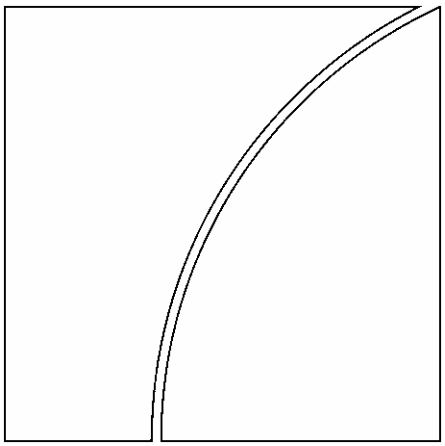
BANK FOR INTERNATIONAL SETTLEMENTS

BIS Quarterly Review

June 2004



International banking and financial market developments

BIS Quarterly Review
Monetary and Economic Department

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This publication is available on the BIS website (www.bis.org).

ISSN 1683-0121 (print)

ISSN 1683-013X (online)

Also published in French, German and Italian.

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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: the prospect of rate increases shakes markets

The prospect that US policy rates might start to rise sooner than expected triggered a broad sell-off in global financial markets in April and early May. Market participants around the world reacted unusually strongly to a few US macroeconomic releases, leading to sharp falls in government bond, emerging debt and equity markets.

While most markets fell, some were more adversely affected than others. Indeed, some markets that had previously tracked each other closely showed signs of diverging. US bond yields rose more sharply than those in other major markets, with euro yields in particular decoupling from dollar yields. Spreads on emerging market bonds widened by substantially more than those on high-yield corporate debt, owing in part to the greater influence of carry trades in the market for emerging market debt. Asian equity markets declined by more than equity markets in other regions on added concerns about a possible slowdown in the growth of the Chinese economy.

Despite the magnitude of the sell-off, market conditions remained orderly. There were few indications that the sharp movements in prices caused immediate financial difficulties for either issuers or investors, although those most exposed to higher interest rates could yet experience difficulties in the months to come.

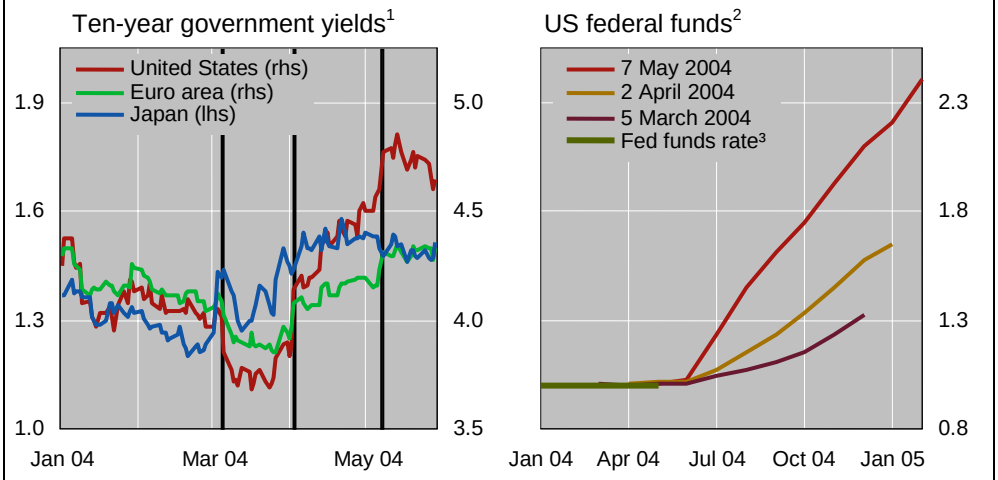
US yields price in Fed rate increases

Yields increase along with expectations for Fed tightening

Bond yields in the major economies moved up from early March to May, rising especially sharply in the United States. From mid-March to mid-May, the yield on the 10-year US Treasury note climbed by more than 100 basis points to more than 4.80%, a level not seen since mid-2002. The increase in yields was somewhat more pronounced at intermediate-term maturities, reflecting a shift in expectations for both the timing and degree of monetary tightening by the US Federal Reserve. The key data releases that moved markets were the employment statistics announced on 2 April and 7 May, each of which revealed growth of non-farm payrolls greatly in excess of market expectations and triggered daily increases in bond yields of over 20 basis points (Graph 1.1). Evidence of robust consumption in the United States also weighed on bonds, as did the US Federal Open Market Committee's statement following its

Government bond yields and US federal funds rates

In per cent



[1] Vertical lines indicate release dates of US non-farm payroll reports (5 March 2004, 2 April 2004 and 7 May 2004). [2] Thirty-day federal funds futures. [3] Federal funds target rate.

Source: Bloomberg. Graph 1.1

meeting of 4 May, which was perceived as indicating less patience with regard to raising rates. By the end of May, forward curves adjusted for term premia implied that market participants expected the Federal Reserve to start tightening in June 2004, and the policy rate to increase by over 250 basis points in the following two years.

The bond market sell-off is similar to that of 2003 …

In some respects, the recent bond market decline was similar to the sell-off in global bond markets during the summer of 2003. In particular, both episodes saw yields on long-dated Treasuries surge by more than 100 basis points in less than two months. Likewise, in both cases investor efforts to offset the increased duration of mortgage-backed securities (MBSs) by selling in other long-dated fixed income markets appear to have amplified the rise in US Treasury bond yields.

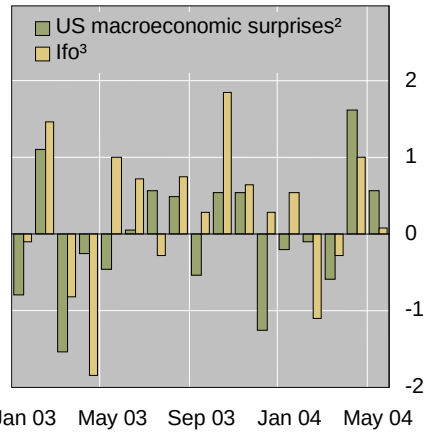
… though driven more this time by positive labour market data

Even so, there were a number of important differences. For one, the most recent move up in US yields was primarily the result of positive macroeconomic data, particularly from the labour market (Graph 1.2). Since the Federal Reserve had given clear signals that it would wait for a marked improvement in labour market conditions before raising rates, bond markets moved to incorporate expectations of Fed tightening as soon as strong data from the labour market came in. By contrast, in the summer of 2003, increases in yields had been driven more by changes in the perceived likelihood of the Federal Reserve's turning to unconventional monetary measures (such as large-scale bond buying) in response to the risk of deflation.

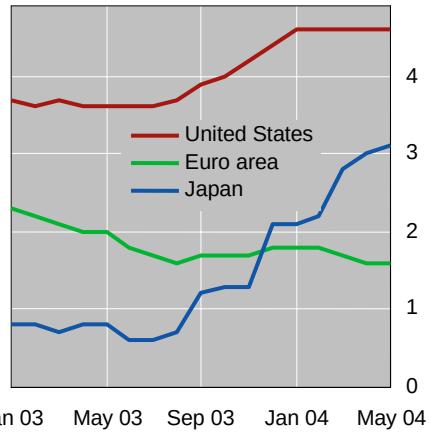
A second difference is that, in the present episode, the impact of MBS hedging seems to have been less pronounced than before. For instance, in the swap market, where the effect of convexity-related flows is greatest, spreads widened from late April by around 10 basis points, but this movement was much more limited and gradual than the spike of the previous summer (Graph 1.3). At that time, deteriorating liquidity conditions in the swap markets

Macroeconomic data and growth forecasts

Macroeconomic surprises[1]



Growth forecasts for 2004[4]



[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] Changes over previous year, in per cent. 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

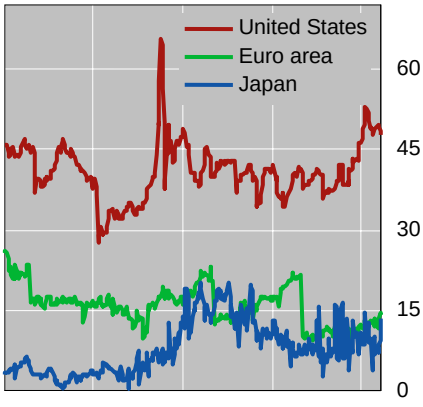
had resulted in additional direct selling pressure on MBSs and agencies, but disorderly market conditions have not been evident in the current period.

The bond market sell-off is much less pronounced in the euro area …

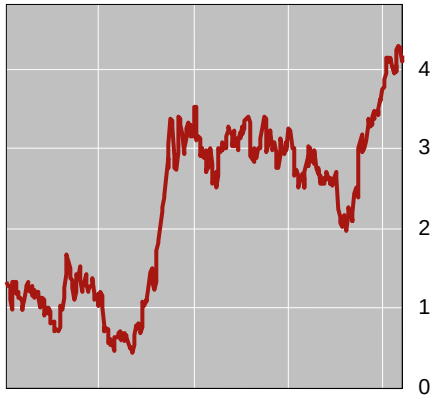
A third key difference is that the bond market sell-off was much less pronounced in mature bond markets outside the United States than it had been in the previous episode. In the euro area, bund yields rose by less than half the amount of the yield increases in the summer of the previous year (Graph 1.4). This was so despite the market's downward revision of the likelihood of ECB rate cuts following the meeting of the ECB Governing Council on 1 April. Bund

Swap and mortgage markets

Five-year swap spreads[1]



Duration of MBSs[2]

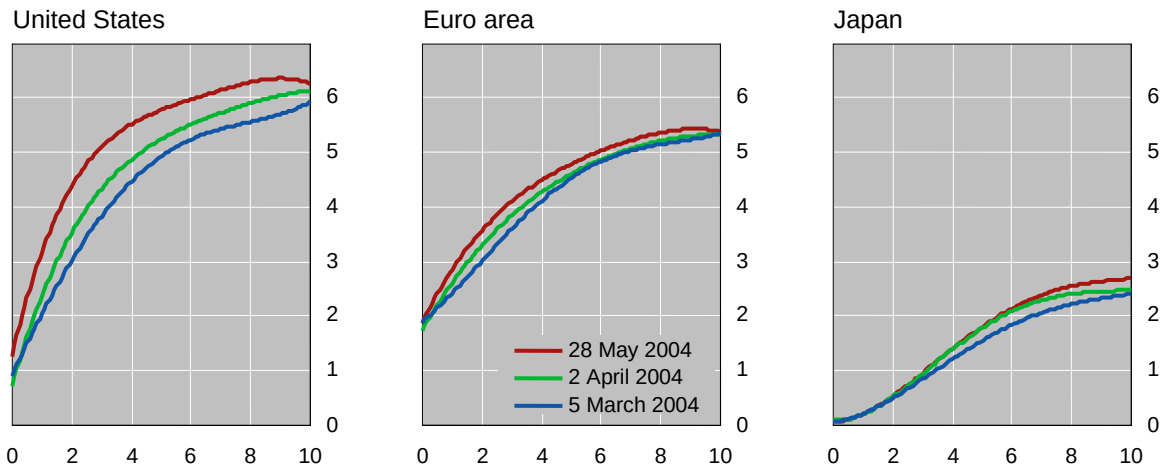


[1] Spread between five-year interest rate swaps and five-year government yields; in basis points. [2] Modified adjusted duration of Lehman Brothers MBS fixed rate index.

Sources: Bloomberg; Lehman Brothers. Graph 1.3

Forward rates[1]

In per cent



[1] Three-month forward rates, derived from Libor/swap curve.

Source: Bloomberg.

Graph 1.4

rates not only decoupled from dollar rates on a level basis, but the exceptionally high correlation in weekly changes of bund and dollar rates that had been observed in late 2003 and early 2004 diminished considerably. The decoupling probably reflected a growing consensus that macroeconomic fundamentals were not as strong in the euro area, as indicated by downward revisions to euro area growth forecasts (Graph 1.2).

… while Japanese yields are virtually unchanged at the short end

Similarly, while Japanese yields rose slightly over the period under review, the rise was much more subdued than that observed in the United States. In fact, already low correlations in weekly movements between Japanese government bond yields and dollar or bund yields declined even further. In particular, the sharp fall in Japanese equity prices from late April increased demand for Japanese government bonds among domestic investors. Worries about the prospective slowdown of growth in China, exports to which had been a major contributor to Japanese growth over the preceding year, also helped restrain bond market yields. And in contrast to both the US and European markets, Japanese yields remained anchored at the short end of the curve (Graph 1.4), probably weighed down by a number of statements from the Bank of Japan indicating that the likelihood of a near-term return to inflation (and, by extension, the end of the quantitative easing policy) remained remote.

Falling equity markets shrug off positive earnings announcements

Equity markets fall despite positive news on earnings …

Despite the fact that increases in yields on government securities were fundamentally the result of a strengthening US economy, equity markets declined across the major economies (Graph 1.5). This occurred even as earnings announcements continued to improve (Graph 1.6). For instance, although over 70% of the firms in the S&P 500 Index announced first quarter earnings that beat forecasts and the profit warnings diffusion indices continued

to rise, the S&P 500 and DJ EURO STOXX indices fell by 4% and 3% respectively from early March to late May.

... on the back of concerns over higher rates ...

The main reason for this weakness was that growing concerns about a rise in policy rates more than offset positive earnings surprises. Admittedly, market participants did not ignore earnings announcements altogether. For instance, positive announcements from eBay and Qualcomm on 21 April contributed to large gains in major US share indices. Even so, revisions of expectations of monetary policy played a dominant role. For example, for the week of 19–23 April as a whole, market indices were flat owing to Congressional testimony from Federal Reserve Board Chairman Alan Greenspan, interpreted as hinting at an increased likelihood of higher rates.

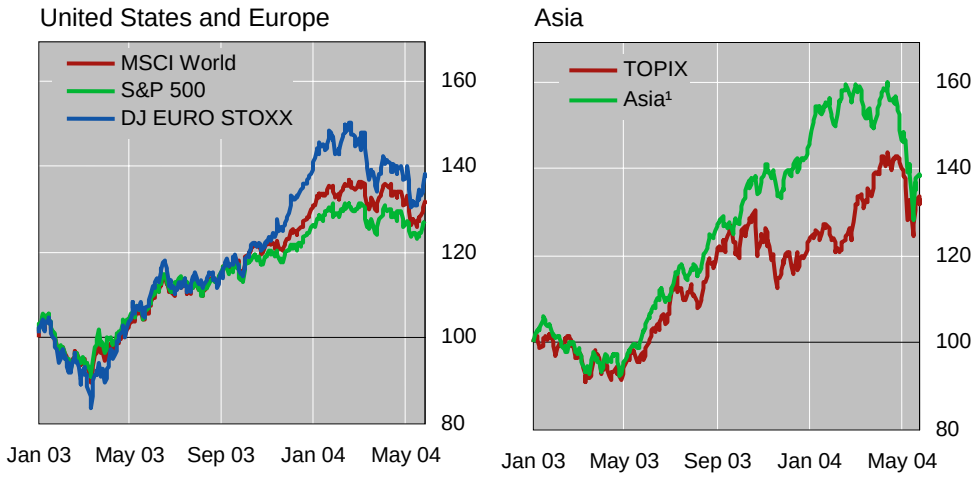
This pattern, which was repeated numerous times during the period, was especially clear at the daily frequency. For instance, major US share indices fell markedly on 13 April, notwithstanding positive earnings announcements by Merrill Lynch and Johnson & Johnson; the higher than expected retail sales report that day led markets to bring forward the anticipated path of Fed tightening. Similarly, US indices decreased sharply on the better than expected payroll report of 7 May despite the fact that confirmation of the long-delayed recovery in the labour market could conceivably boost household incomes and consumer sentiment as well as interest rates.

... and increasing risk aversion

A partial reversal of the long-lived rise in risk tolerance among equity investors also seems to have been a factor weighing on stock markets in the period under review (Graph 1.7). Growing risk aversion was particularly notable in the case of continental Europe. Here, after the marked decline in share prices and the spike in conditional volatilities following the terrorist bombings in Madrid on 11 March, the BIS measure of risk aversion for the DAX increased substantially. The US equity market-based measure also indicates heightened risk aversion starting in March.

Equity markets

End-December 2002 = 100

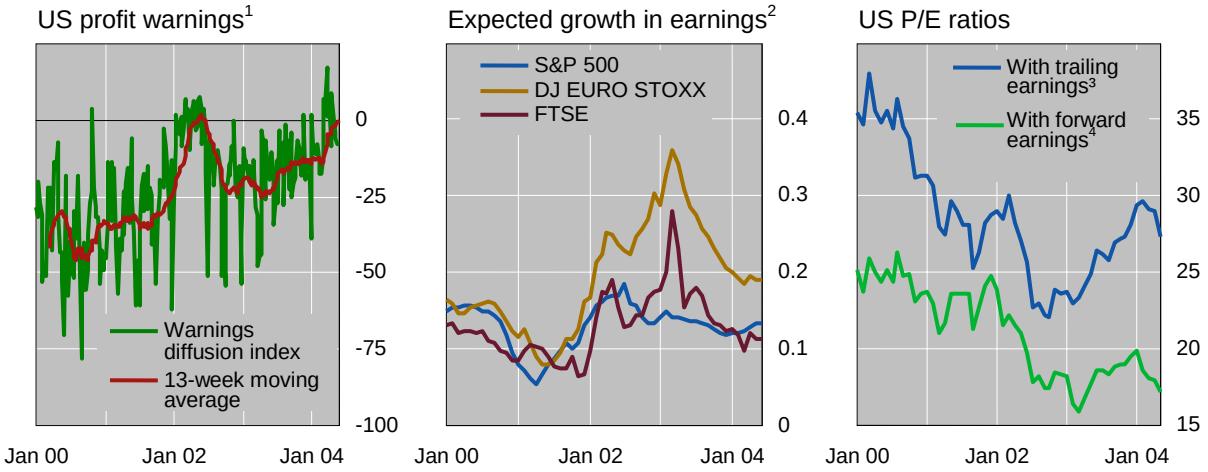


[1] Excluding Japan.

Source: Bloomberg.

Graph 1.5

Earnings and valuations



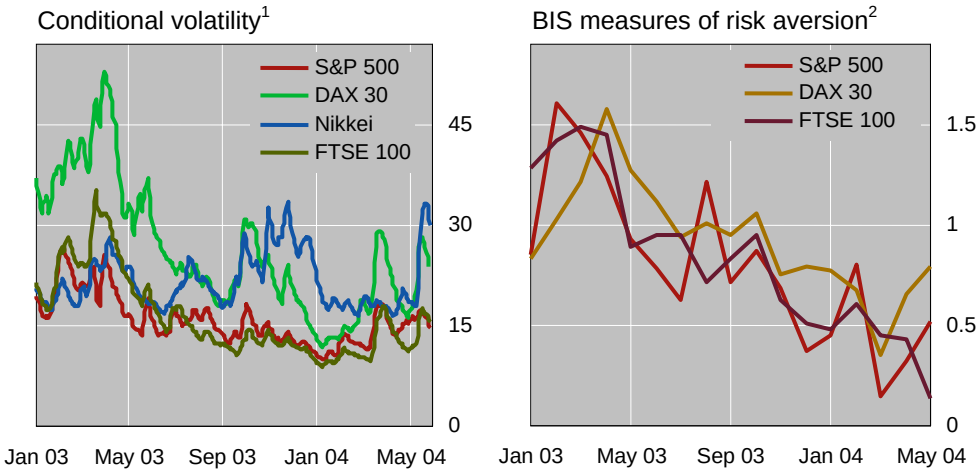
[1] Difference between positive and negative announcements by companies regarding future earnings as a percentage of all announcements. [2] Based on analysts' estimates, expressed as the log of 12-month forward earnings over 12-month trailing earnings. [3] Based on a five-year average of trailing earnings. [4] Based on a one-year average of forward earnings.

Sources: Bloomberg; Datastream; I/B/E/S; BIS calculations. Graph 1.6

From mid-April, the equity market sell-off was by far the sharpest in Japan and other Asian markets. The TOPIX and broader indices for Asia (excluding Japan) declined by 6% and 11%, respectively. The Japanese market was particularly volatile in May, with the four largest price moves in a single day since March coming in the first few weeks of May. This included a drop on the 10th that was the largest since the terrorist attacks of 11 September 2001. It appears that concerns about the potential for an economic slowdown in mainland China, a major engine of growth in the region, played a substantial role, especially given the steps announced by the Chinese government to curb

The sell-off is sharpest in Asia

Volatility and risk aversion in equity markets



[1] Conditional volatilities of daily returns from an asymmetric GARCH(1,1) model. [2] Derived from the differences between two distributions of returns, one implied by option prices with varying strike prices and one based on actual returns estimated from historical data. For more details, see the March 2004 issue of the *BIS Quarterly Review*.

Sources: Bloomberg; Chicago Mercantile Exchange; Eurex; London International Financial Futures and Options Exchange; BIS calculations. Graph 1.7

the expansion of credit. Higher oil prices were also a factor, as were increasingly mixed macroeconomic signals concerning the Japanese recovery. For instance, the announcement on 13 May of much lower than expected machinery orders contributed to a 2% decline in the Nikkei 225.

Rally in credit markets loses momentum

The prospect of an earlier than expected increase in US policy rates ended the long rally in credit markets. The downward trend in corporate and emerging market bond spreads evident since October 2002 lost momentum in early 2004 and, for emerging market borrowers, reversed direction in late April.

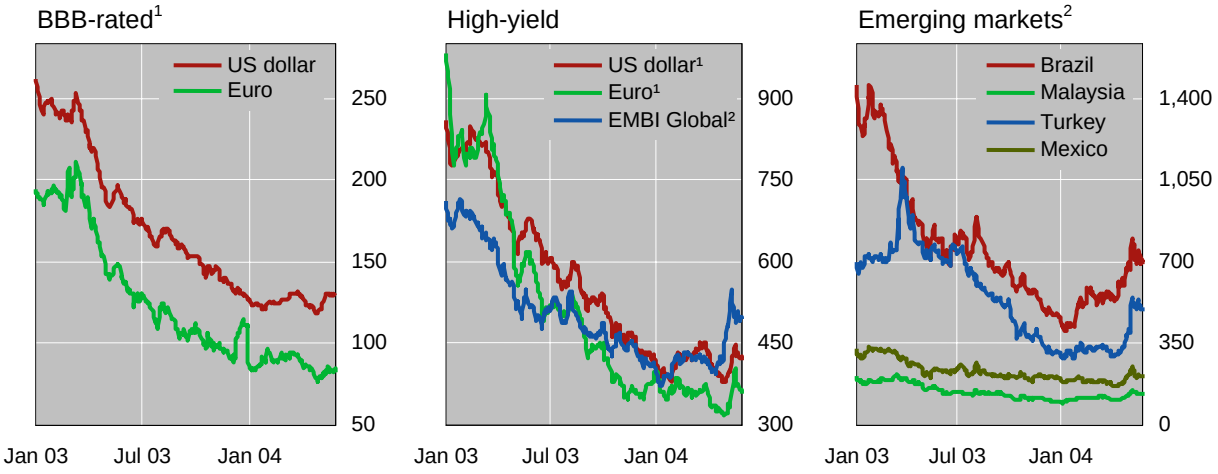
Corporate spreads trade within a narrow range

Spreads on corporate bonds traded within a relatively narrow range over the first five months of 2004, with BBB-rated credits fluctuating between 120 and 135 basis points in the dollar market (Graph 1.8). As during the sell-off in government bond markets in mid-2003, the increase in long-term yields in April and May had only a modest impact on corporate bond spreads. Indeed, through much of April investment grade and high-yield corporate spreads narrowed even as government bond yields rose and equity markets fell. It was not until late April that spreads started to widen. By end-May neither investment grade nor high-yield spreads were significantly different from their end-2003 levels. In fact, excluding the troughs reached earlier in 2004, corporate spreads were still lower than at any time since August 1998.

A decline in investors' appetite for risk, or more specifically an abatement in the search for yield, put upward pressure on credit spreads in April and May. Investors previously attracted by the high yields offered by corporate and emerging market bonds shifted out of higher-risk assets and into government

Credit spreads

Spreads over government bond yields; in basis points

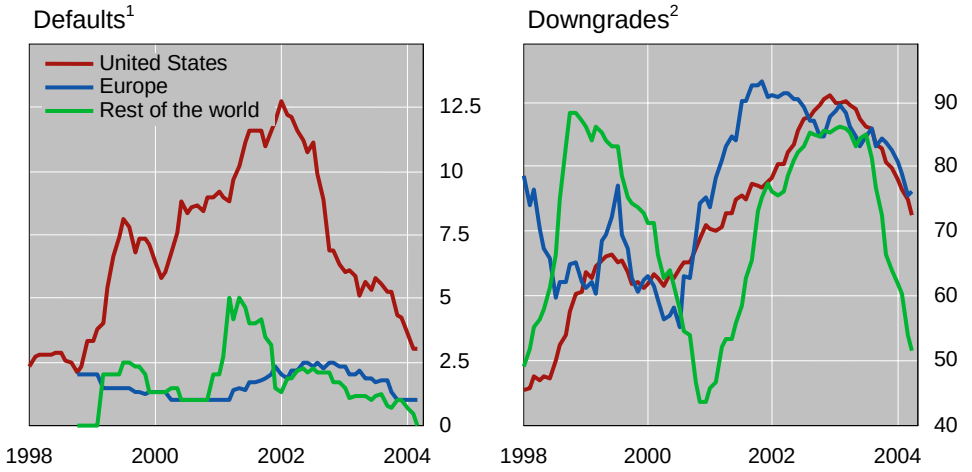


[1] Option-adjusted spreads; Merrill Lynch corporate bond indices. [2] Sovereign stripped spreads; JPMorgan Chase EMBI Global indices.

