian region. This heightened sensitivity to risk is not fully reversed in the subsequent years. In fact, during the market turbulence in the autumn of 1998, our indicator series register the longest sustained rise in investors' reluctance to bear risk. In contrast, the events of 11 September 2001 are marked only by a short-lived jump in the three indicators.[4]

... show a high degree of co-movement

A striking feature of the graph is the degree of co-movement between the three indicator series. Bilateral correlation coefficients ranging between 62% and 78% confirm the visual impression. We interpret this fact as suggesting that integrated financial markets tend to be driven by the actions of investors with similar perceptions and objectives. Furthermore, since we estimate the three indicators independently for each equity index, this co-movement provides a reassuring signal for the validity of our methodology.

[4] These patterns are very similar to those exhibited by the indicator of risk aversion constructed by Hayes and Shin (2002), which is based on the same principles.

Risk aversion indicators



Sources: Bloomberg; CME; Eurex; LIFFE; BIS calculations. Graph 2

The high correlation between the three indicators suggests that there is a strong common factor driving their dynamics. For the rest of this special feature we base the analysis on this common factor, which we derive statistically as the first principal component of the three indicators. The new series accounts for 80% of the overall variation in its constituent series.

Risk aversion and the dynamics of financial markets

In this section, we examine whether the behaviour of asset prices changes systematically with the level of investors' effective risk aversion. To this end, we focus on the three equity indices we used to derive the indicator, and price indices of US, UK and German government bonds with a maturity of seven to 10 years. We have classified each month in our sample as being characterised either by "high" or "low" effective aversion to risk on the basis of the value of the risk aversion indicator.[5] Tables 1 and 2 contain, respectively, univariate and bivariate descriptive statistics on the annualised daily returns on the six assets. The statistics are calculated over the entire period and over each of the two subsamples characterised by different levels of effective risk aversion.

High risk aversion coincides with ...

We first test whether asset return distributions are similar across the two subsamples marked by "high" or "low" risk aversion. The results of a test for equality of the distribution functions are reported in the bottom row of each panel of Table 1. The test concludes that returns on most assets exhibit different statistical behaviour in periods characterised by different levels of risk aversion. The sole exception is the gilt market, where we cannot reject the hypothesis that the returns are drawn from the same distribution.

In order to cast light on what factors drive the outcome of the distribution test, we examine separately the returns' first four moments. More specifically, we calculate for the entire period and for each of the two subsamples the

[5] We use the median value over the entire period of our composite indicator as the cutoff point in order to determine the high and low risk aversion subsamples. We have tried a variable trend as the cutoff point with no material impact on the results.

average annualised daily return, the annualised volatility of the daily returns, a measure of the asymmetry in the probability of low and high returns (skewness), and a measure of the likelihood of extreme returns in either direction (kurtosis). Tests of equality of these measures across the two subsamples attribute the differences in the distribution of returns, indicated by the overall test, to differences in the first two moments. Mean returns of equity indices are lower in periods that are characterised by higher effective risk aversion, while the opposite is true for fixed income securities. This finding is consistent with the intuitive argument that investors would tend to withdraw from riskier asset classes as they become less inclined to take on risk. In contrast, at times of increased risk tolerance, the demand for riskier assets would tend to support an increase in their price at the expense of that of bonds.

... below par performance of equity markets ...

Another general pattern that emerges from Table 1 is that higher risk aversion is associated with higher volatility of asset prices. This result holds for both asset classes, but is more pronounced in the case of equities. A possible interpretation of this pattern is consistent with one of the motivations we offered for the time variation in market participants' effective risk aversion. Increased price volatility is tantamount to heightened market risk and is likely to coincide with periods when participants' capital base is stretched to its limits. This, in

... higher volatility ...

Return distributions and risk aversion

December 1995–December 2002

	Equities[1]											
	S&P 500				FTSE 100				Dax 30			
	Whole	High	Low	Test[2]	Whole	High	Low	Test[2]	Whole	High	Low	Test[2]
Mean	0.081	–0.041	0.206	**	0.080	–0.014	0.177	*	0.109	–0.064	0.287	**
Std dev	0.195	0.228	0.153	***	0.191	0.234	0.132	***	0.265	0.331	0.173	***
Skewness	–0.168	–0.197	0.159	.	–0.237	–0.197	–0.026	.	–0.280	–0.171	–0.308	.
Kurtosis	5.868	5.245	4.385	.	5.347	4.196	4.359	.	5.785	4.414	3.913	.
K-S test[3]	0.000***				0.000***				0.000***			
	Fixed income[1]											
	US Treasury notes				UK gilts				German bunds			
	Whole	High	Low	Test[2]	Whole	High	Low	Test[2]	Whole	High	Low	Test[2]
Mean	0.043	0.074	0.012	*	0.024	0.055	–0.007	*	0.000	0.020	–0.020	.
Std dev	0.066	0.069	0.063	**	0.063	0.065	0.062	.	0.057	0.057	0.057	.
Skewness	–1.032	–0.946	–1.160	.	–0.753	–0.947	–0.532	.	–2.177	–2.045	–2.324	.
Kurtosis	7.431	7.151	7.725	**	8.964	8.666	9.382	.	14.941	13.414	16.620	.
K-S test[3]	0.021**				0.025**				0.429			