Sources: Bloomberg; JPMorgan Chase; Merrill Lynch. Graph 1.8

Corporate credit quality

Non-financial corporations; 12-month moving average



[1] Number of defaults. [2] Downgrades as a percentage of all rating actions.

Sources: Moody's; BIS calculations. Graph 1.9

bonds as yields on lower-risk securities increased. For example, US mutual funds investing in high-yield and emerging market debt registered large outflows in April and especially May.

Improvements in credit quality cap any rise in corporate spreads

At the same time, improvements in credit quality appeared to cap the rise in corporate spreads. Investors seemed confident that the growth of the US economy in particular would support a further strengthening of corporate balance sheets and compensate for any negative impact arising from higher interest rates. The robust growth of corporate earnings in the first quarter of 2004, coupled with further declines in the number of defaults and credit rating downgrades, reinforced this confidence (Graph 1.9). Past experience also reassured investors; corporate bond spreads had tended to narrow during the early phases of previous monetary tightening cycles.

The subdued level of corporate bond issuance in early 2004 provided further support for spreads. In both the United States and the euro area, total issuance by non-financial corporations was down by approximately 5% over the first four months of 2004 compared with the same period in the previous year, despite lower borrowing costs. The pickup in earnings reduced many firms' borrowing requirements, while those needing to raise capital had prefunded a large part of their needs in 2003. Some borrowers took advantage of the rebound in equity prices over the past year to raise new equity capital. In March, General Electric – one of the largest issuers in the dollar corporate bond market and one of very few corporations with a top AAA credit rating – issued new shares for the first time since 1961, raising $3.8 billion to retire outstanding debt. And in late April, an internet search company, Google, announced its intention to raise $2.7 billion in a widely anticipated initial public offering (see the box on page 9).

Google and the pricing of IPOs

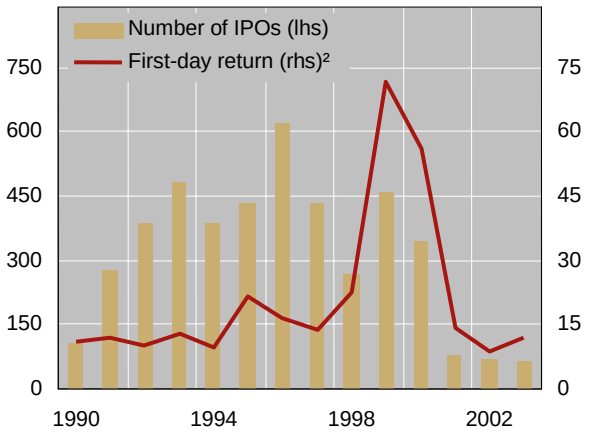
The announcement in April of plans for the initial public offering (IPO) of Google, an internet search company, aroused great interest in the financial markets. One reason for this interest is that it will be by far the highest-profile IPO since the bursting of the technology bubble in 2000 and the marked slowdown in IPO issuance that followed in the United States (see graph below). The scale of the planned issue – $2.7 billion – is also one of the largest of recent years. But perhaps most significant is Google's announced intention to price the deal through an electronic auction, for the purpose of having a "fair process ... inclusive of both small and large shareholders". As auction-based pricing is not typical for IPOs of private corporations, there has been widespread speculation that the Google IPO might trigger a fundamental change in the way large IPOs are priced.

The most common process for taking a firm public is the so-called "book-building" procedure, which has often been criticised for its tendency to underprice shares at issuance.[①] Here the lead underwriter(s) sets an offer price in consultation with the issuer after gathering expressions of interest from investors. This is how virtually all IPOs are priced in the United States, the world's biggest IPO market. The process has often resulted in offer prices that are far below the market prices on the first day of trading, in some years by as much as 70% on average (see graph). Such underpricing implies that significant sums that could have been raised for companies and early stage investors have instead been "left on the table" for recipients of the IPO allocation. In fact, the trading of commission business for IPO allocations in explicit profit-sharing arrangements has been the target of numerous legal investigations over the past few years.

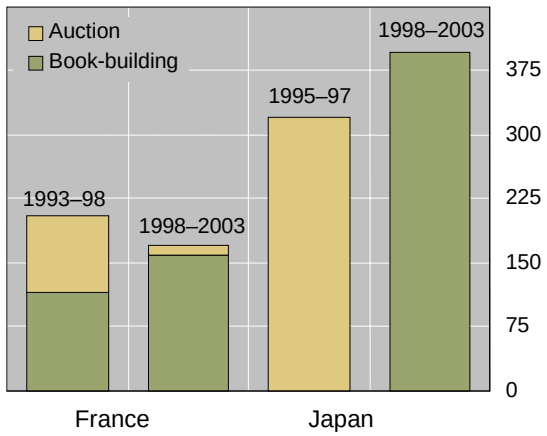
Academic models of the book-building procedure often assume widely dispersed private information about the value of companies going public. In this context, underpricing and discretionary allocation can be a means of compensating institutional investors for an accurate revelation of their private information. At the same time, auctions that are open to all interested investors, allowing them to primarily determine the offer price and allocation, provide an alternative method of distribution and price discovery that has been tried in many countries. Auctions are the main mechanism in Israel and in Taiwan, China. Furthermore, the empirical evidence appears to suggest that auctions result in significantly less underpricing than book-building.

Initial public offerings

IPO underpricing[1]



Book-building versus auction[3]



[1] Refers to IPOs in the United States, based on data in J Ritter, *Some factoids about the 2003 IPO market*, University of Florida, January 2004. [2] Equally weighted average of the change, in per cent, in the closing price on the first day of trading from the offer price. [3] Based on data in F Degeorge, F Derrien, and K Womack, "Quid pro quo in IPOs: why book-building is dominating auctions", *working paper*, March 2004; F Kerins, K Kutsuna and R Smith, "Why are IPOs underpriced? Evidence from Japan hybrid auction-method offerings", *working paper*, September 2003; Japan Securities Dealers Association.

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① Cross-country evidence indicates that the so-called fixed price method (where the price is established before information is collected about demand) has resulted in even more underpricing than book-building (see T Loughran, J Ritter and K Rydqvist, "Initial public offerings: international insights", *Pacific-Basin Finance Journal*, June 1994).

Google will utilise a Dutch (uniform price) auction to sell its shares, in which all winning bidders must pay only the minimum clearing price. The most common alternative is the discriminatory auction, in which investors with accepted bids must pay what they bid.[2] Though a discriminatory auction might appear advantageous to the issuing company, investors know that they face a "winner's curse", in which having a bid accepted is likely to mean paying more than the marginal bidder will pay. By mitigating this problem, a Dutch auction induces a more aggressive bidding strategy. In fact, both theory and the bulk of experimental evidence suggest that issuers can raise more funds for a given number of shares by a uniform price auction than a discriminatory one.

Nonetheless, the possible advantages of auctions – Dutch or otherwise – would appear to be belied by the fact that auctions are still only rarely used for IPOs in the United States, and have been losing ground in a number of other major IPO markets. For instance, in France, while auction and book-building methods were more or less evenly split in the 1990s, auctions are now in decline (see graph). In Japan, a hybrid procedure in which a first stage auction played a very significant role in determining the market price was the norm in the late 1990s, but was virtually abandoned once a book-building procedure was allowed. This suggests that factors other than the maximisation of revenue for existing owners at the time of the IPO may dominate the choice of IPO method.

[2] SEC requirements mandate that all shares of an IPO be sold at the same price, and thus prohibit discriminatory auctions for IPOs in the United States. Google has reserved the right to set the offer price below the auction clearing price, in which case everyone who bids above the offer price receives a pro rata allocation.

Sell-off in emerging markets

Emerging market spreads decouple from high-yield corporate spreads …

In contrast to the relatively modest moves in corporate bond spreads, emerging market spreads jumped sharply higher during April and May. Indeed, the sell-off of emerging market debt over this period was the heaviest since mid-2002, when political uncertainty in several important emerging markets in conjunction with a repricing of credit risk following the earnings restatement by WorldCom had caused emerging market spreads to soar. By end-May 2004, spreads on emerging market bonds were 125 basis points higher than their January lows, reversing the gains of the past year. Even so, at approximately 500 basis points, spreads were still substantially below their average level over 1998–2003.

The sell-off began on 14 April, when Brazil in particular witnessed a jump in its spreads following a large decline in US equity prices. Spreads on Brazil's sovereign dollar bonds peaked at 800 basis points on 10 May – almost twice as high as their January low – before falling back to about 700 basis points by end-May. Spreads on Turkish bonds also widened sharply, especially after the release of the US payroll report on 7 May. Even investment grade sovereigns, including Malaysia and Mexico, saw spreads on their international bonds temporarily widen.

Surprisingly, spreads on emerging market debt decoupled from those on high-yield corporate debt during the sell-off. Emerging market spreads began to widen two weeks before high-yield spreads, and by significantly more. The two had tracked each other closely during the rally in credit markets, owing in part to the influence of investors' search for yield. Their divergence during the sell-

off suggests that factors other than a waning of the search for yield played a role in the widening of emerging market spreads.

… because of emerging markets' uncertain growth prospects …

One such factor was uncertainty about the growth prospects of emerging markets. Whereas the credit quality of US and European corporations seems likely to continue improving even in an environment of rising interest rates, many emerging markets appear vulnerable to higher rates. The prospect of higher oil prices and slower growth in China has further clouded the economic outlook for some emerging markets. Countries with large fiscal deficits, such as Brazil and Turkey, appear to be particularly susceptible to any diversion of capital flows from emerging to mature markets. The large volume of issuance by emerging market borrowers in the first quarter of 2004 highlighted their need for external funding, especially when juxtaposed with the decline in corporate issuance. Many emerging market borrowers were able to raise long-dated funds on very favourable terms and so to smooth the maturity profile of their debt (see "The international debt securities market" on page 29). However, a lasting improvement in financing conditions would seem to require an acceleration in macroeconomic and structural reforms.

… and the unwinding of carry trades

The larger presence of hedge funds and other leveraged investors in the market for emerging economy debt also contributed to the divergence between emerging market and high-yield spreads. Borrowing short-term funds to invest in higher-yielding bonds had been a popular strategy among leveraged investors during the rally in credit markets. Liquidity is an important consideration in such carry trades because of the potential need to unwind positions quickly if interest rates rise or credit lines are reduced. Emerging market bonds had reportedly been a popular investment because of their greater liquidity compared to similarly rated corporate bonds. For example, the average issue size of bonds included in JPMorgan Chase's EMBI Global index exceeds $1.5 billion, compared to less than $300 million for bonds included in Merrill Lynch's US High-Yield Master index. Moreover, credit default swaps referenced against emerging market sovereigns are among the most heavily traded contracts. Consequently, when carry trades began to be unwound in response to the prospect of higher US policy rates, this had a larger impact on emerging market debt than on corporate debt.

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2. The international banking market

Following a large contraction in the third quarter of 2003, activity in the interbank market in the fourth quarter returned to levels seen earlier in the year. US dollar-denominated claims led the recovery, as banks in offshore centres, the United Kingdom and the euro area lent to one another and to banks in the United States. The rise in interbank claims was driven not so much by the usual inter-office flows, but by new lending to other banks. Loans to non-bank borrowers, which had displayed signs of life in the third quarter, stagnated in the fourth; the modest increase that did materialise largely took the form of lending from offshore centres to borrowers in the United States, as well as new loans to non-banks in other financial centres.

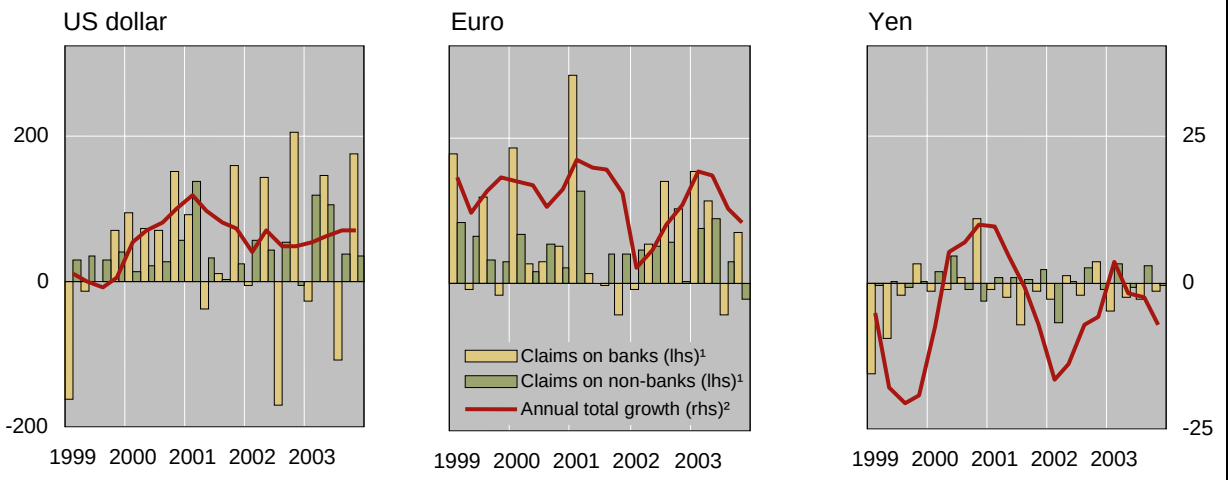
While less pronounced than in previous quarters, a discernible shift within banks' exposures to emerging markets into somewhat safer credits continued in the fourth quarter. This shift was visible in a fall in the share of claims on Latin America as well as a rise in the share of claims on the public sector in certain regions. Moreover, the average rating of the overall emerging market portfolio further improved, partially reflecting rating upgrades of several emerging market sovereign borrowers. These trends in bank flows occurred against a background of falling spreads and robust issuance of debt securities by emerging market borrowers.

In the fourth quarter of 2003, an expansion in deposits placed with BIS reporting banks outpaced one in lending, resulting in an overall net outflow from emerging market economies. Increased deposits with reporting area banks contributed to net outflows from Asia-Pacific, Latin America and the Middle East and Africa, while a rise in claims on emerging Europe led to a net inflow there.

Interbank market activity recovers

Lending between banks recovered strongly in the fourth quarter of 2003, pushing activity in the interbank market to levels seen earlier in the year. Fuelled by US dollar-denominated business (Graph 2.1), total claims of BIS reporting banks rose by $313 billion, although the year-over-year growth in claims fell for the second consecutive quarter from 9% to 8%. The tentative signs of a pickup in corporate loan demand that had been noted in the third

Cross-border claims by sector and currency



[1] Exchange rate adjusted changes in amounts outstanding, in billions of US dollars. [2] 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, in per cent.

Graph 2.1

quarter failed to solidify in the fourth, with loans to non-bank borrowers rising only modestly.

London provides the setting for the interbank recovery

Lending in the interbank market recovers in the fourth quarter ...

Having declined substantially in the third quarter, interbank activity resumed in the fourth, returning total credit to the elevated levels reached earlier in the year. Interbank claims rose by $276 billion, with lending by banks located in the United Kingdom, Belgium and offshore centres accounting for over two thirds of the increase (Table 2.1). Much of this flowed into banks in the United Kingdom, the euro area and offshore centres. Interestingly, four major national banking systems (UK, US, Japanese and German banks) largely remained on the sidelines; the global interbank claims of banks headquartered in these countries fell, some of them for a second consecutive quarter (Graph 2.2, left-hand panel).

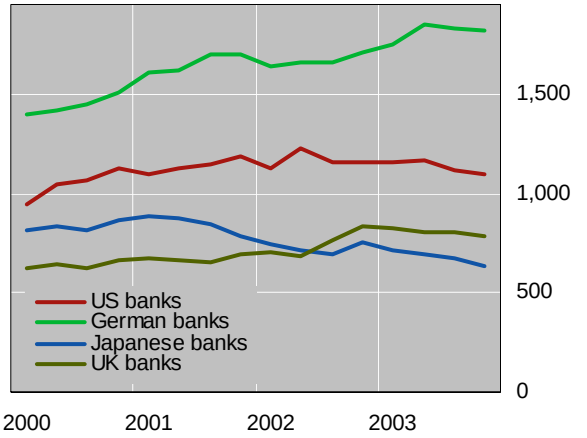
... despite a fall in inter-office activity

Despite the recovery, claims on own offices, typically the dominant component of interbank loan flows, actually decreased in the fourth quarter. Globally, Swiss and US banks cut inter-office activity the most, contributing to a $25 billion fall in inter-office claims. Excluding these claims, new business in the interbank market rose by $194 billion, driven by Swiss banks' lending out of their offices in London ($137 billion) and Belgian banks' lending out of home offices ($70 billion).

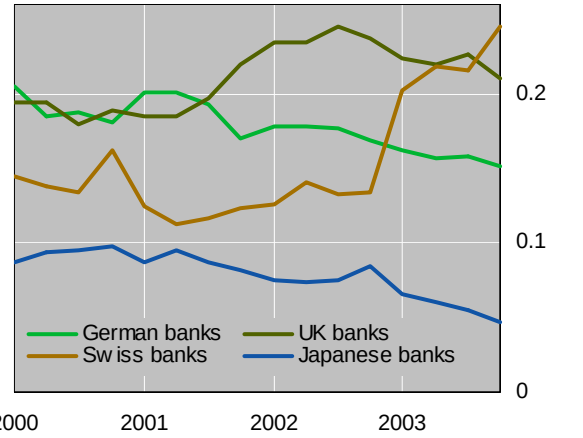
Not all banks that had reduced claims in the previous quarter returned to the interbank market in the fourth. In their global operations, Japanese, German and US banks experienced a second consecutive contraction in interbank claims. Once the largest players in London's interbank market, Japanese banks continued to reduce their international activities; four consecutive quarterly declines pushed the share of Japanese banks' interbank claims from their offices in London to 5% of all interbank claims booked in

Interbank claims by nationality of banks

Stock of international claims[1]



Share of interbank claims in UK interbank market



[1] Exchange rate adjusted outstanding amounts, base period 2003 Q4, in billions of US dollars. Graph 2.2

London, down from 8% a year earlier (Graph 2.2, right-hand panel).[1] German banks saw a second quarterly decline despite a relatively substantial rise in inter-office claims. Globally, their lending to other banks fell by $70 billion, the result of reduced interbank credit from their home offices and their offices in London. US banks lowered inter-office claims by $41 billion, but increased loans to other banks by $19 billion, virtually all of which was booked in offices in offshore centres.

Loans to private customers stagnate

A modest rise in loans to non-bank customers ...

Following a comparatively large increase in the third quarter, loans to non-bank borrowers stagnated in the fourth. Total claims on non-banks were up by $37 billion, less than two thirds of which actually took the form of new loans. However, this rather modest aggregate growth masks some relatively large underlying movements. In particular, total claims in US dollars rose by $35 billion, despite a notable contraction in claims by banks in the United States, while euro-denominated claims declined for the first time since the introduction of the euro.

Banks in the reporting area seemed to have halted their tentative advance in international lending to corporate and other non-bank private sector borrowers in the fourth quarter. A resumption of Japanese banks' investment in US Treasury and other debt securities vis-à-vis the United States accounted for a large part of the $35 billion overall increase in US dollar-denominated claims. The BIS consolidated data indicate that Japanese banks' international claims on the US public sector rose by $11 billion to $191 billion, or 47% of their total international claims on the United States.[2]

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[1] Ten years ago, Japanese banks, the largest in London at the time, accounted for no less than 26% of all interbank claims booked in London.

[2] Their claims on the EU public sector rose as well, particularly vis-à-vis Germany, Italy and the United Kingdom.

Cross-border claims of BIS reporting banks

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

	2002	2003	2002	2003				Stocks at end-Dec 2003
	Year	Year	Q4	Q1	Q2	Q3	Q4	
Total cross-border claims	742.4	1,024.6	367.2	336.3	494.6	–119.3	313.0	15,928.9
on banks	427.2	482.2	344.3	135.2	308.5	–237.2	275.7	10,255.8
on non-banks	315.2	542.4	22.9	201.1	186.0	118.0	37.3	5,673.1
Loans: banks	397.4	397.1	422.7	109.3	322.7	–274.6	239.6	8,767.3
non-banks	103.8	279.9	–5.5	156.8	14.9	83.8	24.3	3,034.8
Securities: banks	36.3	89.5	–51.8	18.5	–4.6	25.4	50.2	1,064.1
non-banks	202.2	202.6	27.9	55.4	133.0	15.2	–1.0	2,344.4
Total claims by currency								
US dollar	321.4	486.7	201.2	92.8	253.0	–68.7	209.7	6,285.9
Euro	453.3	472.7	107.7	229.6	203.3	–11.3	51.2	5,977.8
Yen	–40.3	–52.5	19.8	–12.2	–24.9	0.2	–15.6	781.2
Other currencies[2]	8.0	117.7	38.5	26.1	63.2	–39.5	67.7	2,884.0
By residency of non-bank borrower								
Advanced economies	315.1	454.7	75.0	148.6	160.0	101.8	44.3	4,449.3
Euro area	117.4	154.5	6.1	57.2	67.6	50.4	–20.7	2,007.0
Japan	4.1	37.7	0.5	21.5	15.6	6.5	–5.9	181.1
United States	153.1	180.2	59.1	25.8	60.0	40.9	53.6	1,508.4
Offshore centres	18.8	101.2	–28.2	80.9	18.9	10.2	–8.8	623.9
Emerging economies	–16.5	5.1	–23.8	–6.2	3.3	4.9	3.1	546.3
Unallocated[3]	–2.2	–18.6	–0.1	–22.2	3.8	1.1	–1.3	53.6
Memo: Local claims[4]	*44.5*	*413.7*	*36.1*	*180.6*	*88.8*	*51.7*	*92.5*	*2,339.3*

[1] Not adjusted for seasonal effects. [2] Including unallocated currencies. [3] Including claims on international organisations. [4] Foreign currency claims on residents of the country in which the reporting bank is domiciled. Table 2.1

Moreover, the BIS consolidated data indicate that portfolio shifts towards the non-bank private sector, while apparent in several euro area countries in the third quarter, remained stable vis-à-vis this sector for most banking systems in the fourth. Although US banks did raise their exposure to this sector, $16 billion of their $26 billion in new international claims flowed to such borrowers in the United Kingdom, offshore centres (primarily the Cayman Islands) and Luxembourg, suggesting that increased credit ties with non-bank financials was responsible.[3]

[3] Lending to the non-bank private sector rose to 47% of US banks' total international claims, up from 46% in the previous quarter. Another notable exception was UK banks. Increased credit to the non-bank private sector in the United States and the euro area boosted the share of UK banks' international claims on these borrowers to 46% of their total international claims, from 44% in the previous quarter.

... largely reflects non-bank financial activity

Overall, activity involving offshore and other major financial centres, either as lenders or borrowers, remained significant in the fourth quarter.[4] Banks in offshore centres accounted for a rise in lending to non-bank borrowers in the United States, extending $40.5 billion in loans, which possibly reflected the funding of affiliated securities houses and hedge fund activity. At the same time, banks in the United States reduced loans to non-bank borrowers in offshore centres by $22 billion; excluding this move, loans to these borrowers in offshore centres rose by $3.6 billion, mainly as a result of credit from banks in the United Kingdom and the euro area. Claims on non-bank customers in other major financial centres also increased. Banks in the reporting area, primarily in the euro area and the United States, directed $19 billion in new loans to non-banks in the United Kingdom. Similarly, banks in the United Kingdom and the euro area channelled $12 billion to non-banks in Luxembourg.[5]

Euro-denominated debt securities decline following the Parmalat accounting scandal

Total euro-denominated credit to non-banks fell for the first time in the BIS coverage period. The overall decrease in the fourth quarter was the result of a significant reduction in holdings of international debt securities. In a quarter in which the accounting irregularities in the Italian food conglomerate Parmalat became public, BIS reporting banks' holdings of debt securities issued by non-bank residents in Italy fell by $24 billion. Banks in the United Kingdom and France reduced holdings the most, followed by those in Germany, the Netherlands and Spain. As a consequence, euro-denominated debt security claims on the Italian non-bank sector fell to $324 billion, or 24% of all euro-denominated debt security claims on this sector (from 25% in the previous quarter and 28% a year earlier).[6] Euro-denominated loans were up by $13 billion, but were buoyed by new lending to non-banks in Luxembourg. Elsewhere, an $11 billion reduction in euro-denominated loans to non-banks in Germany was partially offset by increased credit to these borrowers in Portugal, Greece, Ireland and Sweden.

Emerging markets increase deposits

Funds flowed out of emerging economies for the second consecutive quarter, although regional differences were apparent. A relatively large rise in deposits placed with reporting area banks by residents in emerging markets outpaced

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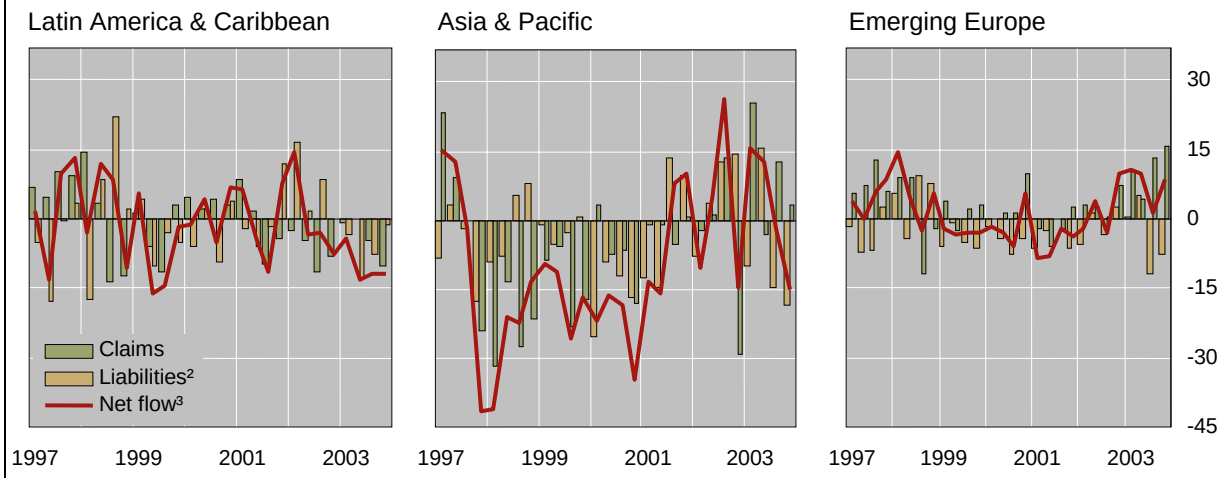
[4] The BIS consolidated data, which net out inter-office claims, indicate that total international claims on offshore centres reached $851 billion in the fourth quarter; 73% of these claims were on non-bank private sector borrowers.

[5] In addition, $42 billion in foreign currency denominated claims flowed to residents in individual reporting countries. Banks in the United Kingdom extended $26 billion in loans to non-bank residents, while banks in offshore centres channelled $7 billion to residents.

[6] Securities issued by residents of Italy and Germany accounted for 39% of all BIS reporting banks' holdings of euro-denominated debt securities. Outstanding debt security claims vis-à-vis Italy and Germany totalled $363 billion and $370 billion respectively, almost double the outstanding stock vis-à-vis France ($182 billion). Debt securities comprised 58% of all euro-denominated claims vis-à-vis Italy, but only 40% of such claims vis-à-vis Germany.

Banking 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

new credit to these borrowers, producing a net outflow of $29 billion (Graph 2.3 and Table 2.2). In Latin America, a 10th consecutive fall in claims, as well as a single large equity transfer, led to a $12 billion outflow from the region. Substantial increases in deposits by banks in Asia-Pacific and the Middle East and Africa drove net outflows. By contrast, greater lending to almost every country in emerging Europe brought about a net inflow into the area.

Claims on emerging markets stabilise

Emerging market loan portfolio moves into safer credits ...

While arguably less prominent than in previous quarters, several trends suggestive of reduced exposure of BIS reporting banks to riskier assets continued in the fourth. These developments took place against a backdrop of robust debt issuance by emerging market borrowers and falling spreads on emerging market debt. After trending downwards over the past year, the overall share of bank claims on emerging markets remained stable for the second consecutive quarter, even as these claims shifted towards regions with higher average credit ratings. Reporting banks' emerging market portfolios moved away from Latin America in relative terms for the fourth consecutive quarter and towards emerging Europe and Asia-Pacific.

... as claims shift out of Latin America ...

An improvement in the average rating of banks' emerging market portfolios, while partially the result of higher sovereign ratings, reflected reduced exposure to riskier credits (Graph 2.4, left-hand panel).[7] Claims on Latin America, which have an estimated (claim-weighted) average rating near the Standard & Poor's B rating, fell to 26.5% of total claims on emerging

[7] The sovereign debt ratings of Indonesia, Malaysia, Thailand and Turkey were upgraded by Standard & Poor's in October 2003. See the Overview in the March 2004 *BIS Quarterly Review* for discussion.

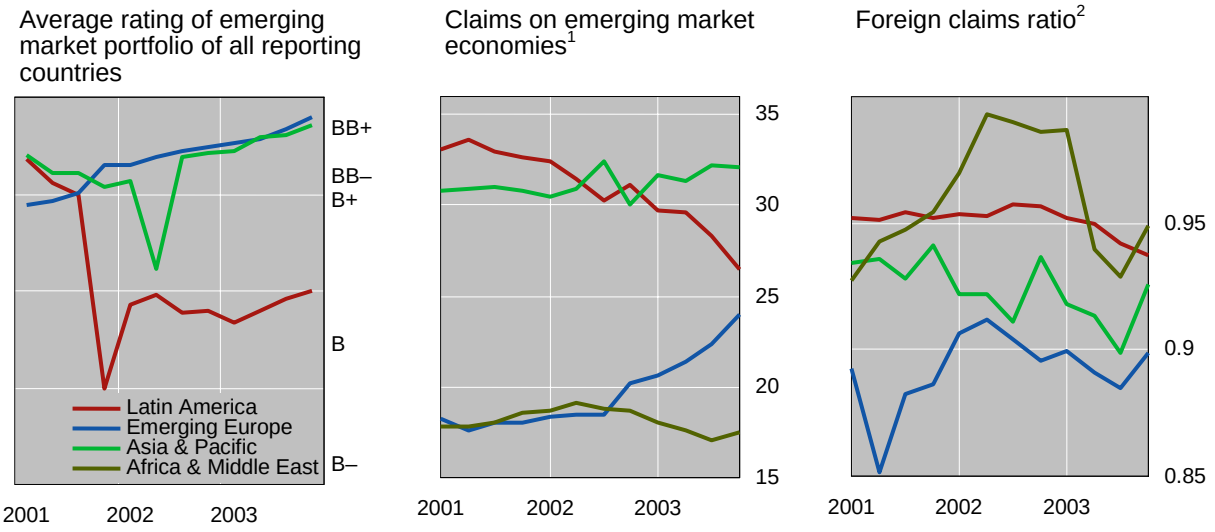
markets, from 28% in the previous quarter and 31% in late 2002 (Graph 2.4, centre panel).[8] Over this same period, the share for emerging Europe, with an average rating near the Standard & Poor's BB+ rating, rose to 24% from 22% in the previous quarter. The share for Asia-Pacific remained stable at 32%.

... and towards the public sector

Although the sectoral distribution of claims on emerging markets was, on the whole, little changed from the previous quarter, claims on several emerging market regions (Latin America and the Middle East and Africa) continued to shift towards the public sector. The BIS consolidated statistics indicate that the share of claims on the public sector in Latin America reached 21% of total international claims on the region, the third consecutive quarterly increase. The corresponding share vis-à-vis this sector in the Middle East and Africa rose to 19% from 17% in the previous quarter and 14% a year earlier.

The share of ultimate risk claims in total foreign claims, a measure of the true exposure of BIS reporting banks, increased in several emerging market regions after three consecutive quarterly declines (Graph 2.4, right-hand panel). In total claims on emerging markets, this share rose from 91% in the previous quarter to 93% in the fourth, primarily reflecting movements vis-à-vis Asia-Pacific and emerging Europe. In particular, net risk transfers out of Korea and China fell, pushing total net risk transfers out of the region down to $35 billion from $45 billion in the previous quarter.[9] In emerging Europe,

Emerging market asset portfolios of BIS reporting banks



[1] Share of total claims on emerging markets. [2] Ratio of foreign claims vis-à-vis emerging economies on an ultimate risk basis to those on an immediate borrower basis.

Graph 2.4

[8] The average rating of the emerging market portfolio is calculated as the weighted average of the Standard & Poor's sovereign ratings of all vis-à-vis countries to which banks in the reporting area lend. The weights are the share of ultimate risk claims on each vis-à-vis country in total ultimate risk claims. See the September 2003 issue of the *BIS Quarterly Review* for details of the calculation.

[9] Other borrowing countries in the region, namely India, Taiwan (China), Thailand and the Philippines, experienced similar although smaller moves.

Cross-border bank flows to emerging economies

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

	Banks' positions[1]	2002	2003	2002	2003				Stocks at end-Dec 2003
		Year	Year	Q4	Q1	Q2	Q3	Q4	
Total[2]	Claims	–36.9	64.0	–37.0	33.0	–4.2	20.2	14.9	1,006.7
	Liabilities	–45.9	71.9	–11.0	11.0	–10.3	27.7	43.5	1,225.7
Argentina	Claims	–11.8	–8.5	–2.3	–1.9	0.9	–5.4	–2.1	23.4
	Liabilities	0.0	–0.9	0.2	0.5	0.1	–2.2	0.7	24.9
Brazil	Claims	–11.2	–7.2	–6.3	2.2	–1.7	1.4	–9.1	83.1
	Liabilities	–8.0	14.4	–4.3	3.3	6.6	7.9	–3.4	57.1
China	Claims	–12.4	13.5	–10.2	16.0	–6.4	4.9	–1.0	61.1
	Liabilities	–3.6	–6.4	–1.9	1.4	–11.3	1.8	1.8	89.4
Czech Rep	Claims	2.3	3.7	0.3	0.7	0.5	0.8	1.7	19.4
	Liabilities	–3.7	–2.4	–2.7	–1.8	0.1	0.2	–0.9	10.1
Indonesia	Claims	–6.0	–4.7	–1.2	–1.1	–1.0	–1.9	–0.8	29.0
	Liabilities	–2.4	0.2	–0.5	0.4	–0.1	–0.5	0.3	12.5
Korea	Claims	8.2	–1.1	–6.4	2.3	–2.0	–1.8	0.3	76.5
	Liabilities	0.5	7.3	–4.8	–0.8	–6.1	1.6	12.6	40.0
Mexico	Claims	3.1	–0.8	0.0	–0.5	–0.1	0.8	–0.9	65.4
	Liabilities	–11.4	6.2	1.7	4.5	2.2	–0.3	–0.1	62.2
Poland	Claims	2.9	3.3	–0.4	0.9	0.9	1.0	0.4	33.2
	Liabilities	–3.1	–0.1	–2.5	0.8	–1.1	–1.0	1.2	18.7
Russia	Claims	3.6	12.1	2.4	1.8	1.7	2.8	5.8	49.1
	Liabilities	9.6	16.2	2.0	5.6	–4.4	7.2	7.8	57.7
South Africa	Claims	–0.4	–1.2	1.5	–0.4	0.8	–0.9	–0.7	18.5
	Liabilities	2.7	9.7	1.4	0.6	4.8	1.4	2.8	32.1
Thailand	Claims	–5.0	–1.6	–1.8	–0.3	0.3	0.0	–1.6	18.8
	Liabilities	–4.6	5.7	–1.2	2.5	–0.9	0.9	3.2	17.8
Turkey	Claims	–2.8	5.3	–0.1	2.4	–0.5	3.4	0.1	44.4
	Liabilities	0.0	–0.4	0.5	–3.9	1.5	1.0	0.9	20.5
Memo:									
EU accession countries[3]	*Claims*	*10.1*	*21.8*	*3.3*	*5.7*	*1.4*	*5.7*	*9.1*	*126.8*
	Liabilities	*–6.4*	*–0.8*	*–5.4*	*–2.1*	*–1.2*	*2.0*	*0.5*	*66.9*
OPEC members	*Claims*	*–9.8*	*–6.7*	*–8.2*	*–0.3*	*–6.4*	*–1.9*	*1.9*	*130.1*
	Liabilities	*–8.8*	*–15.1*	*1.5*	*–5.2*	*–11.8*	*–10.2*	*12.2*	*251.4*

[1] External on-balance sheet positions of banks in the BIS reporting area. Liabilities mainly comprise deposits. An increase in claims represents an inflow to 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] Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

Table 2.2

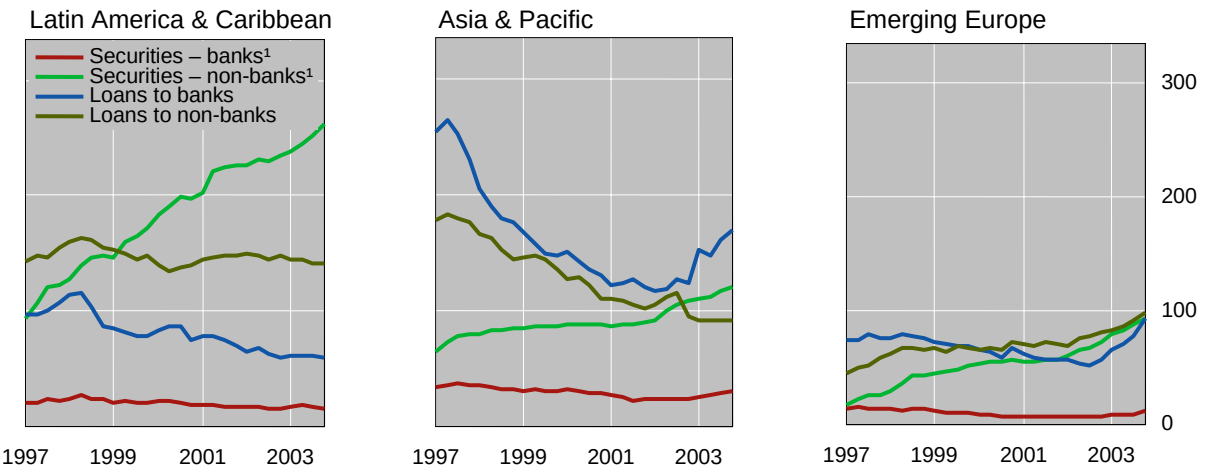
increased local currency lending to the Czech Republic contributed to a rise in the ratio for the region as a whole; the share of ultimate risk to immediate borrower claims grew to 90% after falling to 88.5% over the previous two quarters.

Emerging market borrowers increasingly turn to bond financing over loans

Overall, emerging market borrowers have increasingly turned to bond financing in preference to bank loans. Their robust issuance of debt securities, and the compression in spreads on this type of debt, in the course of the last

International credit to emerging economies

Amounts outstanding, in billions of US dollars



[1] Long-term bonds, notes and short-term money market instruments issued in international markets.

Sources: Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; BIS. Graph 2.5

year suggest that international bond investors were rather sanguine about emerging market risk throughout 2003. As shown in Graph 2.5, which combines the BIS international banking data with data on outstanding debt securities, emerging market borrowers, particularly non-banks, have increasingly turned to debt issuance over loans. This is particularly true in Latin America and Asia-Pacific, regions at opposite ends of the rating spectrum. The outstanding stock of loans to non-bank borrowers in Latin America has fallen to 35% of total international credit to non-banks in the region, from 39% at end-2002 and 56% at end-1997. A similar shift has been evident in Asia-Pacific (see box on page 23).

Net outflow from Latin America for the seventh quarter in a row

Outflow from Latin America reflects reduced loans ...

Reduced lending to all sectors in Latin America led to the seventh consecutive quarterly outflow of funds from the region. The fourth quarter saw a $12 billion outflow, although this was largely the result of a single bilateral move vis-à-vis banks in Brazil. Excluding this, net claims fell by $6 billion. A relatively steep drop in claims on the region (the 10th consecutive quarterly decline) pushed the year-over-year rate of contraction in claims to 6% from 5% in the previous quarter. At the same time, liabilities to Latin America remained stable overall, although deposit repatriations by residents of Brazil were noteworthy.

... and reduced equity claims on banks in Brazil

Movements vis-à-vis Brazil accounted for almost half of the large net outflow from the region as a whole. However, unlike in the previous two quarters, when significant increases in deposits placed with BIS reporting banks were the primary factor, the most recent outflow was the outcome of a sizeable equity transfer. A bank in Spain transferred its equity holdings in a bank in Brazil to a non-bank holding company (and thus out of the BIS reporting population). Consequently, total claims of banks in Spain on the Brazilian banking sector fell by $7.2 billion to $410 million. Excluding this move, the net flow of funds into Brazil, while modest, was positive for the first time in

six quarters, as deposit repatriations more than offset reduced loans to the country. Non-bank borrowers in Brazil repatriated $2.5 billion in deposits, primarily from banks in the United States and offshore centres, while banks in the reporting area decreased loans to Brazil's banking sector by $2.3.

A decline in lending to Argentine borrowers also contributed to the net outflow from the region. Loans to non-bank borrowers in Argentina were down for the eighth consecutive quarter, giving rise to a net outflow of $3 billion. While the outstanding stock of loans from banks in the United States contracted the most, that from banks in the euro area also shrank, probably in part the result of the continued write-off of loans to Argentine borrowers. Total claims on Argentina fell to $23 billion, or slightly less than 9% of total claims on the region from 11% a year earlier.

Increased deposits by banks in Korea drive net outflow from Asia-Pacific

Growth in deposits placed with reporting area banks greatly outpaced new lending to Asia-Pacific, yielding the largest net outflow from the region since the second quarter of 2001. Following a substantial rise in deposits by Indian residents in the previous quarter, an even larger one by Korean residents in the fourth drove a net $15 billion in funds from the region. The growth in deposits placed abroad was partially offset by new lending to the region. Increases in loans to borrowers in Taiwan (China)[10] and India offset decreased lending to those in Thailand, Pakistan and China, and pushed total claims on the region to $323 billion.

Banks in Korea deposit funds abroad ...

Korea remains the BIS reporting banks' largest net debtor in Asia-Pacific. Yet, a second consecutive quarter of net outflows seems to have capped the rise in the stock of net claims that started in the second quarter of 2002 (Graph 2.6, left-hand panel). The increase in deposits in the fourth quarter of 2003 may have in part reflected Korea's ongoing accumulation of foreign exchange reserves, as well as surplus liquidity of commercial banks.[11] In the fourth quarter, banks in Korea parked $11 billion in funds as bank deposits in offshore centres and the United Kingdom.

... as do banks in Thailand

Movements vis-à-vis other countries also contributed to the net outflow from the region. As in Korea, banks in Thailand placed surplus funds abroad in a quarter in which foreign exchange reserves continued to grow. They deposited $3 billion (primarily in US dollars, but also in euros) with banks in the United Kingdom, offshore centres and, to a lesser extent, Switzerland and Spain. This pushed total liabilities vis-à-vis Thailand to $17.8 billion, or 5% of total liabilities vis-à-vis the region (from 4% in the previous quarter).

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[10] Hereafter Taiwan.

[11] Foreign exchange reserves rose to $154.5 billion in the fourth quarter of 2003, from $140.8 billion in the third and $130.9 billion in the second. The annual percentage change in total domestic credit in Korea decreased to 9.3% in the fourth quarter of 2003, from 12.4% in the third and 15.8% in the second.

Cross-border holdings of Asian bonds: banks and all investors

Robert N McCauley and Patrick McGuire

While there is broad agreement among policymakers in East Asia that further financial integration in the region would be desirable, no such consensus has emerged regarding the proper understanding of the current extent of such integration. Market-based analysts highlight the importance of the "Asian bid" – that is, a disproportionate representation of regional buyers – in the primary and secondary market for dollar bonds issued by East Asian governments, banks and firms.[1] This view has been challenged, however, by reference to official Japanese data on holdings of bonds by Japanese residents, which suggest low and declining holdings of the obligations of Asian issuers.

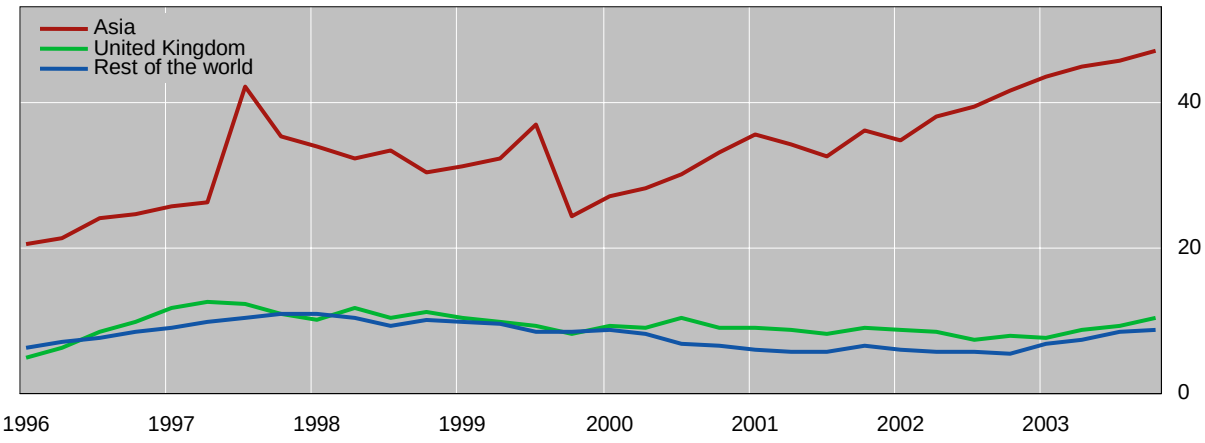
This box consults two sources of evidence to shed light on the extent of the regional bias in holdings of international bonds issued by East Asian borrowers. First, the BIS international banking data report banks' cross-border claims that take the form of bonds, providing country detail and a time series perspective. Banks are natural buyers of bonds, especially those of relatively short maturity or bearing floating interest rates, but represent just one investor segment. Second, the IMF portfolio survey of security holdings provides broader coverage of the investor base, capturing institutional investors as well as banks, but only a snapshot at end-2002. The IMF data are in principle universal, while the BIS reporting area does not include all the important Asian economies.

BIS international banking data

Even as a means to profile a single segment of investor demand, the BIS data are limited by the reporting area, which does not include some important economies in East Asia. In particular, while Hong Kong SAR, Japan and Singapore are long-time reporters, Australia and Taiwan have joined only recently. Yet to participate are China, Korea, Malaysia and Thailand. Thus, Asian holdings of Asian bonds as measured by the BIS data will be smaller than the actual amount insofar as banks in these latter countries hold bonds issued by their neighbours. The data include both international bonds and domestic securities held offshore, for instance a Hong Kong bank's holdings of a Korean treasury bond (which are, judging by Korean flow of funds data, very small).[2]

Estimated holdings of Asian bonds by BIS area banks

In billions of US dollars



[1] See F Schmidt, *Asia's credit market: from high-yield to high-grade*, Singapore: Wiley Asia, Chapter 2, 2004.
[2] The data also include some holdings of short-term paper, such as certificates of deposit, that are not relevant to the question under discussion.

Cross-border investment in bonds, end-2002

In millions of US dollars

Invested in:	Investment from:									Total from Asia	Total in Asia	Asia share[1]
	HK	ID	JP	KR	MO	MY	PH	SG	TH			
China	1,232	...	578	38	15	...	2	416	–	2,281	3,430	67
Hong Kong SAR	...	57	1,137	455	521	40	58	1,653	20	3,941	7,208	55
India	...	...	159	47	8	1	...	241	–	456	788	58
Indonesia	...	...	49	78	...	1	4	869	–	1,001	2,462	41
Japan	5,351	...	–	29	21	...	5	3,828	–	9,234	159,937	6
Korea	4,202	...	5,348	...	23	51	15	2,586	–	12,225	25,015	49
Macao SAR	...	...	–	...	...	...	...	...	–	0	1	0
Malaysia	2,085	3	1,823	332	3	...	9	1,830	–	6,085	8,844	69
Philippines	...	5	1,389	81	...	4	...	595	–	2,074	7,805	27
Singapore	1,842	23	680	144	31	41	23	...	–	2,784	6,451	43
Taiwan, China	674	...	46	...	13	...	7	333	–	1,073	1,372	78
Thailand	447	...	550	24	...	1	...	542	–	1,564	1,895	83
Total in Asia	15,833	88	11,759	1,228	635	139	123	12,893	20	42,718	225,208	19
Total investment	123,528	703	1,135,519	9,608	2,637	471	1,553	52,830	1,344	1,328,193	7,733,214	17
Asia share[1]	12.8	12.5	1.0	12.8	24.1	29.5	7.9	24.4	1.5	3.2	2.9	.
Share of inv in Asia[1]	7.0	0.0	5.2	0.5	0.3	0.1	0.1	5.7	0.0	19.0	.	.
Share of inv in Asia excl JP[1]	16.1	0.1	18.0	1.8	0.9	0.2	0.2	13.9	0.0	51.3	.	.

[1] In per cent.

Source: IMF.

The BIS banking data do suggest a regional bias in holdings of Asian bonds by Asian banks. This conclusion emerges from two findings. First, as of the fourth quarter of 2003 BIS area banks held an estimated $66 billion in bonds issued by borrowers from Asia excluding Japan.[3] In terms of country composition, the largest holdings are vis-à-vis Singapore and Korea (as suggested by the BIS data on international bonds issued by Asia excluding Japan). Second, an estimated two thirds of these bonds are held in Asia, including Hong Kong, Japan, Singapore and Taiwan (see the graph on the previous page). About half the rest are held by banks in the United Kingdom.[4] Holdings of Asian bonds by reporting banks in Asia were squeezed by the combination of regional banks' loss of access to international interbank markets during the period of the Japan premium and the Asian crisis, but have risen since mid-1999.