[1] A normality test rejects the hypothesis that the returns are drawn from normal distributions. [2] Outcome of the test of whether the difference between the moment estimates across the two subsamples is greater than zero. *, ** and *** indicate that the null hypothesis is rejected at the 10%, 5% and 1% significance levels, respectively. [3] Kolmogorov-Smirnov test of whether returns are distributed identically across the two subsamples: p-values indicate the significance level at which one rejects the null hypothesis that the distribution of returns is invariant to the measure of risk aversion.

Sources: Bloomberg; Datastream; BIS. Table 1

Cross-correlations of asset returns[1]

December 1995–December 2002

	S&P 500	FTSE 100	Dax 30	US Treasury notes	UK gilts	German bunds
S&P 500	...	0.448	0.493	–0.229	–0.071	–0.022
FTSE 100	0.420	...	0.741***	–0.197	–0.150	–0.133
Dax 30	0.437	0.587	...	–0.269	–0.178	–0.077
US Treasury notes	0.126***	0.085***	–0.036***	...	0.389	0.183
UK gilts	0.142***	0.149***	0.095***	0.362	...	0.335**
German bunds	0.026	0.045***	0.176***	0.116	0.233	...

[1] The numbers above (below) the main diagonal correspond to correlations in "high"("low") risk aversion periods. *, ** and *** indicate that the hypothesis of equality of correlations between asset returns across "high" and "low" periods of risk aversion is rejected at the 10%, 5% and 1% significance levels, respectively.

Sources: Bloomberg; Datastream; BIS. Table 2

turn, increases the insurance value of options. In terms of Graph 1, the area under the left tail of the preference-weighted likelihood function increases and so does the indicator of risk aversion.

An alternative interpretation would reverse the direction of causality. When traders are more reluctant to expose themselves to risk, they are particularly cautious in managing their portfolios and tend to react more vigorously to news. Furthermore, when the overreaction is market-wide, it would be difficult to find counterparties for investment positions. Large swings in prices would then be a natural consequence.

The correlations of returns across different equity markets appear to increase during periods when investors are more apprehensive about risk (Table 2).[6] The direction of causality is ambiguous. On the one hand, a closer co-movement of stock markets narrows the scope for portfolio diversification, thus increasing the correlation of market returns with investors' wealth. As explained earlier, this would tend to increase the effective risk aversion of investors. On the other hand, it is possible that increased volatility (or, equivalently, measured market risk) might be driving both the higher correlations and the higher values of the indicator of effective risk aversion. Loretan and English (2000) show that higher correlation between asset prices should be expected during periods of increased volatility. As risk management systems typically register higher market risk during these periods, one would expect investor behaviour that is observationally similar to lower tolerance of risk, and similarities in investment strategies might lead to a tighter relationship between stock markets. Despite the fact that the differences in correlations between the two subsamples appear economically significant, formal tests fail to establish statistical significance except for the correlation between the German and British equity markets.

… and decoupling of bond and equity returns

The comparison of tightness of correlation between bond and equity returns exhibits a clearer pattern. The co-movement between the two asset

[6] This can be observed by comparing entries in the table that are symmetrically positioned with respect to its main diagonal.

classes is uniformly higher during periods of lower risk aversion. The differences are not only economically significant (in the range of 10–20 percentage points) but also pass the statistical test of equality. This finding is consistent with the results from the comparison of the univariate statistics reported earlier. According to Table 1, government bond markets are less sensitive to shifts in investors' attitude towards risk than equity markets, the returns on which tend to suffer as investors withdraw from risk-taking during periods of heightened risk aversion. Thus, during those periods the prices in the two asset classes tend to move in opposite directions, leading to lower correlation.

Conclusion

This special feature compares data that can be extracted from option and cash markets in order to derive time series of risk aversion indicators. An encouraging feature of the estimation results is that these indicators co-move closely across market segments.

Furthermore, we find evidence that financial market dynamics tend to change systematically with the level of investors' effective risk aversion. In particular, heightened risk aversion is associated with lower returns and higher volatility, especially for equity markets, and weaker co-movement of asset classes. Our findings thus have a bearing on the interpretation of signals sent by financial markets. Incorporating changes in risk attitudes in such an interpretation adds information relevant for understanding the functioning of financial markets.