[3] Asia excluding Japan includes Hong Kong SAR, Macao SAR and Singapore, countries typically classified as offshore centres in the BIS international banking data. [4] The country composition of the international bond holdings reported by banks in Hong Kong is estimated using the country composition of loans, and bond holdings are estimated for Japan and Singapore from country by country data on non-loan claims.

IMF portfolio survey

The IMF survey of cross-border portfolio holdings of bonds provides a matrix of holdings for East Asia and allows these holdings to be put into a global context. It shows holdings of long-term debt securities at the end of 2002 and includes both foreign currency and local currency bonds. These data need to be interpreted with some care because the decomposition by country is often not complete.

The data indicate an uneven but in aggregate a high degree of regional bias in bond holdings across Asia excluding Japan. Asia excluding Japan holds over half (51.3%) the bonds issued by borrowers in that area (last row of the table). In the first column of the table, for instance, investors in Hong Kong put 12.8% of their international bond portfolio into Asian bonds, and, given the size of their aggregate portfolio, they account for a high share (7%) of international holdings of such bonds. Excluding Japanese bonds, Hong Kong holds 16% of global holdings of Asian bonds. Singapore puts a higher fraction of its overall international bond portfolio in Asian bonds, but, given its portfolio size, accounts for a smaller share (13.9%) of global holdings of Asia excluding Japan's bonds. These portfolio data support the hypothesis of a regional bias.

It turns out that the largest foreign investor in the region, Japan, does not show an Asian bias. While Japan's holdings of Asian bonds amount to more than Hong Kong's or Singapore's holdings (last row of the table), they are very small from the Japanese perspective. Of the grand total of $7.7 trillion in cross-border bond investment captured by the survey, Asian bonds amount to about $225 billion (about 3%), of which Japanese bonds account for around two thirds ($160 billion). Global holdings of bonds from Asia excluding Japan thus amount to approximately 1% of holdings. Japan's holdings of bonds from Asia excluding Japan are also around 1%, which is about par. Despite the scale of the Japanese portfolio and proximity, therefore, Japan has no disproportionate holdings of Asian bonds. In contrast, with double digit percentage weights on Asian bonds, investors in Hong Kong, Indonesia, Korea, Macao (where the currency board vis-à-vis the Hong Kong dollar must play a role), Malaysia and Singapore do favour regional bonds. Given the scale of holdings, the regional bias derives mostly from the behaviour of portfolio managers in Hong Kong and Singapore. The result of a neutral Japanese weight, on the one hand, and regional bias elsewhere in the region, on the other hand, are the high fractions of internationally held bonds of Asia excluding Japan to be found in Asia (last column of the table).

It can still be asked: who are the beneficial owners of the bonds held in the financial centres of Hong Kong and Singapore? To the extent that they are held at branches of banks headquartered outside the region, one could question whether there really is a regional bias. Whether institutional investors like insurance companies and pension funds would hold bonds in these centres to fund liabilities to retirees and policyholders outside the region is another issue.

Based on the data reviewed, it can be said that a disproportionate share of cross-border holdings of bonds issued by East Asian borrowers are held in bank and institutional portfolios located in East Asia. Whether the ultimate beneficial ownership of these securities, in some sense, is likewise concentrated in Asia remains an open question.

A similar expansion of deposits by non-bank residents in China, coupled with a contraction in lending to these borrowers from banks abroad, was behind the $3 billion net outflow from the country. Non-banks in China withdrew a total of $0.9 billion in US dollar deposits from banks in the United Kingdom, and at the same time increased local currency deposits in banks in Hong Kong SAR by $3 billion.

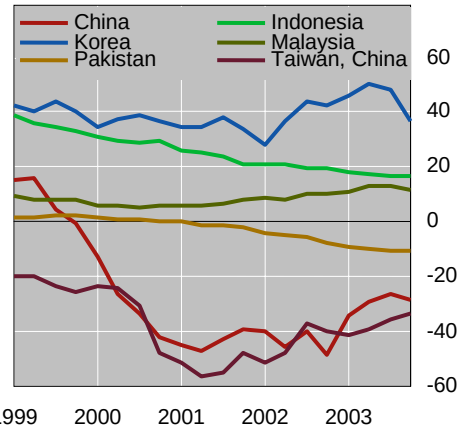
Banks in China shift deposits placed abroad out of US dollars

While the deposits of banks in China placed abroad were little changed from the third quarter, a significant shift in the currency composition of these deposits was evident (Graph 2.6, right-hand panel). The Chinese banking system as a whole transferred roughly 7% of its total US dollar deposits into other (primarily Asian) currencies during a quarter in which the US dollar depreciated against both the yen and other major currencies. Banks in China

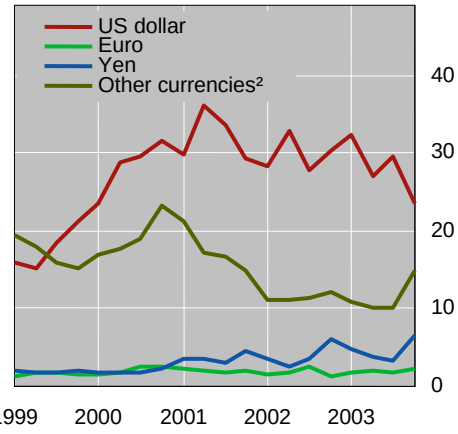
Positions of BIS reporting banks vis-à-vis Asia-Pacific

In billions of US dollars

Net stock of claims by country[1]



Deposit liabilities vis-à-vis China by currency



[1] Claims minus liabilities. [2] Domestic currency deposit liabilities of offshore centres. Graph 2.6

repatriated $5 billion in US dollar deposits from banks in the United States, and an additional $2.6 billion from banks in offshore centres. At the same time, their yen-denominated deposits in banks in Japan and local currency deposits in banks in Hong Kong grew by similar amounts.

Increase in claims on emerging Europe sets second consecutive record

A record increase in claims on emerging Europe ...

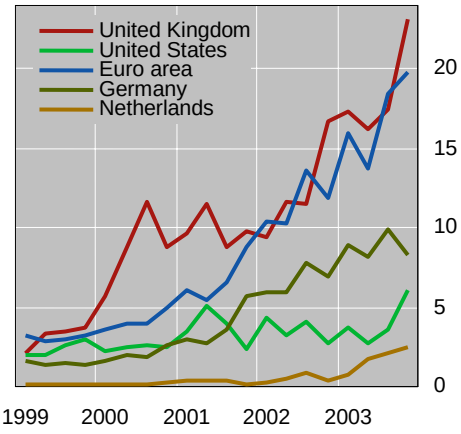
As in the previous quarter, increased claims overshadowed a rise in deposits placed abroad to produce a fifth consecutive net inflow into emerging Europe in the fourth quarter of 2003. Moreover, the growth in claims on the region as a whole, at $16 billion, was the largest in the BIS coverage period, surpassing the previous record in the third quarter ($13 billion). As a result, claims on emerging Europe rose to 24% of total claims on emerging markets, up from 22% in the previous quarter and 20% a year earlier. Nine billion dollars of the overall expansion in claims on the region flowed to the EU accession countries, particularly to banks in Hungary, the Czech Republic, Malta and Slovakia. New lending to banks in Russia made up much of the difference. Liabilities vis-à-vis the region were also up, by $7.4 billion, following an even larger rise in the previous quarter. Again, this reflected increased deposits by banks in Russia with BIS reporting banks.

Unlike in the previous quarter, when investment in government securities was an important factor, the expansion in claims on the region in the fourth quarter was mainly the outcome of new lending to banks. Total claims on this sector rose by $13 billion, as banks in the reporting area, primarily in Austria, the United Kingdom, Germany and Luxembourg, extended a combined $9.4 billion in new loans to banks in the region, mainly those in Russia, Malta, the Czech Republic and Poland. Banks in Austria also channelled an additional $1 billion to this sector through purchases of debt securities issued by banks in Hungary, Russia and elsewhere.

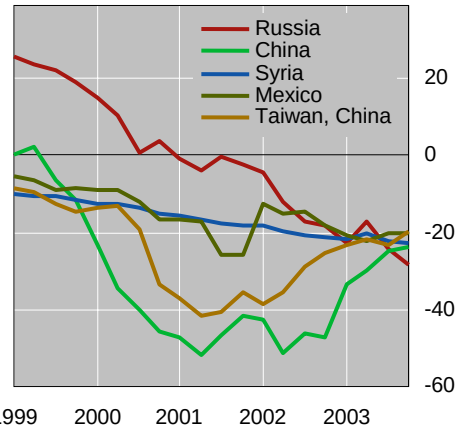
Cross-border positions vis-à-vis emerging economies

In billions of US dollars

Deposit liabilities to banks in Russia



Net claims vis-à-vis banks in selected countries[1]



[1] Claims minus liabilities.

Graph 2.7

... and deposits placed abroad by Russian banks drive net inflow

Banks in Russia deposited substantial sums abroad for the second consecutive quarter, concurrent with an increase in foreign exchange reserves held by the Russian central bank (Graph 2.7).[12] As a result, total liabilities vis-à-vis all sectors in Russia stood at $57.7 billion, making Russia the fourth largest gross creditor to the international banking system among emerging markets (behind China, Taiwan and Mexico). On a net basis, the expansion in deposits by Russia's banking sector in the second half of 2003, combined with the repatriation of deposits over the past year by banks in China, has made the Russian banking system the largest contributor of funds among banking systems in emerging markets; Russia's banking sector provides a net $28 billion to BIS reporting banks, compared with China's $24 billion and Syria's $23 billion.[13] In the most recent move, banks in Russia increased US dollar deposits in the United Kingdom and the United States by $4.5 billion and $2.7 billion respectively, and euro-denominated deposits in France by $2 billion.

[12] After a slight decline in the third quarter of 2003, foreign exchange reserves held by the Central Bank of the Russian Federation (which include reserves held by the Russian finance ministry) rose from $58.3 billion to $73.2 billion in the fourth quarter.

[13] Across all sectors, residents of Russia provide a net $8.5 billion to BIS reporting banks.

International syndicated credits in the first quarter of 2004

Blaise Gadanecz and Jesper Wormstrup

Activity in the international syndicated loan market in the first (and traditionally weak) quarter continued to be driven by the energy sector. Signings totalled $244 billion, which on a seasonally adjusted basis constitutes an unchanged volume compared with the previous quarter.

US borrowers generated business in line with their historical average. Their signings came to $132 billion, or 54% of global international activity. Companies from the energy and electricity sectors continued to be most active, closing deals totalling $23 billion. Exxon Mobil Corp signed a $5.4 billion revolving credit line, the largest individual deal in the first quarter. Over recent quarters, there has been a decline in the average spreads on loans priced off the US prime rate granted to US borrowers, together with a lengthening of average loan maturities. These developments are consistent with recent evidence that banks were easing lending standards in the first quarter on US commercial and industrial loans.[①]

Lending to western European entities increased modestly from a year ago. Deals worth $69 billion were arranged, with refinancings accounting for 47%, a low percentage by historical standards. Lending for M&A purposes represented 23% of the total, in line with past trends.[②] Retailers and water purification companies, together with the hotel industry, received the most significant amounts.

Borrowing by emerging market entities was exceptionally strong, with signings reaching their highest level in any first quarter since 1997. In a total of $21 billion, Asian borrowers secured the largest amount ($8.6 billion), boosted by substantial deals in the electronics and telecommunications industries in both China and Taiwan. A project finance deal, worth $1 billion, to fund the construction of an oil pipeline between Azerbaijan and Turkey by an international consortium was the first signing by an entity registered in Azerbaijan in five years.

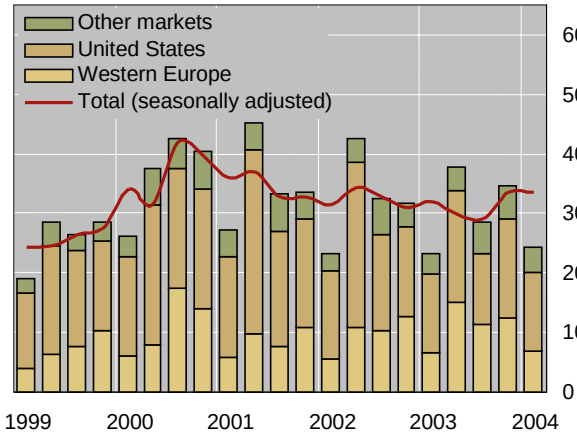
In anticipation of EU membership, entities from accession countries drove borrowing in emerging Europe to the highest level of any first quarter. Large amounts were secured by Polish oil companies and the Hungarian government, which arranged a sovereign standby facility of €500 million for debt and liquidity management purposes. In the past few years, commercial banks, telecommunications firms and oil and energy companies have typically taken on the lion's share of international syndicated lending to accession countries.

Borrowing by Mexican and Chilean energy and transportation companies accounted for a major part of Latin American activity. Business in the Africa and Middle East region was relatively strong, with signings worth a total of $5.3 billion. The National Iranian Oil Company arranged a facility of $1.7 billion for trade financing purposes, the largest signing by an emerging market entity in the first quarter of 2004.

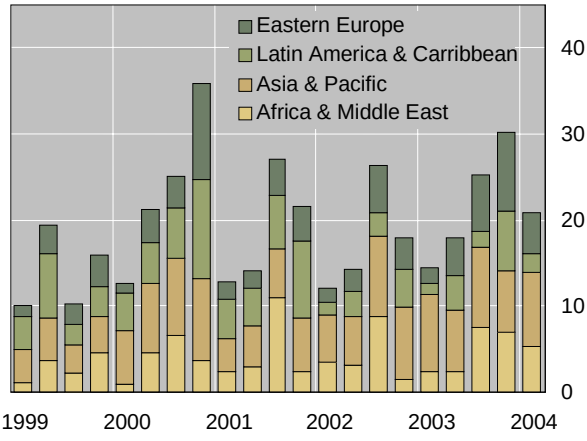
Activity in the international syndicated credit market

In billions of US dollars

Signed facilities



Facilities for emerging economies



Sources: Dealogic Loanware; BIS.

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① See Federal Reserve Board, *Senior Loan Officer Opinion Survey on Bank Lending Practices*, April 2004. ② Not included in the data compiled by the BIS is the €16 billion facility arranged for Sanofi-Synthélabo SA to support its acquisition of Aventis. The loan was funded but not signed in the first quarter.

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3. The international debt securities market

Helped by a recovering global economy and easy financing conditions, financial flows in the international debt securities markets remained at record levels in the first quarter of 2004. Net issuance achieved a second consecutive quarterly all-time high of $517.9 billion (Table 3.1). Announced issuance of bonds and notes, inflated by the need to refinance a large amount of maturing

Main features of net issuance in international debt securities markets

In billions of US dollars

	2002	2003	2003				2004	Stocks at end-Mar 2004
	Year	Year	Q1	Q2	Q3	Q4	Q1	
Total net issues	1,011.4	1,470.4	357.7	349.6	303.4	459.8	517.9	12,051.5
Money market instruments[1]	1.7	75.4	55.4	3.7	–32.9	49.2	33.3	595.7
Commercial paper	23.7	83.3	46.8	13.3	–25.4	48.7	8.9	420.9
Bonds and notes[1]	1,009.7	1,395.1	302.4	345.8	336.3	410.6	484.5	11,455.8
Floating rate issues	198.8	392.7	66.7	74.1	98.1	153.9	154.2	2,961.9
Straight fixed rate issues	800.8	981.2	235.4	271.1	233.9	240.8	337.3	8,143.0
Equity-related issues	10.2	21.1	0.3	0.6	4.3	15.9	–7.0	351.0
Developed countries	945.5	1,364.4	330.6	316.7	281.1	436.0	482.0	10,743.1
United States	330.5	274.3	55.8	29.5	90.6	98.5	124.3	3,197.2
Euro area	479.1	768.7	211.9	208.2	124.9	223.8	231.3	5,119.9
Japan	–22.7	–0.8	–3.5	–1.8	–3.7	8.1	6.3	280.0
Offshore centres	8.1	16.3	2.8	4.0	0.4	9.1	0.9	133.1
Emerging markets	36.9	66.5	14.7	13.5	19.5	18.8	24.9	659.5
Financial institutions	833.4	1,189.3	274.0	248.1	256.5	410.7	414.0	8,849.5
Private	698.0	991.5	225.8	199.6	213.6	352.5	341.4	7,491.1
Public	135.4	197.8	48.2	48.5	42.9	58.2	72.7	1,358.4
Corporate issuers	55.1	110.6	16.1	32.2	21.4	40.9	7.4	1,489.7
Private	44.4	92.8	8.4	29.5	17.7	37.2	–0.2	1,244.0
Public	10.7	17.8	7.7	2.7	3.7	3.7	7.6	245.7
Governments	102.0	147.3	58.0	54.0	23.0	12.3	86.4	1,196.6
International organisations	20.9	23.2	9.6	15.3	2.4	–4.2	10.1	515.7
Memo: Domestic CP[2]	*–102.9*	*–45.9*	*13.3*	*–27.2*	*–37.0*	*5.0*	*33.0*	*1,913.0*
Of which: US	*–91.4*	*–81.3*	*–15.7*	*–41.9*	*–22.3*	*–1.5*	*47.8*	*1,336.5*

[1] Excluding notes issued by non-residents in the domestic market. [2] Data for the first quarter of 2004 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

	2002	2003	2003				2004
	Year	Year	Q1	Q2	Q3	Q4	Q1
Total announced issues	2,099.3	2,884.4	759.1	755.9	657.2	712.3	1,018.0
Bond issues	1,164.9	1,610.0	436.5	424.6	343.9	405.0	606.5
Note issues	934.5	1,274.4	322.6	331.3	313.3	307.3	411.5
Floating rate issues	602.5	963.9	231.5	233.6	241.2	257.6	355.6
Straight fixed rate issues	1,454.1	1,832.5	509.4	505.8	389.1	428.2	645.6
Equity-related issues[1]	42.8	88.1	18.2	16.6	26.8	26.6	16.8
US dollar	985.0	1,169.5	332.8	282.2	285.8	268.7	368.5
Euro	806.3	1,289.1	330.4	369.7	272.0	317.0	495.3
Yen	88.3	102.9	23.4	26.0	24.5	29.0	29.3
Other currencies	219.7	322.9	72.4	78.0	74.8	97.7	125.0
Financial institutions	1,631.8	2,281.9	581.7	569.9	536.4	593.8	815.3
Private	1,361.2	1,920.0	488.6	467.7	455.3	508.5	688.3
Public	270.6	361.8	93.1	102.2	81.1	85.4	127.0
Corporate issuers	211.4	270.7	56.7	78.1	67.0	68.8	63.1
Of which: telecoms	46.0	54.8	23.3	9.5	8.0	14.1	11.6
Private	187.0	220.7	40.8	69.9	53.6	56.5	52.9
Public	24.5	50.0	15.9	8.3	13.4	12.3	10.1
Governments	171.8	239.4	81.6	79.2	39.0	39.6	109.6
International organisations	84.3	92.5	39.1	28.6	14.7	10.1	30.1
Completed issues	2,098.4	2,865.5	717.8	728.0	684.2	735.5	929.9
Memo: Repayments	*1,088.7*	*1,470.4*	*415.5*	*382.1*	*347.9*	*324.9*	*445.4*

[1] Convertible bonds and bonds with equity warrants.

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

debt, exceeded $1 trillion for the first time (Table 3.2). Sovereign borrowers, particularly in Europe and Latin America, were among the most active, while issuance by financial institutions in the United States and Europe remained strong. Among non-financial corporations, by contrast, gross issuance exceeded repayments by only a small amount. Borrowers tended to favour straight fixed rate issues, while the use of equity-related structures slowed.

Robust issuance was supported by a historically low level of credit spreads across virtually the entire credit spectrum. Even after widening somewhat in the course of the first quarter, spreads remained unusually low by the standards of the last five years (see the Overview on page 1). The narrow spreads in turn were a product of the “search for yield” among investors who were willing to adopt somewhat riskier exposures in the face of exceptionally low nominal yields on risk-free assets.

In April, issuance slowed in most sectors, amid widening credit spreads and increased uncertainty about the timing and implications of a shift to a less accommodative monetary stance in the United States. Preliminary data suggest that announcements of new issues in April were 38% below the monthly average of the first quarter. However, the strong pace of issuance by

lower-rated corporates and by European emerging economies appears to have continued.

Financial institutions and lower-rated borrowers are active

Increased borrowing by financial institutions

Net issuance by financial institutions remained at historically high levels in the first quarter of 2004. Issuance exceeded repayments by $414 billion, compared with $411 billion in the fourth quarter of 2003 and a quarterly average of $297 billion in 2003 as a whole. Because of a sharp increase in scheduled repayments, gross issuance by financial institutions jumped, with announced issuance of bonds and notes rising to $815 billion from $594 billion in the previous quarter. Among the most active issuers were US housing finance agencies and European banks.

Non-financial corporations, on the other hand, raised relatively little in international debt securities markets in the first quarter. Net issuance was only $7 billion, compared with almost $41 billion in the previous quarter and a quarterly average of $28 billion in 2003. Announcements of new bond and note issues fell from $69 billion to $63 billion, despite a sharp rise in scheduled repayments.

Investment grade corporates shift to domestic CP ...

The low level of corporate net issuance in the international market was balanced by an increase in the issuance of domestic commercial paper (by both financial and non-financial issuers). Net borrowing rose from $5 billion in the fourth quarter of 2003 to $33 billion in the first quarter of 2004. This was entirely driven by a surge in net CP issuance in the United States, to nearly $48 billion, after several quarters when the amount outstanding had shrunk. The slow pace of international bond issuance could signal that, in the early stages of a global expansion, firms are reluctant to releverage with long-term debt, preferring to fund a relatively high portion of investment through short-term debt and internal funds.

... but low-rated corporates borrow more internationally

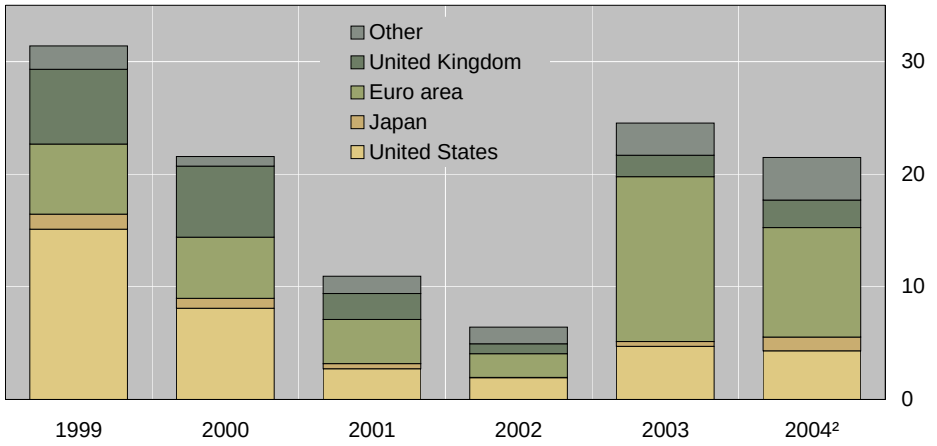
Lower-rated corporate issuers, however, continued to make use of international securities markets. Announcements of new high-yield bond issues by developed country borrowers in the first quarter totalled $5.4 billion, maintaining the strong pace of activity recorded in 2003 (Graph 3.1). As in previous years, about 70% of high-yield issuance was by non-financial corporations. Surprisingly, activity in the high-yield sector does not seem to have slowed in April despite the widening of credit spreads. A €1.3 billion 10-year B3/B-rated issue announced in April by SEAT Pagine Gialle, an Italian telephone directory company, was the largest euro-denominated high-yield issue to date.

Reflecting the upswing in the Japanese economy, net issuance of debt securities by Japanese borrowers was positive for the second consecutive quarter for the first time since 1999. Net issuance of $6.3 billion comprised $3.8 billion by financial institutions and $2.5 billion by non-financial corporations, divided more or less equally among the dollar, euro and yen.

Taken together, the data present a picture in which, in the context of a slow but steady global recovery, finance during the first quarter was extended to borrowers who had been capital constrained in the previous few years,

Non-investment grade[1] issuance of international bonds by developed country entities

In billions of US dollars, by nationality of issuer



[1] Issuers rated BB or lower. [2] Data for 2004 have been annualised based on the issuances during the first quarter.

Sources: Dealogic; BIS. Graph 3.1

including low-rated issuers, European homeowners, bank-financed enterprises and Japanese firms. At the same time, borrowers who had taken advantage of declining long-term interest rates and narrowing credit spreads in 2003, including investment grade corporates, focused on refinancing maturing issues and adjusting the maturity profile of their liabilities. In April, when markets grew more turbulent, investment grade issuers retreated, while lower-rated borrowers maintained or accelerated financing activities, hedging against the possibility that their market access might worsen in the near term.

More dollar issuers use floating rate structures

While the mix of vehicle currencies for borrowing in international markets remained roughly constant in the first quarter of 2004 relative to the previous quarter (Table 3.3), dollar issuers shifted towards floating rate issuance whereas euro issuers preferred fixed rates. Announcements of new dollar-denominated bonds and notes have tended to be approximately 25% floating rate and 75% fixed rate in recent years, but in the most recent quarter floating rate structures accounted for 35% of the total. As a result, the share of floating rate issuance in dollars was virtually identical to that in euros, which was 36% in the first quarter after averaging 39% since 2000.

It is not clear why dollar-based issuers would move towards floating rates at a time when long-term corporate yields were generally low, benefiting from gradually declining long-term risk-free rates and narrow credit spreads. The shift in the composition of the borrowing pool towards financial institutions certainly played a role, though these institutions themselves stepped up the use of US dollar floating rate bonds and notes in the first quarter of 2004, to 39% of announced issues versus 31% over the previous four years. The US

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

In billions of US dollars

		2002	2003	2003				2004
		Year	Year	Q1	Q2	Q3	Q4	Q1
North America	US dollar	297.1	218.9	38.0	26.2	73.8	81.0	97.4
	Euro	40.2	52.0	16.3	6.3	14.9	14.6	14.3
	Yen	–7.0	–1.9	0.6	–1.8	–1.2	0.6	1.3
	Other	12.3	25.1	1.9	7.6	6.0	9.6	11.8
European Union	US dollar	68.3	149.9	39.7	31.1	42.4	36.7	41.1
	Euro	462.6	742.2	203.5	212.4	116.6	209.7	221.3
	Yen	–26.2	–9.0	–4.5	–3.2	–3.5	2.2	1.9
	Other	86.1	117.2	28.7	27.4	17.6	43.6	32.8
Others	US dollar	53.8	97.4	20.2	19.4	25.7	32.2	33.9
	Euro	20.1	39.6	8.1	14.5	8.9	8.1	41.2
	Yen	–10.1	6.9	–2.1	1.9	–2.2	9.2	1.8
	Other	14.2	32.2	7.4	7.8	4.6	12.4	19.1
Total	US dollar	419.2	466.2	97.9	76.7	141.8	149.8	172.4
	Euro	522.9	833.8	227.8	233.2	140.3	232.4	276.8
	Yen	–43.3	–4.1	–6.0	–3.1	–6.9	12.0	5.0
	Other	112.5	174.5	38.0	42.8	28.1	65.5	63.7

[1] Based on the nationality of the borrower.

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

dollar-denominated yield curve was steeper than the euro-denominated yield curve during the period, with 10-year government bonds exceeding three-month rates by some 300 basis points in dollars compared with 200 basis points in euros, but the relative steepness of the two curves was little changed from what it had been for most of 2003. It is possible that US dollar issuers saw floating rate debt as a way to take advantage of cheap short-term funding before the Federal Reserve moved to increase short-term rates, with the expectation that relatively inexpensive long-term finance would still be available when the tightening cycle was completed.

Heavy international issuance by euro area sovereigns

Euro area sovereigns drive overall rise in net issuance …

By themselves, euro area governments more than accounted for the increase in overall net issuance in the quarter. Net issuance by sovereign borrowers in the euro area totalled $75.6 billion in the first quarter of 2004, compared with $6.8 billion in the last quarter of 2003. Announcements by this group jumped from $26 billion to $91 billion over the same period. To some degree, the high level of issuance was a seasonal phenomenon; euro area sovereign issuance has been concentrated in the first quarter in every year since 2000. Yet the amounts have grown steadily from one year to the next: from $23 billion in net issuance in each of the first quarters of 2000 and 2001, to $43 billion in the first quarter of 2002, and to $55 billion in the first quarter of 2003. The new issues in each case were overwhelmingly euro-denominated fixed rate eurobonds.

Italy (with $29 billion in net issues), Germany (with $16 billion, mostly by state governments) and Greece (with $14 billion) were the most active issuers of debt securities in the most recent quarter. Individual issues tended to be very substantial, with a view to encouraging liquidity; for example, the Italian government issued €4 billion in 30-year bonds in January, €5 billion in 10-year notes in February, and €8 billion in 16-year bonds in March.

… reflecting the further integration of European capital markets

To a large extent these figures reflect the ongoing development of European capital markets, as governments seek to take advantage of the common currency to broaden their funding base beyond their respective domestic markets. At the end of 2003, $608 billion in sovereign bonds of euro area governments was outstanding in the international markets, compared with some $4.9 trillion in domestic government securities in those countries. As euro-based investors move to increase the geographical diversification of their portfolios, sovereign borrowers, and particularly the governments of smaller euro area countries, have found it necessary to diversify their funding sources as well. The narrowing of investment banking fees in recent years has been another factor increasing the attractiveness of placing debt through underwriters on the international market rather than through direct auctions on the domestic market. The fact that the use of the international channel is concentrated among a relatively small number of euro area governments suggests that this process is still at an early stage of development.

The eurocommercial paper market continues to expand

Gross issuance in the market for eurocommercial paper (that is, commercial paper issued outside the borrower's home market) grew to $360 billion in the first quarter, compared with $333 billion in the previous one and a quarterly average of $300 billion in 2003. Much of the new paper was used to roll over outstanding issues, with the result that the net amount of new funding totalled only $9 billion. Some 11% of gross issuance was by non-financial borrowers, a figure only slightly higher than that in the US domestic market, where non-financial borrowers accounted for 9%.

Despite the relatively small share of euro-CP in overall net issuance, the growth of this market as a funding vehicle for working capital and as a destination for short-term investments is worthy of note. Commercial paper offers borrowers an alternative channel to short-term bank finance, and thus reduces the exposure of the financial system to transitory shocks that might hit the banking sector. The market is increasingly dominated by European borrowers; about 75% of gross issuance in the first quarter was by borrowers in developed European countries, compared with 66% in the first quarter of 1999. Over the same period, the share of issuance denominated in euros or pounds sterling rose from 38% to 66%. Like the increase in European sovereign issuance on the international markets mentioned above, the growth of euro-CP thus represents an important step in the development of European capital markets.

Continued brisk growth in emerging market borrowing

Benign financing conditions support emerging market borrowing

Borrowing activity in international debt securities markets by emerging market entities continued its upward trend in the first quarter of 2004. Total net issuance came to $24.9 billion, compared with $18.8 billion in the preceding quarter (Graph 3.2). Borrowers benefited from favourable financing costs, with spreads on emerging market debt having fallen to historical lows in January (see Graph 1.8 in the Overview). While emerging market spreads widened somewhat in February and March, in part under the pressure of strong issuance, they remained very narrow by recent standards.

The sell-off in emerging market bonds in April, however, resulted in a slowdown in issuance, with preliminary data indicating that announcements of new issues in that month were 25% below the average for the first quarter. The drop in announcements was evenly spread across Latin America, Asia, Africa and the Middle East. The pace of borrowing by entities in emerging Europe remained robust, reflecting positive investor sentiment ahead of the expansion of the European Union in May.

Asian entities were particularly active in the market in the first quarter. Total net issuance amounted to $10.7 billion, the highest level since 1997. Korean private sector entities – especially financial institutions – accounted for $4.6 billion, and another $2.1 billion was secured by the Taiwanese non-financial corporate sector. A number of Asian sovereigns also raised sizeable amounts. The Republic of the Philippines launched international securities totalling $2.0 billion. More than half of this amount, $1.18 billion, represented an exchange of various outstanding bonds, many of which are scheduled to mature in 2007–09, for a new fixed rate bond maturing in 2011. The Republic of Indonesia, upgraded by Standard & Poor's to B in October 2003 and rated CCC+ only a year ago, had a remarkably successful return to the international debt securities market. After an absence of seven years, Indonesia raised $1 billion through the issuance of a 10-year fixed rate bond on 10 March. Notwithstanding the sovereign's low credit rating, the issue was priced at a modest 277 basis points over 10-year US Treasuries, a tighter spread than for comparable issues by higher-rated sovereigns such as the Republic of the Philippines and the Republic of Turkey. Another successful return to the market, after an absence of more than six years, was that of the Islamic Republic of Pakistan, which on 19 February placed a five-year fixed rate bond with a face value of $500 million. Market participants reported unusually strong bids for Asian paper from US investors, though regional portfolios continued to take up disproportionate fractions of Asian issuance (see the box on page 23).

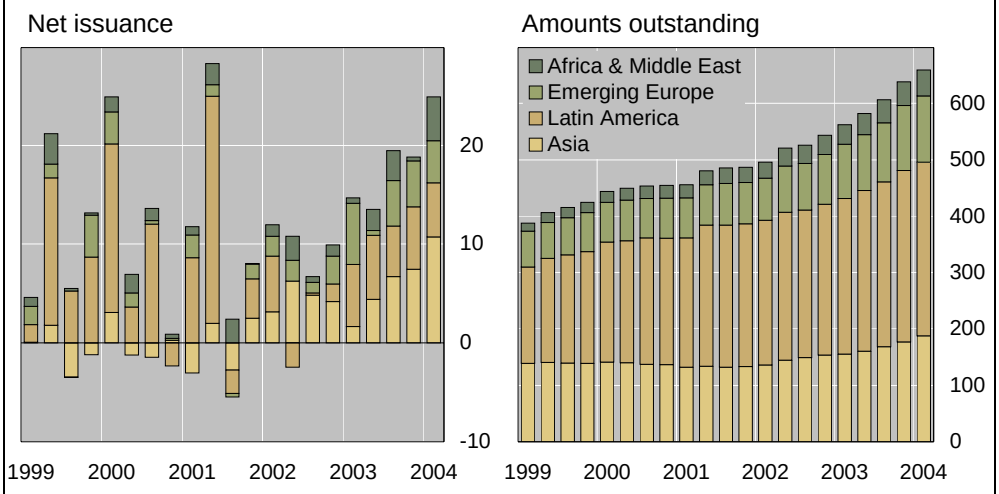
The Republic of Indonesia returns to the market

Low financing costs in early 2004 attract Latin American sovereigns ...

In Latin America, net borrowing was driven entirely by sovereign issuers taking advantage of the benign financing conditions at the beginning of the year. Notable placements – often of securities with a maturity of 20 or 30 years – were brought to the market in early 2004 by several sovereign issuers. Both frequent participants in international markets, such as the Federative Republic of Brazil, the United Mexican States and the Bolivarian Republic of Venezuela, and sovereigns with a more sporadic presence came to the market. The latter group included the Republic of Chile, the Republic of Costa Rica and the

International debt securities issued by emerging market entities

In billions of US dollar



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

Government of Jamaica, all of which took the opportunity to wrap up their entire projected external financing needs for 2004 in January and early February.

... as well as sovereigns in emerging Europe

Borrowing activity in emerging Europe was also predominantly accounted for by sovereign issuers. The heaviest borrower was the Republic of Poland, which raised $3.1 billion. A new €1.5 billion five-year issue in early January, the sovereign's most significant transaction at launch to date, was followed up in March when the existing benchmark paper in the 10-year segment was increased by €700 million to €3 billion, the largest sovereign issue in the region. In addition to this, the Republic of Poland became the first emerging market sovereign to issue paper in Swiss francs in over five years, by launching a five-year note with a face value of 400 million Swiss francs. Among private sector borrowers, the net issuance of $1.2 billion by Russian financial institutions is worthy of note. Previously, Russian private sector issuance on international markets had been dominated by big corporations, particularly in the mining and telecommunications sectors. The strong issuance by financial institutions, which comes on top of $4.2 billion in net issuance by this group in 2003, thus represents another stage in Russia's post-1998 return to international capital markets.

Other sovereigns in emerging Europe were also present in the market in the first quarter. In the beginning of the year, the Republic of Turkey locked in low funding costs by issuing both a $1.5 billion 30-year bond and a €1 billion 10-year bond in the course of a few weeks. Similarly, the Republic of Hungary covered one third of its planned 2004 issuance in international markets in early January through issuance of a €1 billion 10-year bond. Other significant placements in the first quarter were made by the Republic of Latvia (€400 million 10-year bond), the Republic of Lithuania (€600 million nine-year bond) and the Government of Ukraine ($600 million seven-year bond). Boosted by this strong activity by sovereign borrowers, gross issuance in emerging Europe reached an all-time high of $11.8 billion in the first quarter.

An increase in issuance by financial institutions in Israel, South Africa and the United Arab Emirates drove a record level of borrowing activity in Africa and the Middle East. The Israeli company Teva Pharmaceutical Industries Ltd raised the largest amount, $1.1 billion (through a financing vehicle in the United States), by means of two convertible bonds. The most substantial sovereign placement in the region was made by the Central Bank of Tunisia (which raises funds in foreign currencies on the state's behalf) with €450 million in seven-year fixed rate paper, the country's largest deal in euros to date.

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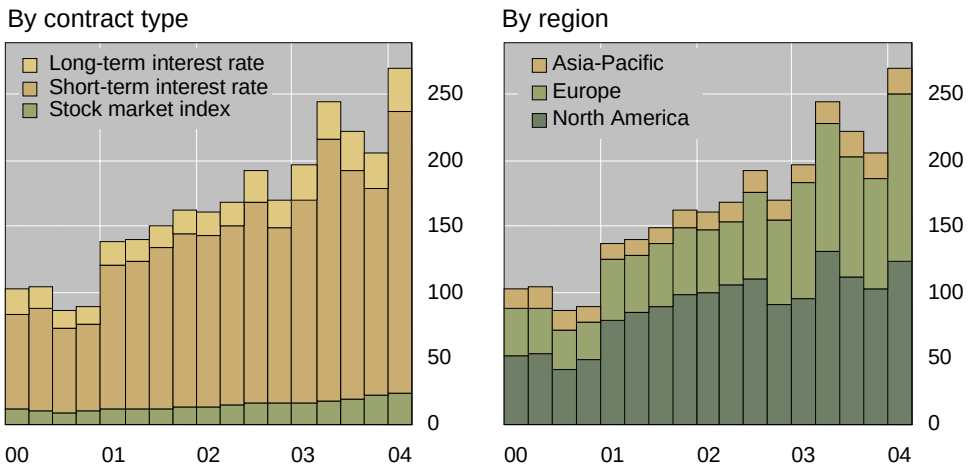
4. Derivatives markets

The aggregate turnover of exchange-traded financial derivatives contracts monitored regularly by the BIS returned to growth in the first quarter of 2004. The combined value of trading in interest rate, stock index and currency contracts amounted to $272 trillion, a 31% rise from the fourth quarter of 2003 (Graph 4.1). This was the strongest percentage increase since the first quarter of 2001, when business expanded by 55%. Fixed income and currency contracts were notably buoyant, with turnover in both types of instruments growing by about 35%. Business in stock index contracts was comparatively subdued, as volumes rose by only 9%. Global turnover was boosted in the first quarter by a marked resurgence of activity in March, with many exchanges witnessing new daily trading records. Trading in options on short-term European interest rates and German government bond futures was unusually brisk as market participants became increasingly convinced that weak economic data would prompt a cut in ECB policy rates. For the first time, the overall value of transactions in fixed income instruments on European exchanges exceeded that of similar trades on North American exchanges.

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

The most recent BIS semiannual survey data on aggregate positions in the over-the-counter (OTC) derivatives market show sustained activity in the second half of 2003, with the notional amount of outstanding contracts up 16% to almost $200 trillion. This expansion, which followed a 20% increase in the first half of last year, appears particularly healthy when compared with the 3.8% drop in open interest on organised exchanges. Unlike notional amounts, gross market values in the OTC market fell by 12% in the second half of 2003, after the positive growth dynamics exhibited since 2001. Most of the decline came from the interest rate swap segment, following the relative stability of yields over the reference period.

Signs of faltering growth in Europe fuel fixed income business

Activity in fixed income contracts rises sharply ...

The aggregate turnover of exchange-traded fixed income contracts rose sharply in the first quarter of 2004. The volume of transactions grew by 34% to $247 trillion, compared with a decline of 9% in the fourth quarter of last year. This overall increase in activity resulted from buoyant trading in the two major market segments, namely money market and government bond contracts. Turnover in short-term interest rate contracts, including on eurodollar, Euribor and euroyen rates, expanded by 35% to $213 trillion, while business in longer-term instruments, including US Treasury notes, German government bonds and Japanese government bonds, rose by 25% to $33 trillion.

... particularly in March ...

A notable feature of activity in fixed income products in the first quarter was the unprecedented volume of transactions in March. Global turnover in such products climbed to $98 trillion in that month, an increase of 40% compared to February 2004 and 49% relative to the monthly average for 2003.

Trading in fixed income contracts was brisk across all the major geographical regions. The most pronounced increase took place in Europe, with quarterly turnover soaring by 53% to $122 trillion, compared with a rise of 20% in North America, to $112 trillion, and growth of 8% in the Asia-Pacific region, to $11 trillion. As a result of this sharp rise, the volume of fixed income business on European exchanges exceeded that of similar activity on North American exchanges for the first time.

... in European money market contracts

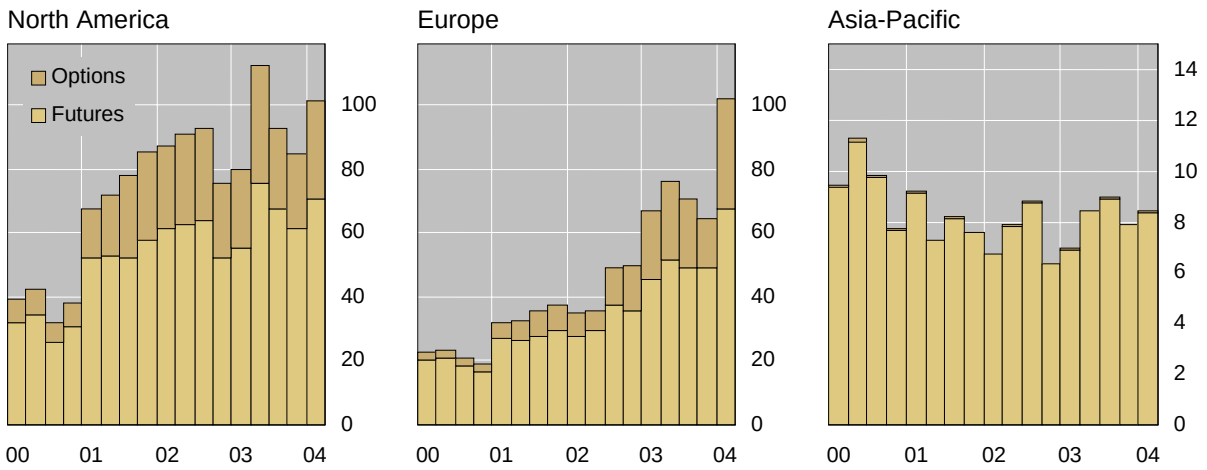
The percentage increase in European fixed income business was the second largest recorded since 1993, when the BIS began to collect quarterly data on activity in exchange-traded derivatives contracts.[1] European money market contracts were unusually buoyant, with turnover rising by nearly 60% to $102 trillion (Graph 4.2). Within this total, futures rose by 38% to $68 trillion, while related options surged by 126% to $34 trillion. Trading in longer-term European instruments, mainly German government bonds, was also lively, rising by 29% to $20 trillion (Graph 4.3). Business in such futures expanded by 29% to $18 trillion, while that in related options grew by 40% to $2 trillion. The growth of European fixed income business reflected macroeconomic developments, particularly changes in financial markets' monetary policy

Macroeconomic factors play a role in Europe

[1] The greatest percentage increase on record took place in March 2001, when turnover rose by 65%.

Turnover of short-term interest rate contracts

Quarterly contract turnover, in trillions of US dollars



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

expectations (see below), but other, longer-term trends may have contributed to boosting activity in this area. Fixed income markets in the euro area have become increasingly liquid since the introduction of the euro at the beginning of 1999, which is likely to have facilitated hedging and position-taking in derivatives markets.

Surge in European money market business ...

Aggregate trading in European fixed income instruments reached a new peak in March. Conditions in euro area money markets were relatively calm during much of the first quarter but this changed abruptly in the last week of March. On 24 March, the price of futures and options on Euribor rates jumped sharply to a nine-month high and combined trading in futures and options on Euronext.liffe rose to record levels after ECB officials noted that consumer confidence in the euro area was not as strong as it should have been at that point of the recovery and that the ECB had room for manoeuvre on monetary policy. Such declarations reinforced market participants' expectations of a forthcoming cut in policy rates. On 24 and 25 March, the volume of option transactions involving Euribor futures was unusually large, exceeding that in futures by a significant margin. Trading in options on money market rates often tends to rise relative to that in futures when market participants revise their expectations for short-term rates or entertain divergent opinions about the course of monetary policy. On 25, 26 and 30 March, the price of Euribor futures scaled new heights but trading returned to more "normal" volumes.

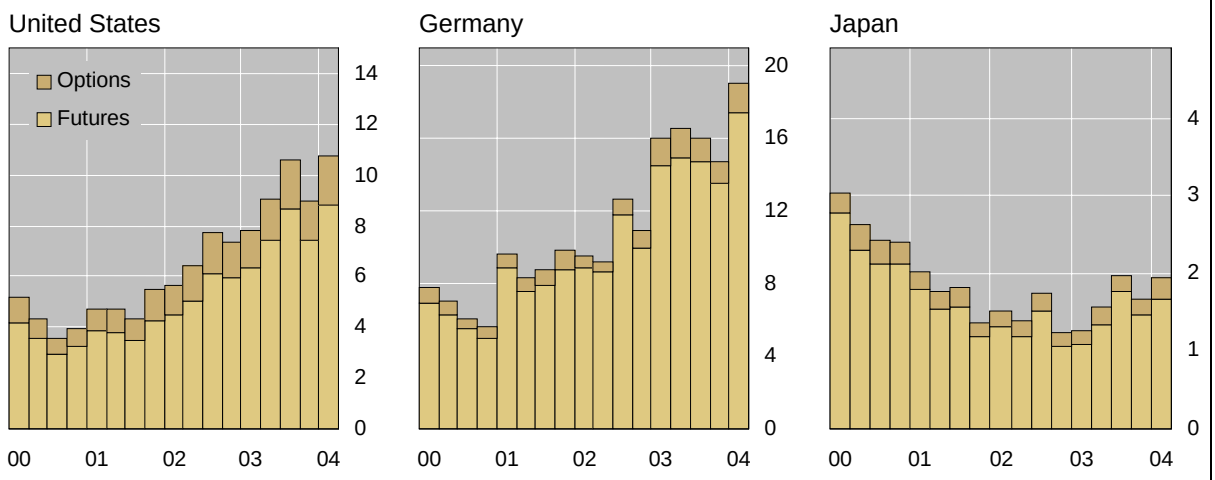
... particularly in options ...

... and in German government bond contracts

The pattern of activity in German government bond contracts was somewhat different from that in money markets. Bond markets in euro area countries evolved within a fairly narrow range during the first two months of the year, tending to react in a somewhat muted fashion to US macroeconomic announcements. However, this changed dramatically in early March. On 5 March in particular, trading achieved record levels on Eurex when global financial markets reacted strongly to much weaker than expected US non-farm payroll figures for February. Activity also surged on 29 March when the euro dropped to its lowest level of the year against the dollar, leading to sales of

Turnover in government bond contracts

Quarterly contract turnover, in trillions of US dollars



Sources: FOW TRADEdata; Futures Industry Association; BIS calculations. Graph 4.3

euro area bonds. Some market participants noted that turnover in German government bonds may have been boosted by adjustments to carry trades involving short dollar and long euro positions. With the weak US non-farm payroll numbers softening expectations of a hike in US policy rates and with continuing economic weakness in Europe, such speculative strategies had been considered attractive by market participants in the early part of the month.

Fairly robust fixed income business in North America ...

Trading in fixed income products expanded at a weaker pace in North America than in Europe. Activity was nevertheless fairly robust, with business in money market and longer-term instruments increasing at a comparable rate, by 20%, to $101 trillion and $11 trillion respectively. As was the case in Europe, futures contracts on US money market rates grew more slowly than those for related options, by 15% to $71 trillion versus 32% to $31 trillion. This pattern was also evident for US Treasury note and bond contracts: the turnover of futures expanded by 18% to $88 trillion and that of options by 28% to $20 trillion. Apart from a few days in March (see below), market conditions in North America were not particularly volatile during the quarter (Graph 4.4).