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What drives investor risk aversion? Daily evidence from the German equity market[1]

Stock prices move as corporate earnings prospects change but they also move as investors change their aversion to risk. Aversion to risk gives rise to a risk premium, which consists of an expected extra return that investors require to be compensated for the risk of holding stocks. Option prices are a unique source of information for the estimation of risk premia. The way strike prices in option contracts distinguish between outcomes that are relatively favourable to investors and those that are relatively unfavourable allows an estimate of risk aversion to be extracted from observed option prices. This is done by comparing what is implied in option prices with the probabilities of various outcomes from a purely statistical point of view.

The purpose of this special feature is to explain daily movements in the risk aversion of investors in the German stock market as reflected in option prices.[2] We focus on the main German index, the Dax, which summarises the stock prices of 30 major German companies. Our data on Dax option prices consist of daily observations from December 1995 to May 2002. To explain movements in our measure of risk aversion, we examine indicators of expectations about economic growth, market volatility, credit risk premia and negative news events. We find that investors in the German equity market seem to have become increasingly risk-averse since 1998. In addition, we note that movements in US stock prices have a strong impact on this risk aversion.

We complement the study of Tarashev et al (also in this *Quarterly Review*) in three respects. First, we analyse risk aversion at a higher frequency: we examine daily movements, while they examine monthly movements. Second, we measure risk aversion in a slightly different way – particularly in estimating statistical probabilities – thus allowing a comparison of two measures and potentially providing a sense of the robustness of option-based measures. Finally, we go a step further by attempting to identify factors that would explain the changes in risk aversion from one day to the next.

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[1] This work was largely carried out while the author was visiting the BIS. The views expressed in this article are those of the author and do not necessarily reflect those of the BIS or the Austrian National Bank. I am indebted to Ernst Glatzer for expert statistical help.

[2] Beber and Brandt (2003), Rosenberg and Engle (2002), Aït-Sahalia et al (2001) and Jackwerth (2000) also explore measures of risk aversion.

Estimating two distributions

Measuring risk aversion

We measure risk aversion by comparing two estimates of the probability density function (PDF) for future stock prices. One estimate is extracted from option prices, while the other is estimated from realised movements in stock prices. Risk aversion can be viewed as accounting for the difference between those two estimates. The components of our methodology are illustrated in Graph 1. The green line represents the probability density extracted from option prices and the red line the density estimated from actual stock price movements. The estimation details are outlined in the box on the next page.

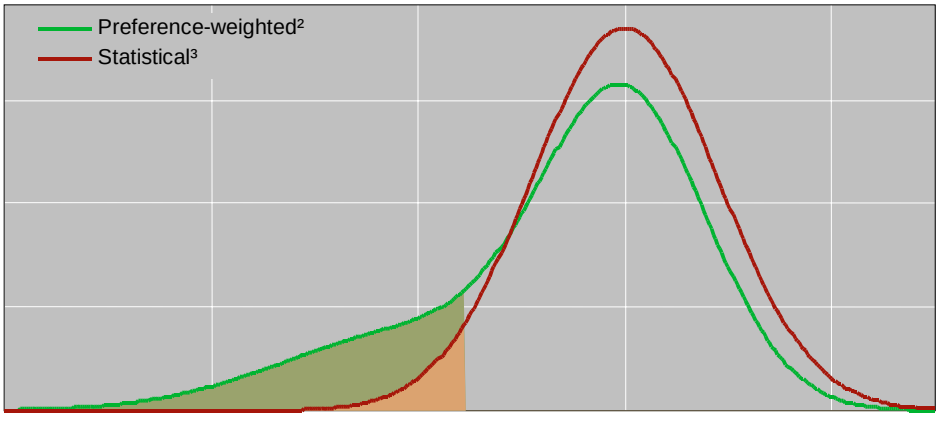
Risk aversion drives a wedge between statistical probabilities ...

When traders price options, they are in effect applying preference-weighted probabilities of different possible asset price outcomes for the period until the derivative expires. In other words, the observed option price incorporates the traders' perceptions of the future movement of the asset price together with their degree of risk aversion, which may change over time.[3] From the time series of actual returns we estimate the statistical PDF, represented by the red line in Graph 1. This is a purely statistical model and therefore contains no information on risk aversion. In our comparison of the two PDFs, we concentrate on the probability of declines in stock prices. From both PDF estimates, we compute the probability of a Dax decline of 10% or more relative to the forward value of the index over 49 days. These probabilities correspond to the two shaded areas in the left tails.

... and probabilities that reflect investors' preferences

If traders pay more attention to events with negative consequences for their wealth, the preference-weighted probability of future declines differs from the statistical probability by a distance reflecting the risk aversion. If traders are

Two probability density functions[1]



[1] The green and red shaded areas represent the preference-weighted and statistical probabilities, respectively, of a decline in price of 10% or more. [2] This density incorporates investors' risk aversion and is also referred to as the "risk neutral density". [3] This density reflects the distribution of actual returns.