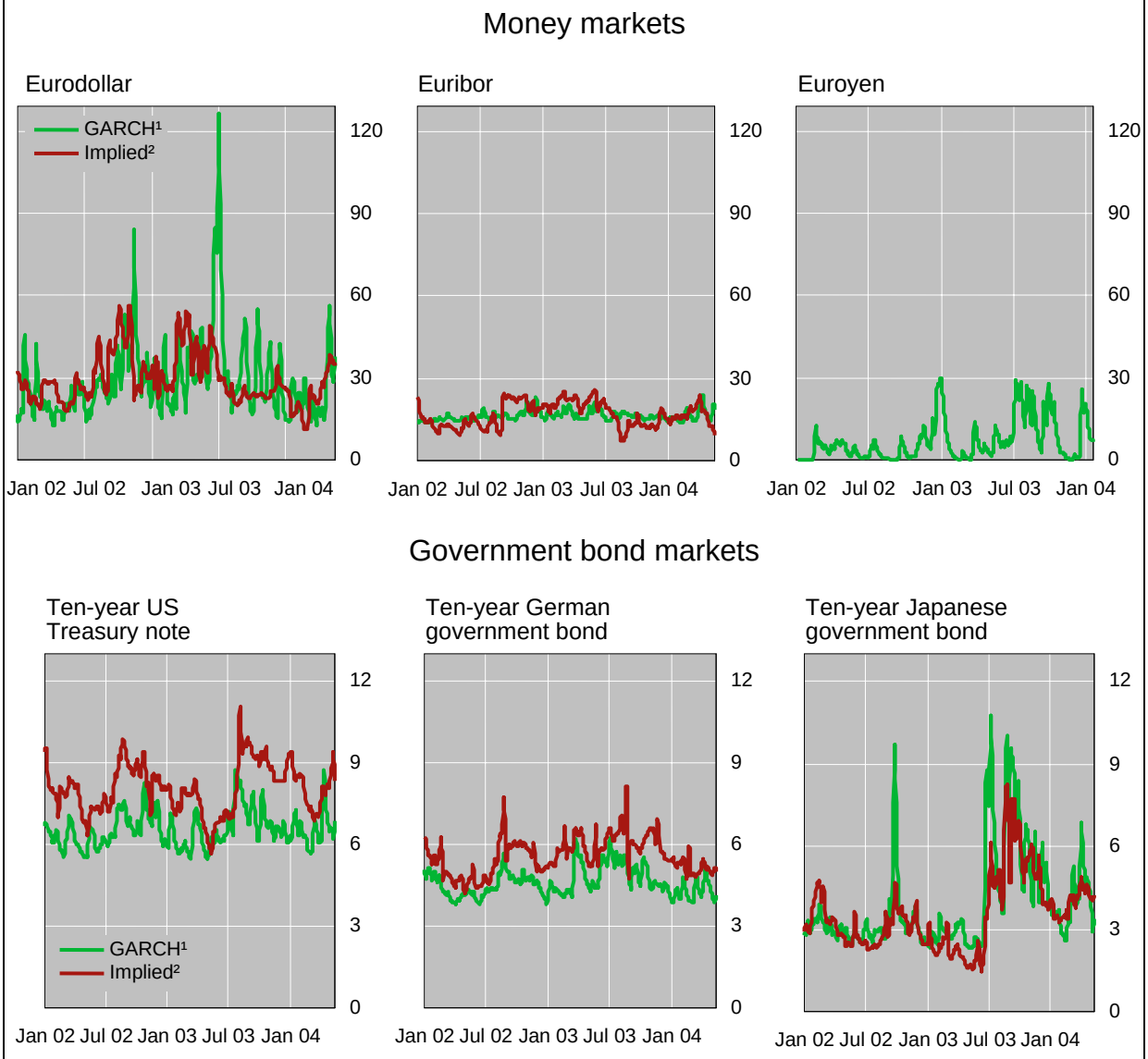
... on evolving risk management practices ...

Market sources suggested that activity in the region may have been supported by changes in the risk management practices of intermediaries. Some of the most active users of derivatives markets, including those involved in the large US mortgage market, were reported to have reacted to the market dislocation of last summer by frequently adjusting their hedges in the cash and futures markets, and by making greater use of options. Such changes in risk management are aimed at reducing the potential strains on balance sheets resulting from sharp shifts in market conditions. The rise in US fixed income business may also have been related to the vigorous response of the Chicago exchanges to the competitive challenge posed by the launch in February of Eurex US, the local fully electronic subsidiary of the German-Swiss exchange

... and stronger competition between exchanges

Volatility of major fixed income rates

Five-day moving averages



[1] Annualised conditional volatility of daily changes in eurocurrency yields and bond prices 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

Eurex AG.[2] The Chicago Mercantile Exchange (CME) and the Chicago Board of Trade (CBOT) responded to the arrival of the new exchange by offering additional financial incentives to various groups of traders, particularly for the use of their electronic trading platforms.

[2] Eurex US began trading futures and options on US Treasury notes and bonds. It intends to expand its offering to include futures and options on German government bonds as well as futures on the European DAX and Dow Jones Euro STOXX 50 SM stock indices. The Chicago-based Clearing Corporation is acting as the clearing organisation for Eurex US in the United States. Pending approval by the US Commodity Futures Trading Commission, a global clearing link will be established between the Clearing Corporation and Eurex Clearing AG.

March also sees record US fixed income trading

Aggregate trading in US fixed income instruments also reached a new peak in March. Although business in eurodollar contracts on the CME set a new daily record after the release of the US non-farm payroll data on 5 March and volumes rose substantially for the month as a whole, activity remained below the all-time peak established in June 2003. By contrast, trading in US Treasury note and bond contracts on the CBOT attained a new monthly record. Activity in such contracts jumped to a new daily maximum on 5 March and was also brisk in the last week of the month, particularly on 26 March, when US fixed income markets were weakened by stronger than expected personal income and business confidence data.

Offsetting trends in fixed income activity in Asia-Pacific

In the Asia-Pacific region, the 8% expansion observed over the first quarter reflected conflicting influences. On Asian exchanges, an 11% drop in Singapore more than offset a 14% increase in Japan, leaving transactions in the subregion 2% lower overall, at $7 trillion. In Australia and New Zealand activity grew smartly, with total turnover up by 37% to $4 trillion. Trading in Australia has experienced a remarkable recovery since the trough reached in the fourth quarter of 2002. Some of the factors underlying this recovery, including the use of derivatives contracts for the hedging of corporate bond issuance, are discussed in the March 2004 issue of the *BIS Quarterly Review*.

Dollar weakness continues to boost currency contracts

Rise in turnover of currency derivatives ...

Turnover of exchange-traded currency derivatives, the value of which represents only a small fraction of exchange-traded financial derivatives surveyed by the BIS, amounted to $2 trillion in the first quarter of 2004, a 35% increase from the last quarter of 2003.

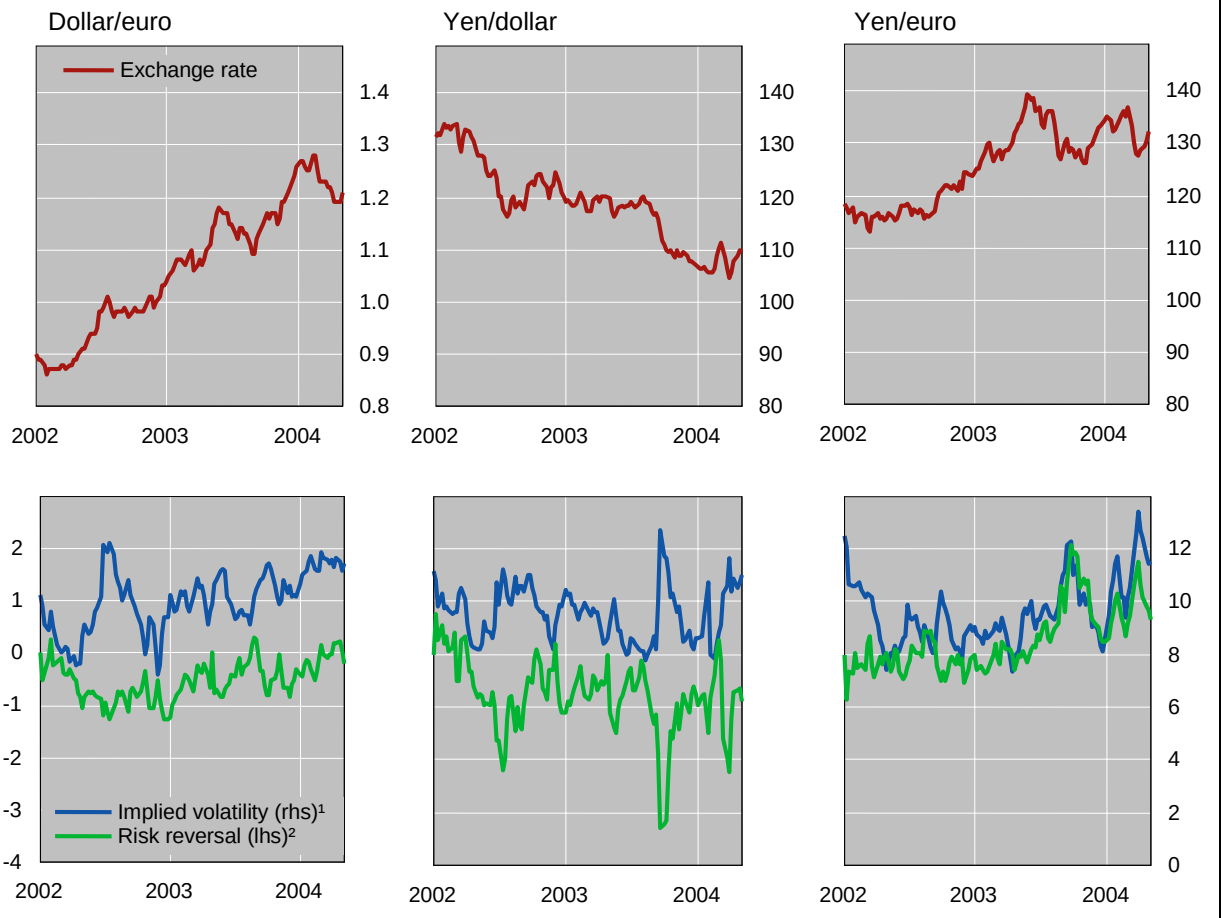
Market activity was influenced by the movement of the dollar, which declined further against most other major currencies between early and mid-February but then recovered strongly until early March (Graph 4.5). As is often the case when market trends are reversed, the aggregate volume of transactions surged, posting a new record in March. In that month, contracts involving the dollar and the euro, the most actively traded currency pair, rose by 25% to $290 billion. Trading in other major currency contracts expanded at an even stronger pace. Transactions involving the dollar and the yen, sterling, the Canadian dollar and the Swiss franc grew by 53%, 61%, 57% and 56% respectively.

... on a reversal of trend

Recovery of currency contracts since early 2003

Since the first quarter of 2003, trading in currency contracts has recovered steadily from a long period of decline. This recovery is mainly due to a significant increase in the turnover of dollar/euro futures on the CME, the largest marketplace in the world for exchange-traded currency contracts. Trading in the CME's major European "legacy" contracts (dollar/Deutsche mark and dollar/French franc) had dropped sharply ahead of the introduction of the euro at the beginning of 1999, but the new dollar/euro contract has since replaced the legacy contracts, and its turnover now exceeds by a wide margin the volumes achieved by them in the early to mid-1990s. Market participants have noted that the introduction by the CME of round-the-clock trading for its

Exchange rates, implied volatilities and risk reversals



[1] One-month horizon, in per cent. [2] A positive value indicates a bias towards dollar strength in the left-hand and centre panels, and towards euro strength in the right-hand panel.

Sources: DrKW Research; Reuters; BIS calculations. Graph 4.5

currency contracts in April 2001, combined with the dollar's recent swings against the euro, have helped enlarge the pool of traders in such contracts.

Declining Korean business dampens global stock index turnover

Uneven activity in stock index contracts ...

Trading in stock index contracts was somewhat lacklustre compared to that in fixed income and currency contracts in the first quarter of 2004. Turnover rose by only 9% to $24 trillion. Activity was uneven across the major geographical areas. Trading in the Asia-Pacific region, principally in options on the Korea Stock Exchange's KOSPI 200 index, declined by 10% to $8 trillion. Korean stock index options, introduced in October 1997, have been one of the main drivers of global stock index activity since 2001. The recent slowdown could indicate either that activity in previous periods experienced some cyclically related overshooting or that business has now entered the "mature" stage of its life cycle.

Issues in the clearing of cross-border derivatives transactions

The rapid growth of exchange-traded derivatives markets has been accompanied by an increasing internationalisation of marketplaces and clearing arrangements.[1] Such clearing arrangements attempt to provide market participants with secure and efficient means of executing and settling contracts across borders. This box provides a brief description of the various types of clearing links and discusses some of the systemic issues they raise.

Key role of clearing house in derivatives markets

In exchange-traded derivatives markets, the clearing house plays the role of central counterparty (CCP). It places itself between two parties to a transaction, acting as the seller to each buyer and the buyer to each seller, on terms agreed by the original parties. The CCP tries to ensure the financial integrity of derivatives markets through a system of daily revaluation and settlement of contracts. This process is supported by a collateralisation of clearing members' exposure in the form of an initial margin payment based on the volatility of the particular contract traded.

Since exchange-traded contracts are standardised, obligations undertaken can in effect easily be transferred from one party to another. A trader holding a short (or long) position in a particular contract can cancel the obligation by taking a new long (or short) position in that contract, a process know as "offsetting" or "closing out". This is what happens in practice, with most contracts tending to be closed before they reach maturity. The role of the clearing house as CCP makes it possible to net any positions in a simple fashion, which means that a high volume of transactions can be carried out without creating further counterparty relationships. This allows for a substantial reduction in counterparty credit risk.

Typology of clearing links

There are a variety of trading and clearing links, which can be divided into two broad types: clearing links and mutual offset systems (MOS).

Clearing links usually involve a "home" CCP which supports the primary exchange and an "away" CCP or exchange, whose members may also trade the contract. In the simplest and most common type of clearing link, contracts executed on the away exchange are cleared by the home CCP, in accordance with the rules of the home CCP. Such links tend to operate during the business hours of the home clearing house but extended trading hours are also possible (with the away CCP assuming counterparty risk for a limited time).

In contrast to a clearing link, an MOS allows market participants to choose which CCP will clear, margin and guarantee their positions.[2] In an MOS, positions may be transferred between one CCP and the other on the trade date and at the trade price. Traders can take advantage of the inter-exchange transfer by designating a trade as an MOS transaction prior to its execution. This enables them to open a position on one exchange and liquidate it on the other through an offsetting transaction, and thus better manage their overnight risk. Each CCP acts as counterparty to a contract with one of its own clearing members and to an offsetting contract with the other CCP. Both CCPs in an MOS are exposed to risks vis-à-vis each other arising from these arrangements. The very first link between derivatives exchanges, established in 1984 by the CME and SIMEX (now named SGX), was an MOS. A planned global clearing link between Eurex AG and Eurex US would be akin to this type of arrangement.

Special risks involved in cross-border clearing

A CCP involved in cross-border clearing faces a number of special risks, which need to be managed carefully.

Default risk. In any clearing link, the away CCP guarantees the contracts of its clearing members and bears the risk of default until the positions are transferred. A CCP may encounter difficulties either if the other CCP accepts transferred positions for one of its clearing members in default or if it seeks to transfer positions to a defaulting clearing member at the other CCP.

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[1] For a more detailed treatment of some of the issues discussed in this box, see the report prepared by the Committee on Payment and Settlement Systems, *Clearing arrangements for exchange-traded derivatives*, Basel, March 1997. [2] See J McPartland, "Open architecture clearing", *Outlook 03*, 2002, pp 18–22; available at www.futuresindustry.org.

Selected links between clearing houses

Clearing house	Type of link	Year of introduction	Contracts covered
CME-SIMEX/SGX	MOS	1984	Eurodollar and euroyen contracts
Euronext.liffe/TIFFE	Automatic open interest transfer	1995	Euroyen contracts
CME-MEFF RV	Clearing link	2001	Stock index contracts based on various S&P European indices
Eurex AG-Eurex US	Global clearing link	Planned	US government bond and stock index contracts and German government bond and European stock index contracts

Sources: ECB; derivatives exchanges; BIS.

In an MOS, the CCPs are exposed to each other as clearing members. A financial problem at one CCP may immediately "spill over" to the other.

Delivery risk. Delivery risk may also exist if derivatives contracts provide for delivery of the underlying asset (rather than cash settlement). As a special clearing member of the opposite CCP, a CCP may be paired with a clearing member on the opposite exchange to make or take delivery of the underlying instrument as agent for its own clearing member. Doing so in another time zone, in another currency and with potentially non-harmonised national bank holidays can be challenging.

Foreign exchange settlement risk. Many of the products subject to clearing links are denominated in a foreign currency. When initiating settlement-related payments, CCPs often use foreign currency accounts at domestic banks, which in turn depend on their correspondent banking relationships abroad to complete any interbank transfers on behalf of the CCP. Time zone differences, non-harmonised national bank holidays and the need for banks to confirm receipt of payments by their correspondents abroad may result in longer delays before foreign currency payments become final than is the case for domestic currency payments. These issues mean that CCPs must adapt their risk management arrangements and procedures to cover settlements in foreign currencies.

Legal risks. The legal framework for the clearing of derivatives is generally not the same in all countries where a contract is cleared or settled across borders. Any transaction conducted via a chain of intermediaries and/or CCPs raises questions about the relevant legal regime. When a defaulting participant holds the bulk of its assets in a foreign jurisdiction, conflicts of law may arise that could cause difficulties for a CCP, intermediaries and other market participants.

Custody and intermediary risks. The use of intermediaries to clear derivatives contracts potentially exposes participants to loss in the case of insolvency, negligence or fraud of such intermediaries. Regulators generally require intermediaries to segregate the assets and derivatives positions of their customers from their own assets. The most common regime is one in which customer positions and assets are aggregated into a joint account but segregated from clearing members' proprietary positions and assets.

Operational risks. CCPs face operational risks related to the technology that supports the trading links, including outages, information technology problems, version control of software or the failure of telecommunications networks. An operational interruption in one system could delay clearing in the other.

By contrast, transactions on North American marketplaces expanded by 16% to $9.7 trillion, while those on European exchanges grew by 34% to $6 trillion. Trading in Germany, the largest European market for stock index

derivatives, rose by 33% to $3 trillion. Activity in the United Kingdom, the second largest market in the region, increased by $57% to $1 trillion. While trading on Euronext.liffe was buoyant, UK business was also boosted by burgeoning activity on EDX London, an exchange that began operations in June 2003.[3]

... but new trading records in March

As in the fixed income and currency segments, aggregate trading in stock index contracts posted a new record in March. The sharp drop in North American and European equity markets from the beginning of March, apparently on a belief that the bull market that had begun in March 2003 was coming to an end, probably prompted investors to seek protection in derivatives markets. Such a need for protection was illustrated by some reduction in risk tolerance among equity investors, following a long-term rise in such tolerance (see the Overview and Graph 1.7).

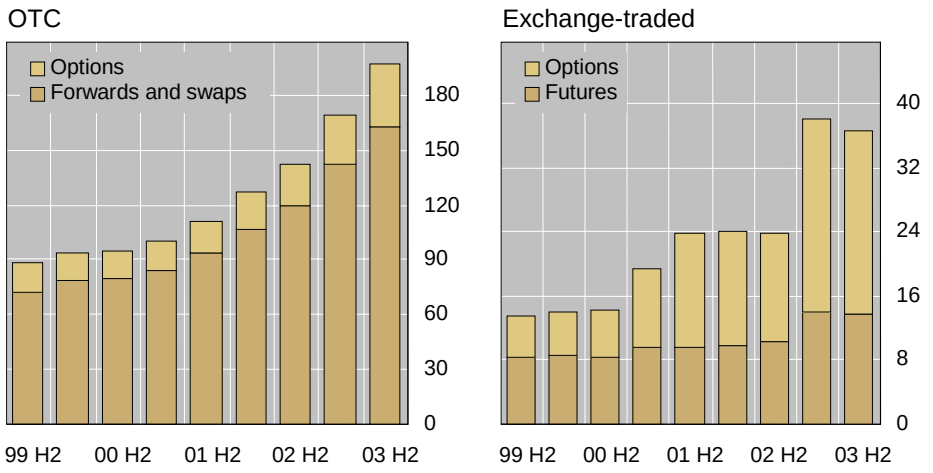
Growth in the OTC segment remains solid through the second half of the year

OTC markets grow in the second half of 2003 ...

After growing by 20% in the first half of 2003, notional amounts outstanding in the OTC derivatives market expanded by a further 16% in the remaining part of the year. By the end of December, the total amount stood at $197 trillion (Table 4.1). In the first six months of 2003, changes in OTC notional amounts went along with a large increase in activity on exchange-traded markets (60%); in the second half, however, the growth in OTC business was accompanied by a decline in open interest on exchanges (–3.8%) (Graph 4.6).

Global derivatives positions

Amounts outstanding, in trillions of US dollars



Sources: FOW TRADEdata; Futures Industry Association; BIS. Graph 4.6

[3] EDX London was built on the foundations of the securities derivatives business of the OM London Exchange (which began operations in 1989). It is jointly owned by the London Stock Exchange and OM AB.

Global OTC derivatives market[1]

Amounts outstanding, in billions of US dollars

	Notional amounts				Gross market values			
	End-Jun 2002	End-Dec 2002	End-Jun 2003	End-Dec 2003	End-Jun 2002	End-Dec 2002	End-Jun 2003	End-Dec 2003
Grand total	127,509	141,679	169,678	197,177	4,450	6,360	7,908	6,987
A. Foreign exchange contracts	18,068	18,460	22,088	24,484	1,052	881	996	1,301
Outright forwards and forex swaps	10,426	10,719	12,332	12,387	615	468	476	607
Currency swaps	4,215	4,503	5,159	6,371	340	337	419	557
Options	3,427	3,238	4,597	5,726	97	76	101	136
B. Interest rate contracts[2]	89,955	101,658	121,799	141,991	2,467	4,266	5,459	4,328
Forward rate agreements	9,146	8,792	10,270	10,769	19	22	20	19
Swaps	68,234	79,120	94,583	111,209	2,213	3,864	5,004	3,918
Options	12,575	13,746	16,946	20,012	235	381	434	391
C. Equity-linked contracts	2,214	2,309	2,799	3,787	243	255	260	274
Forwards and swaps	386	364	488	601	62	61	67	57
Options	1,828	1,944	2,311	3,186	181	194	193	217
D. Commodity contracts[3]	777	923	1,040	1,406	79	86	110	128
Gold	279	315	304	344	28	28	22	39
Other	498	608	736	1,062	51	58	88	88
Forwards and swaps	290	402	458	420	…	…	…	…
Options	208	206	279	642	…	…	…	…
E. Other[4]	16,496	18,330	21,952	25,510	609	871	1,083	957
Gross credit exposure[5]	.	.	.	.	1,317	1,511	1,750	1,986

[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

... with solid activity in all segments

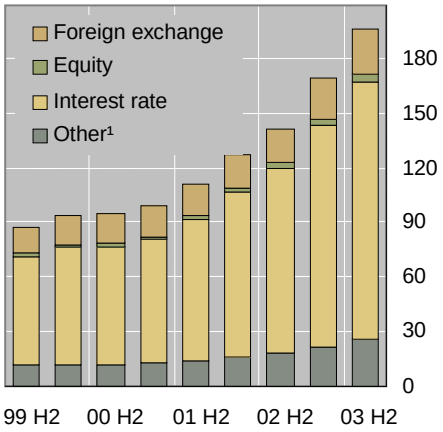
Activity in OTC contracts was solid in all the main segments of the market. The amounts outstanding in equity products and interest rate and currency derivatives grew by 35.3%, 16.6% and 10.8% respectively (Graph 4.7). Compared to the first half of the year, growth accelerated strongly in equity-related instruments, while it slowed in currency derivatives and interest rate contracts. An exception in interest rate contracts was yen-denominated swaps, which rose by 29% in notional amounts on an improving outlook for the Japanese economy (Graph 4.8). The growth recorded by the OTC market in 2003 resulted in an even greater dominance for interest rate products, which by the end of December accounted for 72% of the overall notional amounts.

Gross market values, which measure the cost of replacing outstanding contracts had they been settled on the last day of each reporting period, amounted to $7 trillion, a 12% decline. These values had increased sharply in the previous two reporting periods, by 43% and 24% respectively. The decline in gross market values occurred largely in interest rate swaps, for which these

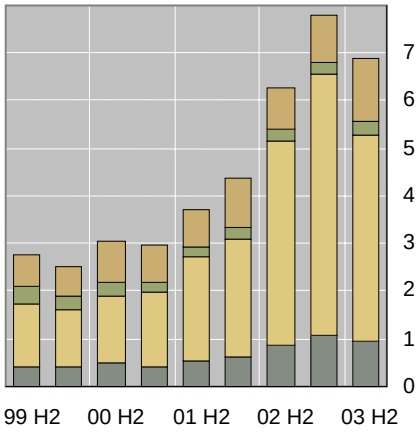
Global OTC derivatives

In trillions of US dollars

Notional amounts outstanding by broad risk category



Gross market values by broad risk category



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

Source: BIS. Graph 4.7

values decreased from $5.0 trillion at end-June to $3.9 trillion at end-December. The reduced cost of replacement in this segment of the OTC derivatives market stemmed from the relative stability in interest rates worldwide after the brief period of turbulence in the first two months of the half-year.

For 2003 as a whole, interest rate derivatives expanded at a pace unseen since 1998. Interest rate swaps represented the vast majority of this segment and at end-December their share stood at 90% of the total. Beyond the contribution of the structural growth which has characterised the OTC derivatives segment since 2001, the growth in interest rate derivatives in the second half of 2003 appears to have been driven by both a directional effect and a volatility effect. The directional effect was the reaction of investors to the sharp rise in interest rates during the summer, while the volatility effect reflected concerns about potential future movements in yields as indicated by high implied volatilities.

OTC interest rate activity driven by hedging of MBSs ...

The directional effect was driven specifically by the dramatic increase in US bond yields between mid-June and end-August. This movement in yields led to a large hedging demand for mortgage-backed securities (MBSs). The rise in rates reduced the incentives of US homeowners to refinance their mortgages, which resulted in an extension of the duration of MBSs. Indeed, the Lehman Brothers mortgage index indicated a lengthening of duration from about half a year in mid-June to over three years in early August. Holders of such securities acted to restore their original durations by taking short positions in long-term interest rates. The instrument of choice for such hedging was the five-year swap contract, with which investors opted to pay fixed and receive floating.

Credit exposure in derivatives markets: some indications from ISDA surveys

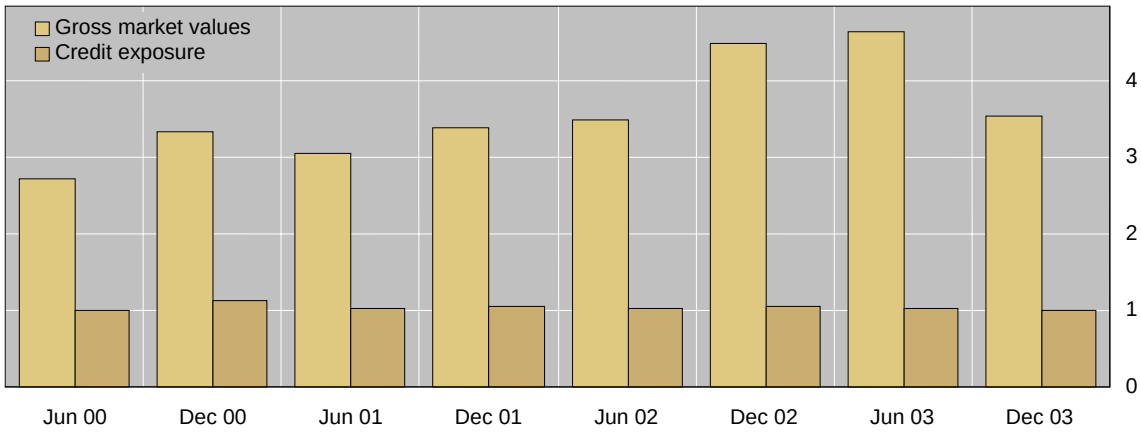
Gross market values provide a more accurate indication of credit exposures in derivatives markets than notional amounts outstanding. These values measure the replacement cost of contracts on the last day of a given reporting period. To the extent that a contract has a positive replacement cost, one of the counterparties will be exposed to default by the other counterparty unless the exposure is covered by collateral or other risk-mitigating practices. Gross market values have been recording large increases since 2001, reflecting the interest rate changes associated with vigorous monetary easing in the major economies, the sharp declines in equity prices and the depreciation of the dollar. In the last half-year of 2003, however, gross market values dropped significantly, by 12%, following the stabilisation of interest rates around historically low values and a less volatile phase of recovery displayed by equities.

Gross market values, however, are only a rough measure of credit risk. In fact, they tend to overestimate actual exposures, since bilateral netting and other risk-reducing arrangements, such as collateralisation, are not considered in their calculation. Taking these items into account brings the derivatives-related credit exposure of reporting institutions at the end of 2003 down from the $7 trillion indicated by gross market values to $2 trillion, this last figure representing 1% of outstanding notional amounts. In addition, while the ratio of gross market values to notional amounts grew from 2.7% to 4.7% between 1998 and June 2003, the same ratio calculated for credit exposure remained fairly constant at around 1% (see graph below). The existence of a sizeable difference between gross market values and credit exposures, both in absolute terms and as a ratio of outstanding notional amounts, may indicate that the increasing use of OTC derivatives has been associated with the adoption of more sophisticated risk management techniques. This development has perhaps been fostered by the large losses occurred during the numerous episodes of financial turbulence in the last decade.

A survey[①] carried out recently by ISDA (International Swaps and Derivatives Association) indicates that firms depend heavily on derivatives. The survey covered the world's 500 largest companies, located in 26 countries and representing a well diversified sample of industrial sectors. Of these firms, 92% reported the use of derivatives to hedge financial risks, with interest rate (85%) and currency exposures (78%) their major concerns. As for other risk categories, only 24% of the firms take out insurance against commodity-related risk and 11% against equity risk. Quite interestingly, there is no geographical pattern in the use of derivatives, with the proportion of firms employing derivatives nearly identical across major economies.

Gross market values and credit exposures as a ratio of OTC notional amounts

In per cent



Source: BIS.

① The discussion in this box relies on the results of the following surveys recently presented by ISDA: *Derivatives usage by the world's 500 largest companies*, *Counterparty credit exposure among major derivatives dealers* and *ISDA margin survey 2004*. They are all available from the ISDA website.

Beyond employing derivatives, firms are also aware of the market risks associated with positions based on such instruments. Another survey carried out by ISDA reports on the use of collateral in a sample of 97 firms. Based on the responses, it is estimated that just over $1 trillion of collateral was employed at the end of 2003, 40% more than one year earlier. Among respondents, the number of collateral agreements in place was close to 55,000, an increase of 29% over the year before. Cash is the most frequently used type of collateral, and the main currencies involved are the US dollar and the euro; US government securities represent the second most common type of collateral. Over half of the counterparties are located in the United States and in Canada, and 22% in Europe; only 3% are resident in emerging countries.

The survey also sought to determine the extent of protection guaranteed by collateral, requesting firms to disclose the percentage of trading volumes and credit exposures covered by collateral. Overall, coverage increased from 30% at the end of 2002 to 50% at the end of last year. The highest coverage, in terms of both trading volumes and exposure, is for interest rate products. Significant increases have taken place in the equity and credit derivatives segments. Among respondents, nearly 50% secure their derivatives transactions through collateral arrangements, which represents a 20 percentage point rise from the 2003 survey (see table). While collateral employed to secure interest rate-related transactions remained stable, the coverage for equity and credit derivatives has increased.

Although it is generally true that derivatives help manage financial risk, there are other types of risks associated with these instruments. Among other concerns, policymakers and regulators have often been worried by the structure of the OTC market, where the high concentration of market-making could result in a concentration of credit risks in a few dealers. In such conditions, failure of one dealer could result in large losses for its counterparties and end in a chain of defaults. According to the results of other two surveys by ISDA (see footnote), market-makers appear to be conscious of the risks involved in their activities and measures seem to have been put in place to limit the impact of financial volatility on the values of their portfolios. An ISDA survey of 17 dealers shows that collateral coverage of the five largest exposures averages 81%, so that less than 20% of the original exposure is left uncovered. Considering only the 10 largest dealers, the average collateralisation rises to 91%, and just 9% of the initial exposure is unsecured. The significance of the risk reduction permitted by collateralisation can be gleaned from the ratio of credit exposures, before and after collateralisation, to the total amount of counterparty credit exposure. For the 10 largest dealers, the mean ratio before collateral is 14.5%, a number which drops to just 1.2% when collateral is considered. On average, the concentration of net exposures, calculated as the sum across the 10 largest dealers of their five largest net exposures after collateral, is close to 2%. This suggests that dealers pay attention to counterparty exposures and try to put a cap on them by means of collateralisation.

Trade volumes and exposures collateralised by surveyed firms

	Percentage of trade volumes		Percentage of exposure	
	2003	2004	2003	2004
All OTC derivatives	30	51	29	52
Interest rate	53	58	48	55
Foreign exchange	21	24	28	37
Equities	27	45	24	52
Metals	18	24	18	40
Energy	16	26	15	30
Credit	30	45	25	39

Source: *ISDA margin survey 2004*.

... and high market volatility ...

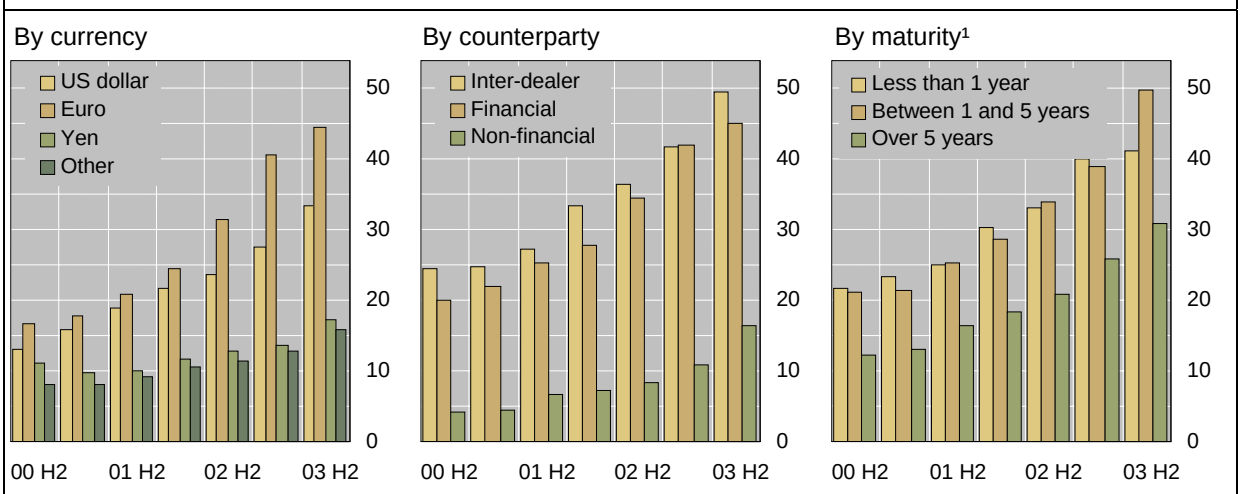
The importance of the volatility effect is suggested by a high correlation between the growth in OTC interest rate derivatives and the level of volatility implied in the prices of options written on Libor rates. At the semiannual frequency, the association between volatility and derivatives activity has been significant and positive since 1995, and the correlation increased sharply after 1999 to reach nearly 80%.[4] High implied volatilities are a sign that investors are more concerned than usual about large potential movements in interest rates. This concern tends to boost notional amounts of both interest rate swaps and interest rate options. In the first case, notional amounts rise because the uncertainty over interest rates leads investors to more actively maintain their hedges, for which they often turn to interest rate swaps. In the second case, notional amounts rise because some market participants act to protect themselves against swings in interest rates by means of various options, such as swaptions, caps and floors. In the second half of 2003, when volatility was unusually high, interest rate options grew by 18%, so that over the year as a whole their notional amount increased by 50%.

... in contrast to exchange-traded derivatives

The positive association between the growth of OTC derivatives in notional amounts and volatility is the opposite of what is typically observed for exchange-traded derivatives. In exchange-traded markets, while a positive correlation between volumes and volatility is detected at the daily frequency, a negative or negligible one emerges when volumes are aggregated at monthly or quarterly frequencies.[5] Since exchange-traded derivatives tend to be highly

Interest rate swaps

Notional amounts outstanding, in trillions of US dollars



[1] Includes forward rate agreements, which in December 2003 accounted for approximately 8% of the total notional amount outstanding.

Source: BIS. Graph 4.8

[4] The BIS began collecting data on OTC derivatives markets in 1998. The calculation of such a correlation uses previous data collected by ISDA.

[5] See M Micu and S Jeanneau: "Volatility and derivatives turnover: a tenuous relationship", *BIS Quarterly Review*, March 2003.

liquid instruments, investors turn to them when initially responding to volatility. Over time, however, they complement these derivatives with OTC contracts, which, while less liquid, can be tailored for more precise positions.

Currency derivatives grow on expectations of a weaker dollar

Currency derivatives also expanded robustly in the second half of 2003. By the end of the period, these OTC contracts stood at $24 trillion in notional amounts, a rise of 11%. Outright forwards and currency swaps, however, showed little change, with notional amounts remaining close to $12 trillion. Currency options accounted for much of the growth, reaching a notional amount of $5.7 trillion, an increase of nearly 25% after an exceptional 42% rise in the first six months of 2003. The strong activity recorded for options came with expectations about a depreciation of the dollar vis-à-vis both the euro and the yen. These expectations persisted throughout 2003, as highlighted by the risk reversal indicator (Graph 4.5). They were heightened by the release of weaker than expected economic data over the summer and, in September, by the official statement following the meeting of the G7 finance ministers and central bank governors in Dubai, which was perceived by market participants as a call for a weaker dollar.

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The price impact of rating announcements: evidence from the credit default swap market[1]

Rating announcements affect spreads on credit default swaps. The impact is more pronounced for negative reviews and downgrades than for outlook changes.

JEL classification: G10, G14.

Credit rating agencies are widely perceived to exert a significant influence on credit markets. Indeed, agencies' rating decisions are sometimes blamed for increasing borrowing costs for affected issuers. For example, in February 2003 spreads on bonds issued by German steel and engineering firm ThyssenKrupp widened by as much as 60 basis points in the days following an announcement by Standard & Poor's that it might downgrade the firm.[2] Careful analysis of the impact of rating announcements on credit default swap prices for a broad range of issuers confirms that credit ratings do convey information to market participants. Even announcements that are anticipated by earlier movements in spreads seem to contain additional pricing-relevant information.

The rating process

Rating events include changes in credit ratings ...

Credit ratings provide a summary measure, albeit subjective, of issuers' relative creditworthiness. They are not precise measures of default risk but instead facilitate comparisons across issuers by means of standardised risk categories. While each rating agency defines its own categories, the correspondence between the different agencies' categories is well understood by market participants. The two largest global rating agencies are Moody's and Standard & Poor's. Moody's assigns ratings from Aaa for the least risky debt to Baa3 for the most risky investment grade debt; these correspond to ratings from AAA to BBB– by Standard & Poor's.

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

[2] Standard & Poor's expressed concerns about ThyssenKrupp's unfunded pension liabilities. The firm was downgraded two weeks after the announcement, from BBB to BB+.

In addition to ratings, agencies also announce *outlooks*, *reviews* and *credit watches*. Outlooks reflect rating agencies' prognosis – positive, negative or stable – regarding the likely direction of an issuer's credit quality over the medium term, usually over a 12- to 18-month horizon. They are typically modified when a change in an issuer's risk profile has been observed but it is not yet regarded as permanent enough to warrant a new credit rating. Moreover, a change in outlook does not always lead to a change in rating. Reviews and credit watches are synonymous; both give a stronger indication than outlooks of future changes in ratings (from here on, we will refer to both reviews and credit watches as just "reviews").[3] The rating of issuers placed on review for an upgrade or downgrade is typically changed within weeks of the review. However, issuers need not be on review to be upgraded or downgraded. Agencies at times change ratings without any prior announcement of a change in outlook or a review.

... outlooks ...

... and reviews

Agencies have privileged access to information about borrowers and devote considerable resources to analysing that information. Outlooks, reviews and ratings are based on both public information about borrowers' operating and financial conditions and private information obtained through confidential discussions with borrowers.[4] In addition, rating decisions incorporate agencies' qualitative judgments regarding the plans and effectiveness of borrowers' management. Some market participants, in particular banks and large institutional investors, enjoy similar informational advantages. However, many other investors rely on credit ratings when assessing the credit quality of borrowers and debt issues.

Rating agencies have privileged access to information

Evidence from corporate bond and equity markets

If investors perceive that rating agencies enjoy an informational advantage, then rating events should have an immediate impact on credit spreads: spreads should adjust instantly to incorporate the new information conveyed by new outlooks, reviews or ratings. Past studies of the informational value of credit ratings are inconclusive. Some find that rating events, in particular rating downgrades, have a significant effect on prices, but others find no impact.

Looking at the US corporate bond market, Katz (1974) finds that bond prices adjust to rating changes, albeit with a slight delay. Moreover, there is no movement in prices prior to the announcement of a rating change, suggesting that investors do not anticipate the change. In contrast, Hettenhouse and Sartoris (1976) and Weinstein (1977) conclude that bond prices react to other information released prior to the rating change. Steiner and Heinke (2001) examine the international bond market and find that there are significant price

Past studies of corporate bond and equity markets ...

[3] Moody's places companies on review for an upgrade or downgrade, while Standard & Poor's puts firms on credit watch.

[4] In the United States, rating agencies are exempt from the Securities and Exchange Commission's fair disclosure regulation. Introduced in 2000, Regulation FD prohibits firms from making selective non-public disclosures to market participants but allows them to share non-public information with rating agencies.

movements up to 100 trading days prior to the rating change. Nevertheless, bond prices still react to the actual announcement of downgrades and negative outlooks, although not to upgrades and positive outlooks.

A number of other studies focus on equity markets, which might be expected to reflect information more quickly because of their greater liquidity. However, the results seem not to differ from those obtained for corporate bond markets. Pinches and Singleton (1978) find that the information content of bond rating changes is negligible. And although Griffin and Sanvicente (1982) find that excess stock returns following downgrades are significantly negative, excess returns following upgrades are found to be statistically insignificant.

... have not reached consensus on whether ratings convey additional information

Still other studies introduce various controls to better isolate the price impact of rating events. Again the results are mixed. Kliger and Sarig (2000) examine the reaction of both bond and equity prices to Moody's refinement of its rating system in 1982. They find that even though the new alphanumeric ratings were based on exactly the same information that underlay the previous alphabetical ratings, the announcement of the new ratings had an effect on bond and equity prices. Hand et al (1992) control for previous rating and outlook changes, dividing announcements into those preceded by other rating events and those not preceded by such events. They find that in both cases downgrades are fully anticipated by market participants and therefore have no contemporaneous impact on equity prices.

This study focuses on credit default swaps ...

In the remainder of this special feature, we extend the literature on the informational value of credit ratings in two ways. First, we focus on credit default swaps, which for many names are more liquid than corporate bonds. Second, we control for various preceding rating events, including outlook changes and reviews from different rating agencies. Hull et al (2003) seem to have been the first to analyse the impact of rating events on credit default swap prices. They find that spreads for these swaps tend to anticipate negative rating announcements. However, they do not control for earlier rating events.

The credit default swap market

Efforts to measure the informational significance of rating events have been hampered by the fact that credit markets have historically been among the least liquid of financial markets. Corporate bond issues are often small in size; many have options or other unique features that make them complicated to price; they are difficult to borrow, and so to sell short in expectation of a widening of spreads; and there tends to be very little trading once they have been placed in institutional investors' portfolios. This lack of liquidity makes it difficult to identify whether price changes are driven by rating (or other information) events or idiosyncratic factors.

... because they are more liquid

With the development of credit default swap markets, a new credit instrument was created which has the potential to offer an advantage in terms of liquidity – and which is increasingly seen as doing so. A credit default swap (CDS) is in essence an insurance contract protecting against losses arising from a default. In a CDS contract, the buyer of credit protection pays to the seller of protection a periodic fee analogous to the spread between the yield on

a defaultable security and the risk-free interest rate. In the event that the reference entity defaults, the buyer typically delivers to the seller debt owed by the reference entity in return for a lump sum equal to the face value of the debt. Liquidity in the CDS market is promoted through the use of standardised contractual terms,[5] and also through the ease with which short positions can be taken, by buying credit protection.

Liquidity is concentrated in entities rated A and BBB

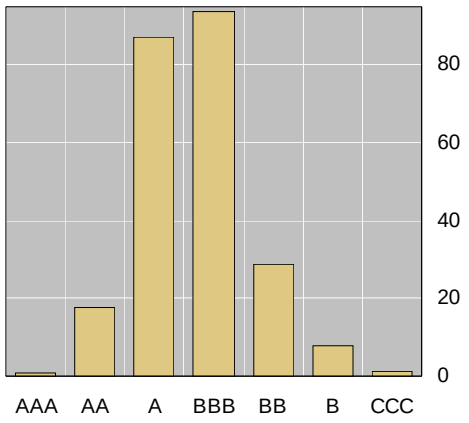
Using data from MarkIT, a London-based provider of credit derivatives data, we compiled a sample of daily CDS prices for 694 reference entities over a three-year period, from 1 January 2001 to 31 December 2003. The prices are those of actual transactions.[6] The sample includes financial institutions and non-financial corporations based in the euro area, Japan, Sweden, Switzerland, the United Kingdom and the United States. Entities rated above AA or below BB are excluded because they tend to be less liquid; trading in the CDS market is concentrated in entities rated A and BBB (Graph 1).[7] Moreover, only contracts with a maturity of five years are included because they are the most liquid.

It is important to control for systematic factors ...

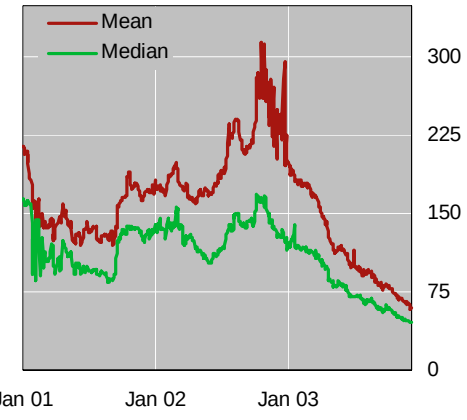
In testing for the price impact of rating events, it is important to control for possible market-wide systematic factors that could move all prices simultaneously. For example, a widening of spreads could reflect the release of worse than expected macroeconomic news rather than a rating event that

Credit default swap market

Number of transactions[1]



BBB spreads[2]



[1] Total between 1 January 2001 and 31 December 2003; in thousands. [2] Index of CDS prices for all BBB-rated entities in the sample; in basis points.

Sources: Bloomberg; MarkIT; BIS calculations. Graph 1

[5] Several different types of CDS contracts are traded, with the main difference between them being the definition of a default or credit event. In particular, some contracts treat debt restructurings differently from others. See BIS (2003, pp 112–13).

[6] The daily price for a given reference entity is calculated as the average across all transactions on the same day.

[7] In the case of entities with split ratings, ie different ratings from different agencies, the lower rating is taken. For simplicity, Standard & Poor's alphabetical rating categories are used throughout the text of this feature.

occurred on the same day. This we attempt to control for by subtracting an index of spreads for a given credit rating from each CDS spread with the same rating. In other words, spreads are adjusted for price movements common across spreads in a given rating category.

The construction of the index can have a significant impact on the eventual results. The index should ideally include the spreads of all similarly rated reference entities. Such broad market indices have long been available for corporate bonds. However, because fluctuations in the liquidity premium are likely to be greater for corporate bonds than for CDSs, corporate bond indices are unlikely to be good proxies for CDS spreads. Broad indices for the CDS market have recently been launched, most notably TRAC-X and iBoxx, but only towards the end of our sample period. Consequently, we follow the example of Hull et al (2003) and construct an index based on prices in our sample.

Whereas Hull et al (2003) calculate a mean spread, an index based on the median spread arguably better represents the sample. The distribution of credit spreads for any given rating tends to be highly positively skewed. As shown in Graph 1, the mean of the distribution can be heavily influenced by one or two extreme observations. Therefore, the median provides a more accurate measure of central tendency.

Rating events

... and for preceding rating events

In addition to controlling for market-wide factors, it is important to take account of two further factors when assessing the informational value of credit ratings. First, rating changes are often but not always preceded by other rating announcements that may anticipate the new rating. This is especially true of reviews, which as mentioned earlier typically result in a rating change within a few weeks. Second, rating agencies often do not act at the same time: a rating change by one agency may already have been anticipated by another agency's rating.

To control for these factors, we distinguish between rating events that are preceded by other rating events up to 60 business days earlier and events that are not preceded by other events. For example, we distinguish between rating changes preceded by reviews and rating changes not preceded by any other announcement. Rating announcements by both Moody's and Standard & Poor's are considered. Only events for which CDS spreads are available in the 60-day period prior to the event are included in the sample.

Sixty days was selected as the period for identifying preceding events because it seems unlikely that rating agencies would take longer to act on material information. Indeed, over the 2001–03 sample, the average period between a review and a downgrade was 49 business days. The event window is further subdivided into four time intervals: 60 to 21 days before the new outlook, review or rating; 20 to two days before the event, one day before and after the event, and two to 20 days after the event. If rating events are fully anticipated, then spreads should adjust prior to the event, in either the first or the second time interval. If rating announcements contain pricing-relevant information, then events should have a discernible effect on CDS spreads

Distribution of negative rating events

Number of rating events during the 2001–03 sample period

	Type of rating event			All events
	Negative outlook	Negative review	Downgrade	
All events	386	754	870	2,010
Moody's	176	424	421	1,021
Standard & Poor's	210	330	449	989
Without preceding events[1]	237	521	374	1,132
With preceding events[1]	149	233	496	878
by type of event:[2]				
Negative outlook	35	15	18	68
Negative review	80	126	382	588
Downgrade	76	118	235	429
by source:[2, 3]				
Same agency	77	57	360	494
Different agency	112	206	347	665

[1] In the 60 business days prior to the rating event. [2] Some events were preceded by more than one event and so the sum of the number of preceding events is greater than the number of events preceded by other events. [3] Rating agency which announced the preceding rating event.

Source: Bloomberg. Table 1

within a day of their announcement, in the third interval. In the case of less liquid names, the full impact of a rating event might be delayed to the fourth interval.

Almost half of all negative events were preceded by other rating events

With these criteria, the sample comprises 2,010 negative events and 325 positive events. The distribution of negative rating events is shown in Table 1. Downgrades account for 43% of the negative events, reviews 38% and outlook changes 19%. Forty-four per cent of the negative events were preceded by other rating events. Approximately 60% of these preceding events were rating announcements by other agencies.

Empirical results

We employ two straightforward statistical methods to test the impact of rating events on CDS spreads. The first is a mean test. The null hypothesis is that the mean of changes in CDS spreads adjusted by the market index is greater than zero for negative rating events and less than zero for positive rating events.[8] The second test is a non-parametric sign test for the median change in adjusted spreads.[9] The null hypothesis of the test is that half of the changes in adjusted spreads have a positive sign and half have a negative sign.

[8] Changes in adjusted spreads are assumed to be independent and have a Student's t distribution with n–1 degrees of freedom, where n denotes the number of events in the sample.