Source: BIS calculations. Graph 1

[3] Jackwerth (1999) offers a survey on the estimation of the PDF from option prices.

Estimation methods

Specification of the preference-weighted PDF

The estimation of the preference-weighted PDF is based on the daily prices of put and call options and futures on the Dax index from December 1995 to May 2002.[1] Options are traded on the Eurex exchange by means of an electronic system. The original maturities of the options in our sample are one and two months.

In order to eliminate time to maturity effects from our estimates, we need to estimate a preference-weighted PDF with a constant horizon. If the effect of the downward trend in the maturity of the options were neglected, the parameters might change solely due to the fact that the expiry date was approaching. In particular, volatility decreases with each time increment, as uncertainty about the asset price on the day of maturity declines. To construct preference-weighted PDFs that are free of these spurious effects, we use an interpolation procedure on the implied volatility.[2] We interpolate between the contracts with one-month and two-month horizons to obtain a constant horizon of 49 calendar days.[3] Our proxy for the risk-free rate is the set of interbank interest rates.

Our parameterisation of the option-implied PDF is the mixture of log-normals model.[4] This flexible specification can generate a variety of shapes for the preference-weighted PDF. The mixture of two log-normal distributions is based on two regimes. In each regime, the stock price is log-normally distributed with a different mean and dispersion. The estimation of the parameters relies on non-linear least squares.[5]

Specification of the statistical PDF

We specify the statistical PDF of the returns as an asymmetric GARCH model with a constant mean and a conditional normal distribution. This specification is frequently applied in the literature. The GARCH model is motivated by the stylised fact that the volatility of stock returns moves over time in a predictable manner. In our model, today's conditional volatility depends on yesterday's volatility, on a term representing the asymmetric relation between volatility and stock returns and on the squared return observed yesterday.

Our database for the statistical PDF consists of the daily closing values of the Dax index for the period between December 1993 and May 2002. The literature offers two methods for constructing the sample, namely an expanding or a rolling window of stock returns. While Tarashev et al (also in this *Quarterly Review*) use the former, we perform rolling GARCH estimations with a moving window of 500 observations. After each estimation, we compute volatility forecasts for the next 49 days. Then we move the sample forward by one observation and restart the estimation and forecasting algorithm. Given that we consider a rather long horizon, namely almost two months, we assume that the 49-day distribution can be approximated by a conditional normal PDF. Therefore, the estimation of the statistical PDF only requires the volatility forecast as an input. Once the 49-day conditional distribution is obtained, we compute the probability of a decline of 10% or more over seven weeks relative to the forward value of the index from the tail of the statistical PDF.

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[1] Dax options are specified as European options, therefore there is no need to take account of the early exercise of contracts. [2] Details of our estimation and filtering procedure are given in Glatzer and Scheicher (2003). [3] For the purpose of comparison, we have also estimated PDFs with a horizon of 42 and 56 days. The results remain unchanged. [4] This specification of the option-implied PDF was introduced by Melick and Thomas (1997). [5] Engle (2001) gives a concise introduction to GARCH models.

risk neutral, they do not charge a risk premium and the statistical and preference-weighted probabilities are equal. In reality, we observe that market participants assign higher weights to economic outcomes where wealth is low, such as in periods of economic downturn. This type of investor behaviour is called risk aversion and leads to significant premia for bearing risk. In consequence, we would expect traders to behave as if the probability of a future stock market decline were higher than the historical data would deem

necessary. This additional probability, illustrated by the difference between the shaded areas in the left tails of the two hypothetical PDFs in Graph 1, is exactly the difference between the preference-weighted PDF and the statistical PDF, which we attempt to capture empirically.

In the academic literature, the concept of the preference-weighted PDF is equivalent to that of the risk neutral PDF. Under risk neutrality, the preference-weighted probabilities incorporate risk aversion in such a way that the preference-weighted probabilities assigned to undesirable outcomes exceed the corresponding statistical probabilities. The preference-weighted probabilities are constructed such that if one uses them to take expected values, one will obtain the observed market price of the asset in question.

Estimation results

Risk aversion explains a 3% difference in probabilities

For our last estimation date, in May of last year, a comparison of the two PDF estimates shows evidence of risk aversion. The likelihood of a Dax decline of at least 10% relative to the mean amounted to 10.7% in the preference-weighted PDF and 7.7% in the statistical PDF. This difference of 3% between the preference-weighted and the statistical probability is mainly caused by the longer tail of the option-implied PDF. Hence, the traders in the options market behaved as if the probability of large future declines of the Dax index were higher than historical experience would suggest. For instance, a fall from 4,800 index points to a level of 3,500 has a statistical probability close to zero, but the preference-weighted assessment of this possibility is still significant.

Risk aversion has risen since summer 1998

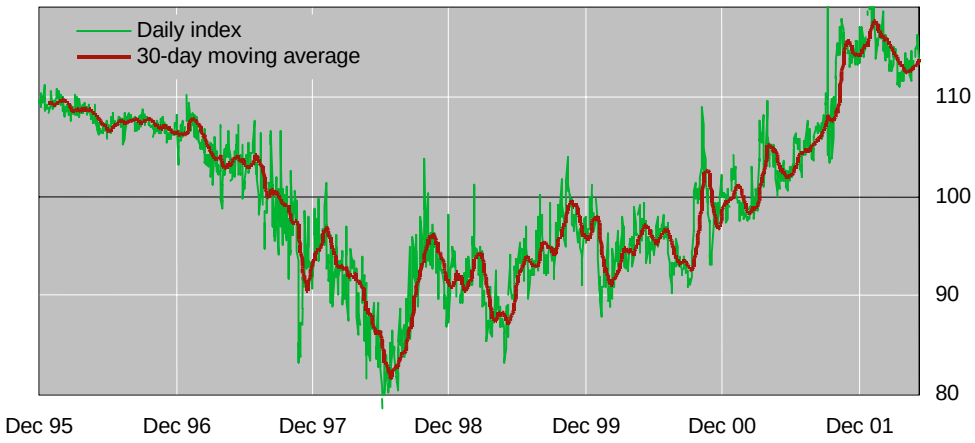
The time series of our measure of risk aversion in Graph 2 shows an upward trend since summer 1998. Inspection of Graph 2 also reveals that the downward movement on the German stock market since the first half of 2000 coincided with an increase in our estimated risk aversion. Note that there is a difference between our measure and that of Tarashev et al, especially for late 1997, when their measure shows a sharp rise in risk aversion. The difference indicates that the estimation of risk aversion measures is sensitive to the choice of the empirical procedure. In particular, the way the sample for the estimation of the statistical PDF is constructed affects the resulting risk aversion.[4]

The variability of the measure indicates substantial changes in the day-to-day behaviour of risk aversion. Overall, the measure starts above its mean in January 1996, moves to a minimum in June 1998 and then increases up to the end of our sample. Our measure of risk aversion is clearly related to the movement of the stock price in general. Linking the sharp upward moves in Graph 2 to the specific dates, we find a close correspondence between market developments and our measure of risk aversion. The first major spike is on 30 September 1998, when the financial crisis in Russia and the collapse of LTCM caused widespread turbulence in the global capital markets. The last visible jump occurred in the aftermath of the events of 11 September 2001.

[4] In the present paper, we use a rolling sample of 500 observations, whereas Tarashev et al use an expanding sample, starting in January 1988 and increasing with each day by one observation.

Risk aversion indicator for the German equity market

Indicator = 100 at the average



Sources: Austrian National Bank calculations; Bloomberg; Eurex. Graph 2

A caveat in our analysis is that the difference between the preference-weighted PDF and the statistical PDF is affected not only by risk aversion, but also by structural differences between the stock and options markets. Our analysis of the determinants of risk aversion in the next section therefore relies on the changes in risk aversion. Hence, a constant bias between the two PDFs that is not related to risk aversion does not affect our results.

Determinants of changes in risk aversion

Which factors drive the movement of risk aversion?

Risk aversion may be affected by the business climate …

Determinants of investors' risk aversion identified in the asset pricing literature are economic growth prospects, measures of equity and credit market risk, fluctuations in the exchange rate and negative news events in other equity markets.[5] A poorer outlook for the economy may raise risk aversion, because investors react to the increased likelihood of lower-wealth situations by reducing their willingness to bear risk. The slope of the term structure reflects the pessimism of market participants about the economic climate, because of the linkage of the term structure to investors' portfolio decisions. If investors expect the business climate to improve, they will shift some of their assets from short-maturity instruments into long-term bonds. This change in the portfolio composition will increase the short rate relative to the long rate, leading to a flatter slope of the term structure. Rising risk in the equity and credit markets makes it likely that future wealth will be lower and hence may lead to higher risk aversion. Our measures of equity market and credit risk are US implied equity volatility and the credit spread in the US capital markets.[6]

[5] See, for example, De Santis and Gerard (1997).

[6] The slope of the term structure is defined as the yield on 10-year benchmark German government bonds minus the three-month money market rate. To measure credit and equity

... by price developments in credit and stock markets ...

Declines in major equity markets may also explain the movements in risk aversion. In particular, the US stock market is a key source of negative news for German equity investors as Tarashev et al find that risk aversion indicators in the US, German and UK equity markets co-move significantly over time. We measure negative news from the US stock market by means of an interaction dummy set to unity for negative S&P 500 returns.

... or by movements in exchange rates

Changes in the exchange rate can reduce the profit flows of companies trading internationally. Many companies in the Dax index generate a substantial portion of their cash flows abroad, which is why the movement of exchange rates also influences their earnings. Depreciation of the US dollar relative to the euro, or the Deutsche mark,[7] leads to a fall in the relative competitiveness of German exports and hence may affect the risk aversion of traders by increasing uncertainty about future profits. Again, we represent negative news as an interaction dummy variable, which is set to unity for negative changes in the exchange rate.

We evaluate the effects of these five factors by means of a standard regression approach.[8] As mentioned, we analyse the first differences of the risk aversion. Thus, in our regression model we evaluate how a change in, for example, the slope of the term structure changes the risk aversion indicator. The estimation in first differences helps us mitigate any bias caused by systematic differences between the statistical and the preference-weighted PDF that are not related to risk aversion.

Empirical results

German risk aversion is indeed affected by exchange rates ...

In the simultaneous estimation with five explanatory variables, we find that three factors are significant.[9] The regression results in Table 1 demonstrate that risk aversion is strongly linked to changes in US volatility and to negative news with regard to the exchange rate. We observe a weaker linkage of risk aversion with the slope of the term structure and no relation to the downturn in the S&P 500 Index or the credit risk indicator. By means of the five variables, we achieve an explanatory value of 9% for the daily variability of risk aversion.

The signs of the three significant factors are in accordance with the argument outlined above. The significant positive sign of US volatility indicates how the transmission of US stock market developments into risk aversion takes place. Risk aversion in the German equity market rises due to higher US volatility and not because of negative returns on the S&P 500. The negative linkage with the exchange rate confirms our interpretation in the framework

market risk, we use the VIX series of implied volatility for the S&P 100 Index and the spread between the yields on BBB- and AAA-rated US industrials.

[7] We use the daily US dollar rate relative to the euro, because the trade-weighted (effective) exchange rate is only available at a monthly frequency.

[8] We use the ordinary least squares approach with White standard errors.

[9] To investigate robustness, we have repeated the regressions with the PDF difference for the probability of a fall of 20% or more in 49 days. The results remain unchanged.

Estimates of factor effects on changes in risk aversion

Sample period: December 1995–May 2002

Variable	Coefficient	t-statistic
German yield curve	–0.0204	**–1.9897**
Negative US stock return	–0.0257	–0.2470
US volatility	0.0027	**6.6364**
Depreciation in US dollar	–0.4665	**–3.2695**
Credit spread	–0.0063	–0.6492

Note: All variables enter the regression in first differences. Coefficients significant at the 5% level are highlighted in bold. Adjusted $R^2 = 0.09$.

Sources: Austrian National Bank calculations; Datastream. Table 1

of the relationship between exports and exchange rates. The importance of foreign trade for German companies implies that their earnings forecasts will deteriorate given an appreciation of the euro, or the Deutsche mark before 1999. These concerns about reduced profitability do indeed seem to raise the risk aversion measure. The slope of the German term structure has a negative effect on risk aversion in the German stock market. Our results show that a poorer outlook for the overall business climate raises the risk aversion of holders of German equities. Hence, investors react to poorer growth prospects by increasing the weight on economic outcomes where the payoffs are low.

... and especially by US stock market volatility

Overall, we observe that the primary determinant of risk aversion is the uncertainty of traders in US stock markets, as represented by the implied volatility of US stock prices. Ranking the five explanatory variables according to their explanatory power, we find that US equity volatility significantly exceeds the other four variables.[10]

Conclusion

In this special feature we have studied a daily measure of risk aversion for investors in the German stock market. We have explored linkages of the measure with developments in the US stock market, the term structure of German interest rates and the exchange rate against the US dollar. Our first finding is that risk aversion seems to have risen since summer 1998. We also record a volatility spillover from the US equity market into risk aversion in the German equity market. In this context, it must be mentioned that our estimate of US volatility is an option-implied measure. Hence, part of the linkage between German risk aversion and US volatility may reflect a linkage between risk aversions in the two countries. Our findings thus parallel the results of Tarashev et al. Despite differences in the estimation results due to the way the samples are constructed, we both document the influence of international information on movements in risk aversion.

A link between US and German risk aversion

[10] In the bivariate regression, the VIX change achieves an R^2 of 8%, whereas values for the other four variables are below 1%.

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Recent initiatives by Basel-based committees and the Financial Stability Forum

Basel Committee on Banking Supervision

The BCBS releases recommendations concerning shell banks ...

In January, the Basel Committee on Banking Supervision (BCBS) released an analysis of banks' management of global operations.[1] The paper identifies a number of structures posing problems for effective banking supervision. In particular, it notes that, to be in line with the Core Principles for Effective Banking Supervision, supervisory authorities should no longer approve the establishment of shell banks or accept their continued operation.[2] Where shell banks already exist, supervisors should set a short deadline for banks to establish a meaningful presence and management in their jurisdiction, after which time their licences should be withdrawn if they have not complied. The relocation of presence and management should be genuine and not cosmetic, and should permit the supervisor to apply the full range of supervisory tools in accordance with the Core Principles.

... issues principles for the management of operational risk ...

In February, the BCBS released a paper outlining principles for the effective management and supervision of banks' operational risk.[3] The BCBS recognises that an individual bank's particular approach to operational risk management will depend on a range of factors, including its size and sophistication and the nature and complexity of its activities. However, despite these differences, clear strategies and oversight by the board of directors and senior management, a strong operational risk culture and internal control culture, effective internal reporting and contingency planning are all crucial elements of an effective operational risk management framework for banks of any size and scope.

[1] See *Shell banks and booking offices*, BCBS, January 2003, at www.bis.org.

[2] See *Core Principles for Effective Banking Supervision*, BCBS, April 1997, at www.bis.org.

[3] See *Sound practices for the management and supervision of operational risk*, BCBS, February 2003. The paper was published for a second period of consultation in July 2002 and this is the final version.

... and analyses the results of a survey on operational risk losses

In March, the BCBS released a paper summarising the results of data collected in June as part of the 2002 Operational Risk Loss Data Collection Exercise (LDCE).[4] The 2002 LDCE asked participating banks to provide information on individual operational losses during 2001, internal capital allocation for operational risk, expected operational losses and a number of exposure indicators tied to specific business lines. The paper describes the results of the 2002 LDCE and compares the data with those compiled in previous data collection efforts. Focusing on the individual loss event data submitted by participating banks, it analyses the range of individual gross loss amounts and the distribution of these losses across a set of standardised business lines and event types. It also evaluates the information banks reported on insurance and other recoveries associated with these individual loss events. Finally, the paper briefly examines the data collected on the share of economic capital that the participating banks allocated to operational risk, as well as their use of information on expected operational losses for pricing, reserving and expensing.

Committee on Payment and Settlement Systems

The CPSS publishes a report on policy issues in retail payments

In March, the Committee on Payment and Settlement Systems (CPSS) published a report on policy issues for central banks in retail payments.[5] The report identifies current trends in the markets for consumer and lower-value commercial payments and explores related policy issues for central banks. It puts forward four public policy goals for maintaining and promoting efficiency and safety in these markets. These relate to: (i) the legal and regulatory framework; (ii) market structure and performance; (iii) standards and infrastructure; and (iv) central bank services. Furthermore, it considers the contribution central banks can make to attaining these goals and identifies a range of possible actions. Recommended minimum actions emphasise the importance of market monitoring and of a cooperative and advisory approach by central banks towards both the private and public sectors. Central bankers share the view that market mechanisms should be the primary engine for achieving and maintaining efficiency and safety in retail payments. However, they acknowledge that the market may encounter persistent impediments that prevent appropriately efficient and safe outcomes in all cases.

Committee on the Global Financial System

The CGFS releases a report on credit risk transfers ...

In January, the Committee on the Global Financial System (CGFS) released a report on credit risk transfer (CRT) mechanisms, such as financial guarantees and credit insurance.[6] The report reviews the recent development of CRT

[4] See *The 2002 loss data collection exercise for operational risk: summary of the data collected*, BCBS, March 2003, at www.bis.org.

[5] See *Policy issues for central banks in retail payments*, CPSS, March 2003, at www.bis.org. An earlier version was issued in September last year as a consultation document.

[6] See *Credit risk transfer*, CGFS, January 2003, at www.bis.org.

markets, describing the characteristics of the instruments used, the nature of the market participants and the reasons for their involvement. It also discusses some of the principal features of the markets themselves, focusing on questions of transparency and data availability, on how CRT instruments of different kinds are priced and on how far the existence of CRT markets has affected the process of price discovery. The report concludes by identifying possible implications of the evolution of CRT markets for the overall functioning of the financial system and discusses some of the concerns which have been expressed about the impact of CRT on financial stability. Such concerns relate inter alia to transparency in the disclosure of CRT activities, market concentration, the robustness of documentation, the adequacy of risk management and the potential for regulatory arbitrage.

... and another on the institutional asset management industry

In March, the CGFS published a report on trends in the institutional asset management industry.[7] The CGFS gathered information about the evolving structure of the asset management industry and possible implications of industry trends for financial markets. The information gathering effort included two rounds of interviews with more than 100 industry practitioners from 14 countries. Since asset management involves a delegation of responsibilities, appropriate incentive structures are essential for aligning the incentives of owners of funds with those of the institutional managers of these funds. In an industry that is growing strongly, structural changes are likely to affect market outcomes. The report makes a number of specific recommendations regarding risk management and disclosure, conflicts of interest, explicit and implicit barriers to market entry and regulatory trade-offs.

Financial Stability Forum

The FSF discusses vulnerabilities in financial systems ...

In March, the Financial Stability Forum (FSF) met in Berlin to discuss two broad topics: a review of potential vulnerabilities in the international financial system and progress made in addressing weaknesses in market foundations.

Members reviewed various underlying sources of economic and financial strength and weakness. An important element has been developments in corporate and household sector balance sheets and the sensitivity of those balance sheets to changes in interest rates and exchange rates. Members reviewed a number of financial factors that could be important to the economic outlook, including volatility in equity markets, various strains affecting some parts of the banking and insurance sectors, and credit risk transfer activity. Members considered the ongoing adjustment in emerging market economies and their improving access to international capital markets. They observed that most emerging market economies were pursuing generally sound macroeconomic policies and had been able to arrange financing quite well, as needed. Nevertheless, some concerns were identified that could arise if the global economy were to remain weak or if sound policies were not sustained.

[7] See *Incentive structures in institutional asset management and their implications for financial markets*, CGFS, March 2003, at www.bis.org.

The FSF reviewed the actions taken at national and international level to address weaknesses in market foundations. Encouraging progress has been achieved to date. On the whole, national reform initiatives are aimed at similar objectives across countries, and cross-border consultations have been extensive, laying the basis for stronger and internationally more coherent market foundations. But work remains to be done to implement and enforce the reforms taking shape. To sustain the momentum, actions in a number of areas were thought to be desirable, including corporate governance, auditor independence and oversight, audit practice standards and accounting standards.

... reviews progress in addressing weaknesses in market foundations ...

The FSF emphasised again the importance of progress by offshore financial centres (OFCs) in bringing their supervisory, regulatory, information sharing and cooperation practices up to international standards. The FSF welcomed the significant advances achieved in the IMF's assessment programme and reiterated its expectation that IMF-led assessments of all significant jurisdictions listed in the FSF groupings of May 2000 will be completed by the end of 2003. The FSF recognises that resource limitations can be a constraint in the implementation of standards and calls upon its members to strengthen the provision of technical assistance to promote further progress by OFCs. The FSF will assess the overall effectiveness of its OFC initiative in September 2003.

... and emphasises that OFCs should adopt international standards

Other initiatives

In February, central banks contributing to the BIS international consolidated banking statistics announced that they had agreed to collect more complete and detailed statistics on banks' country risk exposures from the end of 2004. The BIS sees these changes as helping enhance the status of its consolidated banking statistics as a key data source for monitoring and analysing international financial market developments. The improved statistics on banks' financial claims vis-à-vis foreign borrowers will feature the following additional information on an ultimate risk basis:[8] separate country breakdowns of banks' on-balance sheet cross-border claims and local claims of their foreign offices; a sectoral breakdown of total on-balance sheet claims; data on derivatives exposures by country; and separate country breakdowns of guarantees and credit commitments. The new agreement among contributing central banks has its origin in a September 2000 report of a working group set up by the CGFS on the BIS international banking statistics.[9]

The BIS announces it will collect more complete banking statistics

In March, the G10 central bank governors and heads of banking supervision met in Basel to discuss the work of the BCBS. The participants in the meeting confirmed the ongoing importance of the BCBS's work, in particular the establishment of global benchmarks for capital adequacy

The G10 banking authorities confirm plans for updating the Capital Accord

[8] That is, claims secured by a guarantee or collateral are allocated to the country of the guarantee/collateral issuer, not that of the immediate contractual counterparty.

[9] See *Report of the Working Group on the BIS International Banking Statistics*, CGFS, September 2000, at www.bis.org.

regulation. These efforts provide a critical foundation for international cooperation regarding the stability of the global banking system. The participants reaffirmed their strong support for updating the existing Capital Accord and welcomed the progress that the BCBS had made on this important project. Based on a discussion of the BCBS's work, the participants supported plans to release a third consultative package for public comment by early May, believing that this additional opportunity for comment will form the basis for a successful conclusion to the BCBS's efforts to develop, on the timetable previously announced, a Capital Accord that is more closely aligned with risks in the banking system.

The G10 Ministers and Governors release a report on CACs

In the same month, the G10 Ministers and Governors approved the public release of a report on collective action clauses. An important factor complicating the rapid and orderly resolution of sovereign debt crises is the collective action problem, whereby the incentives of individual creditors diverge from those of creditors as a whole. This problem has become more acute as bond finance has accounted for an increasing share of sovereign borrowing, leading to growing interest in mechanisms to facilitate faster and more orderly debt restructuring. In that context, the report sets out the key features of collective action clauses for sovereign bonds that the G10 Ministers and Governors believe would, if widely adopted, make the resolution of debt crises more orderly. It also contains an annex with examples of clauses that conform to the key features identified by the working group.