[9] An advantage of the sign test is that it does not impose distributional assumptions on changes in adjusted spreads. A disadvantage is that it is not well specified if the distribution of changes in spreads is skewed.

Too few positive events to give meaningful results

While the tests were carried out for both positive and negative rating events, only the results for the negative events are presented below. The results for positive events may suggest that these do not contain pricing-relevant information. However, there were too few positive events in the sample to give statistically meaningful results.

Impact of downgrades

Downgrades have a highly significant impact on CDS spreads ...

As shown in Table 2, rating downgrades have a highly significant impact on CDS spreads. Even when preceded by other rating events, the announcement of a downgrade still has a significant effect.

The impact is largest for A- and BBB-rated entities; downgrades have only a marginal impact, if any, on the adjusted spreads of AA- and BB-rated entities. The greater impact on A- and BBB-rated entities possibly reflects investors' aversion to issuers at risk of losing their investment grade status and becoming fallen angels. Many institutional investors are prevented by mandate from holding debt securities rated below investment grade. This restriction often leads them to scale back their holdings of issuers at risk of becoming fallen angels well before the firm is downgraded to below BBB–. The dislocation in the US commercial paper market in early 2001 and the sell-off in credit markets in mid-2002 were extreme examples of a shift by investors out of securities perceived to be susceptible to downgrading (see BIS (2001, 2003)).

... even when anticipated

Spreads tend to widen well before the announcement of a downgrade. This is especially true in the case of downgrades preceded by other rating events. Rating and other announcements in the 60 days prior to the downgrade appear to have a larger impact on adjusted spreads than the actual downgrade. In the case of downgrades not preceded by any other rating

Impact of downgrades on CDS spreads

Mean change in CDS spreads adjusted by the market index; in basis points

Rating category	Number of events	Business days before or after the event			
		[–60 to –20)	[–20 to –1)	[–1 to +1]	(+1 to +20]
Events not preceded by other rating events					
AA/Aa	50	–	–	–	–
A/A	132	–	–	8 **	–
BBB/Baa	114	23 **	15 **	15 **	44 *
BB/Ba	42	–	–	–	–
Events preceded by other rating events					
AA/Aa	24	–	–	–	–
A/A	142	33 ***	20 **	8 ***	–
BBB/Baa	196	87 ***	76 ***	52 ***	–
BB/Ba	76	165 ***	94 **	64 *	–

Note: *** indicates that the change in adjusted CDS spreads is greater than zero at the 1% significance level, ** at the 5% significance level, and * at the 10% significance level; – indicates that the change is not significantly different from zero.

Sources: Bloomberg; MarkIT; BIS calculations. Table 2

events, adjusted spreads for BBB-rated entities also widen well before the downgrade. However, in the absence of earlier rating events, market participants do not seem to anticipate downgrades of A-rated entities. This may be because they devote more resources to analysing the credit quality of BBB-rated entities – which have a greater probability of becoming fallen angels than do A-rated entities – and so may adjust more quickly to new information about the prospects of BBB-rated issuers.

Impact of negative reviews

Investors react as strongly to reviews as they do to downgrades

The announcement of a negative review also has a highly significant impact on adjusted CDS spreads. Indeed, market participants react as strongly to reviews as they do to actual downgrades. This is consistent with the intent of a review, which is to warn of an impending change in a rating.

As with downgrades, the impact of a review is significant regardless of whether the review is preceded by other rating events (Table 3). And again the effect is greatest for A- and BBB-rated entities. Reviews have a more significant impact than downgrades on the adjusted spread of BB-rated entities, but puzzlingly only when the review is preceded by other rating events: surprise reviews have no significant effect on the adjusted spreads of BB-rated entities.

Market participants appear to anticipate negative reviews, with spreads for A-, BBB- and BB-rated entities all widening in the 60 days prior to a review. Spreads for A- and BBB-rated entities continue to widen during the 20-day interval following the review. One explanation for this delayed response could be a lack of liquidity. However, given that the A- and BBB-rated segments of the CDS markets are considered the most liquid, it is also possible that new information drives the post-review widening.

Impact of negative reviews on CDS spreads

Mean change in CDS spreads adjusted by the market index; in basis points

Rating category	Number of events	Business days before or after the event			
		[–60 to –20)	[–20 to –1)	[–1 to +1]	(+1 to +20]
Events not preceded by other rating events					
AA/Aa	41	–	–	6 *	–
A/A	174	4 *	14 ***	6 **	7 **
BBB/Baa	177	19 ***	7 **	26 ***	49 **
BB/Ba	61	76 ***	28 **	–	–
Events preceded by other rating events					
AA/Aa	12	–	–	–	–
A/A	70	12 **	23 ***	12 ***	15 *
BBB/Baa	89	32 ***	45 ***	56 ***	34 **
BB/Ba	44	82 ***	71 **	131 **	–

Note: *** indicates that the change in adjusted CDS spreads is greater than zero at the 1% significance level, ** at the 5% significance level, and * at the 10% significance level; – indicates that the change is not significantly different from zero.

Sources: Bloomberg; MarkIT; BIS calculations. Table 3

Impact of negative outlooks on CDS spreads

Mean change in CDS spreads adjusted by the market index; in basis points

Rating category	Number of events	Business days before or after the event			
		[–60 to –20)	[–20 to –1)	[–1 to +1]	(+1 to +20]
Events not preceded by other rating events					
AA/Aa	14	–	–	–	–
A/A	62	–	–	2 *	–
BBB/Baa	52	–	–	4 *	–
BB/Ba	22	–	–	9*	–
Events preceded by other rating events					
AA/Aa	4	–	–	–	–
A/A	39	14 *	–	2 *	–
BBB/Baa	41	–	–	5 **	–
BB/Ba	29	–	–	–	–

Note: *** indicates that the change in adjusted CDS spreads is greater than zero at the 1% significance level, ** at the 5% significance level, and * at the 10% significance level; – indicates that the change is not significantly different from zero.

Sources: Bloomberg; MarkIT; BIS calculations. Table 4

Impact of negative outlooks

Outlook changes have only a marginal impact

Outlook changes have the least significant impact on CDS spreads, in both statistical and economic terms. As mentioned earlier, outlook changes are intended to be indicators of long-term trends in credit quality and may or may not eventually lead to a rating change. Therefore, it is not surprising that they have only a marginal effect on spreads.

The impact of outlook changes seems to be more significant, albeit still small, for potential fallen angels than for other entities. As shown in Table 4, only for BBB-rated entities, and only when preceded by other rating events, is the impact of an outlook change greater than zero at less than a 10% significance level. An outlook change appears to have the most informational value when it is one in a series of negative announcements about an issuer clinging to investment grade status.

Conclusions

Evidence from the credit default swap market indicates that negative rating events have a highly significant impact on credit spreads. The effect is most pronounced for negative reviews and downgrades and least so for outlook changes. Furthermore, the impact is significant even when rating events are anticipated by an earlier widening of CDS spreads.

Two ratings seem more informative than one

Notably, the results are similar regardless of whether rating announcements are preceded by other rating events. Considering that more than half of these prior events are rating changes by other agencies, the results suggest that two ratings might be more informative than one; both the first and second credit ratings seem to contain pricing-relevant information. Cantor et al

(1997) obtain similar results, finding that in the case of split ratings both ratings affect corporate bond spreads.

Impact is strongest when investment grade status is at risk

The impact of rating events is most pronounced for A- and BBB-rated issuers. This could reflect the greater liquidity of these segments of the CDS market. Alternatively, it could be due to investors' aversion to issuers at risk of becoming fallen angels. In the latter case, the impact of rating announcements could be lessened by promoting the integration of the investment grade and high-yield debt markets so as to reduce the costs associated with a loss of investment grade status. This would require a change in the credit risk management practices of institutional investors to give more emphasis to internal credit assessments and less to agencies' assessments. It would also require revisions to the many regulations and statutes that restrict regulated institutions from investing in lower-rated debt.[10]

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[10] In the United States, eight federal statutes, 47 federal regulations and over 100 state laws and regulations make reference to credit ratings (US Senate (2002, p 102)).

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Asian local currency bond markets[1]

The liquidity of Asian local currency bond markets varies with overall size, turnover, issue size and dispersion of holdings. Recently, returns on higher-yielding instruments have led local currency bonds to outperform US Treasuries in aggregate.

JEL classification: E440, G150, H630, O160.

Through various initiatives, East Asian governments are focusing their financial cooperation on developing regional bond markets. In June 2003, 11 central banks announced that they were pooling about $1 billion of their official reserves to invest in US dollar bonds issued by sovereigns and agencies of eight of the 11 economies. They also set to work on funds to be invested in bonds denominated in domestic currencies (EMEAP (2003), (2004)).

What characteristics make these local currency bonds so interesting as an asset class? This special feature addresses this question. It offers an introduction to Asian local currency bond markets, analysing their size and liquidity and describing their performance in recent years.

While the scale of Asian local currency bond markets makes them a potentially important asset class, several factors limit liquidity. Since the Asian crisis, these markets, and their most liquid subset, have grown to be substantially larger than the Asian US dollar bond market. Liquidity varies a great deal across Asian bond markets, and some have achieved considerable trading volume, especially in Northeast Asia. We find that size matters for liquidity: larger markets enjoy higher trading volume, which in turn underpins narrower bid-ask spreads. Markets with larger average issue size, moreover, are more liquid. Given size, holdings that are concentrated among buy-and-hold investors depress liquidity. A broader investor base, including foreign investors, could thus improve liquidity, perhaps particularly at times of stress.

Recent experience, at least, suggests that these less liquid markets have offered respectable returns. While yields on local currency bonds stand both higher and lower than those on US Treasuries, Asian local currency bonds on an unhedged basis returned more than US Treasury securities of similar duration from January 2001 to March 2004. This outcome resulted largely from

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

capital gains and higher yields for bonds that started out with higher yields. A question we leave for future analysis is how these bonds fit into global bond portfolios.

Size of Asian local currency bond markets

Outstandings of over $1 trillion ...

Asian local currency bond markets have experienced rapid growth since the Asian crisis. They more than doubled in size between 1997 and 2002 (excluding Australia, Japan and New Zealand). The total outstanding amount reached $1.2 trillion by end-2002, equivalent to about 50% of regional GDP (Table 1).[2] This impressive growth reflected official measures to develop alternative channels of financial intermediation, as well as the funding needs of bank restructuring and government deficits.

Size of local bond markets in EMEAP economies in 2002

Economy	Bond market		Of which:			
			Government bonds		Corporate bonds	
	US$ bn	% of GDP	US$ bn	% of total	US$ bn	% of total
Australia	208	53	71	34	58	28
China	465	38	243	52	10	2
Hong Kong SAR	68	42	15	22	5	7
Indonesia	56	31	54	96	2	4
Japan	6,735	161	4,838	72	753	11
Korea	381	76	96	25	151	40
Malaysia	83	87	34	41	38	46
New Zealand[1]	18	29	18	..	..	..
Philippines	26	34	25	97	1	3
Singapore	53	60	33	62	3	5
Thailand	47	38	29	61	7	14
Total	8,140	115	5,456	67	1,027	13
Total excluding Japan	1,405	48	618	44	274	19
Total excluding Australia, Japan and New Zealand	1,179	48	528	45	216	18
Memo:						
India	*156*	*34*	*154*	*99*	*2*	*1*
Taiwan, China	*107*	*38*	*61*	*57*	*33*	*31*
United States	*16,324*	*156*	*4,537*	*28*	*2,421*	*15*

Note: Bonds issued by financial institutions are not included in corporate bonds.

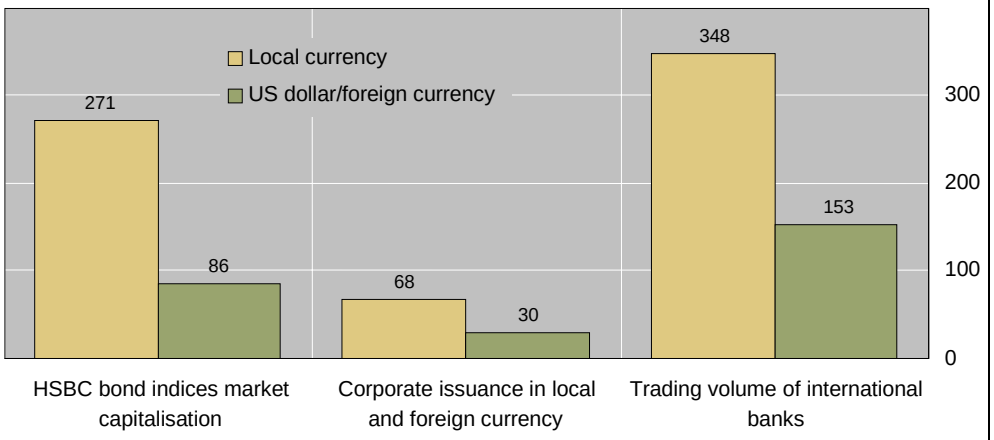
[1] Private sector bond data are not available.

Sources: Deutsche Bank (2003); Hong Kong Monetary Authority; Reserve Bank of New Zealand; CEIC; IFS; BIS. Table 1

[2] The amounts in Table 1 for government bonds are understated by excluding central bank debt instruments. In a number of economies, the central bank issues its own liabilities to sterilise foreign exchange purchases (McCauley (2003)). In Korea, for instance, monetary stabilisation bonds, with original maturities up to two years, now top 100 trillion won, much the same size as the government bond total on Table 1. Similar central bank liabilities, albeit of generally shorter maturity, are found in China, Indonesia, Malaysia, Taiwan (China) and Thailand.

Local and foreign currency bonds in East Asia: size, issuance and trading

In billions of US dollars



Note: The market capitalisation is based on HSBC Asian local currency and US dollar bond indices at March 2004. Corporate issuance in local and foreign currency from 1998 to 2003 is from Fernandez and Klassen (2004). Trading volume of local currency bonds and eurobonds in 2003 reported by international banks is from EMTA (2004).

Sources: Bloomberg; BondWare; EMTA; HSBC. Graph 1

Despite rapid growth, Asian local currency bond markets remain to varying degrees underdeveloped. They are small relative to those in the United States or Japan, where outstanding domestic bonds account for over 150% of GDP. Moreover, government bonds make up half of the market. Corporate financing remains dominated by bank lending and equity financing.[3] In addition, the markets are to some extent segmented from each other and from global fixed income markets by, inter alia, withholding taxes, regulatory and legal factors, and deficiencies in infrastructure.

... with a smaller portion readily accessible ...

The "investible" portion of these markets is much smaller than the total outstanding amount, but not inconsequential. The investible universe of Asian local bonds, as defined by the HSBC local currency bond index, had a capitalisation of about $270 billion in March 2004, less than a quarter of the outstanding $1.2 trillion. HSBC has excluded Chinese bonds owing to capital controls. In addition, illiquid bank recapitalisation bonds in Indonesia and the retail bonds targeted at domestic individuals issued in 2002 to cover bank rescue costs in Thailand are excluded.

... but still larger than Asian dollar bonds

Nonetheless, compared to their foreign currency counterparts, the local currency bond markets bulk substantially larger, attract heavier issuance and show higher aggregate trading volumes. Even the investible portion of the local markets is larger than the Asian US dollar bond market (Graph 1), whether measured by the HSBC Asian US dollar bond index (with a capitalisation of about $86 billion) or the similar JPMorgan Asia Credit index (about $94 billion). In the primary market, domestic currency issuance has recently dominated that in foreign currency for both the government and corporate sectors (Reserve

[3] This pattern of corporate finance is observed widely in Europe as well.

Bank of Australia (2003), Fernandez and Klassen (2004)). In the secondary market, even the multinational financial firms that make up the Emerging Markets Traders Association (EMTA) alone report a trading volume of Asian local currency bonds more than double that of Asian international bonds in 2003. Only for bonds issued by borrowers in China, Indonesia and the Philippines are more transactions reported in international bonds.

Liquidity of Asian local currency bond markets

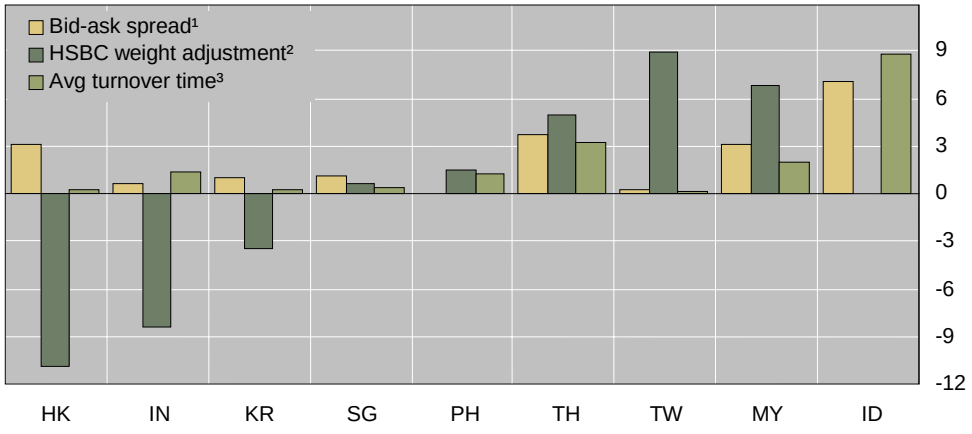
In a liquid market, transactions can be carried out cheaply and rapidly without affecting the price. Liquidity has several dimensions – tightness, depth, immediacy and resilience (CGFS (2000)). Tightness refers to the difference between buy and sell prices, such as bid-ask spreads in a quote-driven market. Depth refers to the size of transactions that can be executed without moving the price. Immediacy refers to the speed at which orders can be executed, and resilience refers to the ease with which prices return to normal after temporary disturbances or imbalances in orders. There can be trade-offs between dimensions. For instance, competition between market-makers or regulation can narrow the bid-ask spread at the cost of less depth, as reduced profitability leads to less capital devoted to market-making. A liquid government bond market is important for cash or funding liquidity, as it improves the ability of financial institutions to realise value via sales of government securities.

Measuring liquidity

Three measures

Since liquidity is a multidimensional concept, we examine several indicators: a market-maker's assessment, turnover and the bid-ask spread. These indicators turn out to be broadly consistent (Graph 2).

Three indicators of liquidity



HK = Hong Kong SAR; ID = Indonesia; IN = India; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; TW = Taiwan, China.

[1] Average spreads on government bonds (Barclays). [2] Market capitalisation less the weight in HSBC local bond index. [3] Frequency of turnover, in quarters.

Sources: Barclays; Deutsche Bank; HSBC. Graph 2

HSBC's assessment of liquidity, accessibility and infrastructure leads the bank to place a higher or lower weight on its local bond index than would be justified by market capitalisation alone. The overweighted markets of Hong Kong SAR, India and Korea are considered to have better liquidity and accessibility than the other markets.

Broadly paralleling this assessment is the indication offered by turnover and its relation to market capitalisation. Measured by the frequency of turnover, Hong Kong, Taiwan (China),[4] Korea and Singapore enjoy more liquid bond markets.

A similar indication is provided by reported average bid-ask spreads. These range from around 1 basis point in India, Korea, Singapore and Taiwan to 7 basis points in Indonesia. Reported spreads in general are narrow, even when compared to the liquid US Treasury markets, where bid-ask spreads range from 0.5 basis points for Treasury bills to 3 basis points for Treasury bonds. While Fleming (2003) finds that the bid-ask spread is the best indicator of liquidity, the narrowness of this spread in East Asia may in part reflect government or exchange rules that constrain the market-makers' bid-ask spreads. The apparent liquidity of the narrow spread may be offset by less market depth.

Determinants of liquidity

Turning from measuring to assessing the determinants of liquidity, several factors play a role (CGFS (2000)). On the supply side, the size of the bond markets in Asia, which Eichengreen and Luengnaruemitchai (2004) find to be empirically related to the size of the economy itself, could contribute to the lack of depth and liquidity. Further, small individual issue size, which could reflect the shallowness of markets, may also discourage trading and thereby contribute to the lack of liquidity. On the demand side, a narrow investor base, dominated by local commercial banks and/or a government provident fund, could result in a one-sided bond market, with participants all attempting to sell or buy at any given moment. Absent or high-cost hedging instruments and restrictions on short selling could accentuate momentum trading in bond markets, and discourage broad investor participation. Accounts based on historical rather than market value could encourage buy-and-hold strategies which reduce market liquidity (Mohanty (2002)).

Supply factors: overall size ...

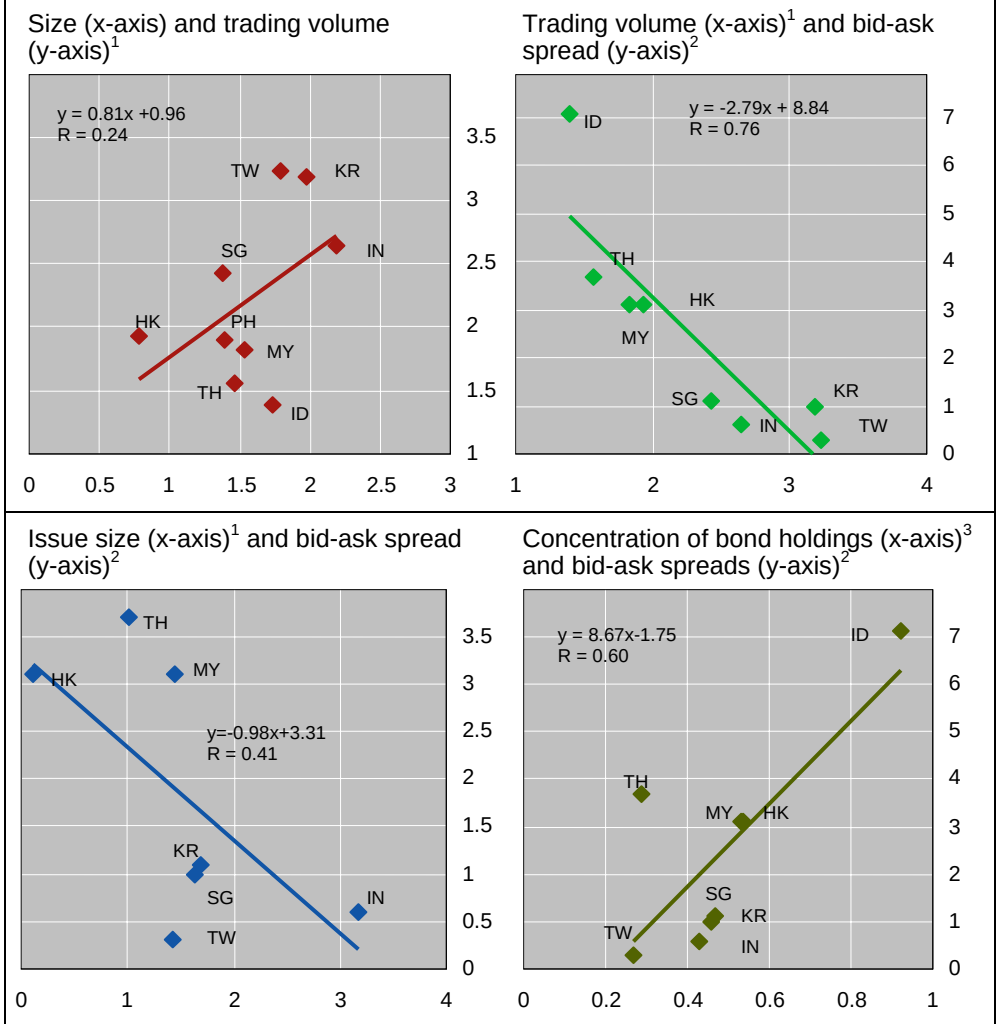
We find that size matters for liquidity in Asia (Graph 3, upper panels). A larger market tends to be associated with higher trading volumes (both variables are in logs), which are in turn associated with tighter bid-ask spreads. This is similar to (although somewhat weaker than) the relationship between size, turnover and liquidity observed in G10 government bond markets and ascribed to economies of scale in market-making (McCauley and Remolona (2000)).

Using the existence of an active government bond futures markets as well as bid-ask spreads in G10 markets, McCauley and Remolona (2000) suggest

[4] Hereinafter Taiwan.

Liquidity in East Asian bond markets

Size, trading, issue size and concentration



[1] In billions of US dollars; in logs. [2] In basis points. [3] Herfindahl-Hirschman index.

Sources: Barclays Capital; Bloomberg; Deutsche Bank; HSBC; BIS calculations. Graph 3

that the critical size for a liquid market is around $100–200 billion. In Asia, China and India have crossed this threshold, and Korea and Taiwan are approaching it. Australia's experience, however, suggests that, under the right circumstances, liquid government bond cash and futures markets can both be sustained at a much smaller size (Australia (2003)). Equally, though, the $100–200 billion threshold may be too low under less favourable circumstances.

... and individual issue size

Large individual issues in a market indicate market depth, itself a liquidity indicator, but can also promote liquidity by attracting more trading. In Asia, the average issue size is negatively associated with bid-ask spreads, implying that the bond markets with larger average issue sizes have better liquidity (Graph 3, lower left-hand panel). Again, China and India stand out with average issue sizes above $3 billion. Thus, while fostering liquid bond markets is no doubt easier in larger economies than in smaller ones, careful debt management can lead to better liquidity than size alone would suggest.

One way of creating size is by lumping together different types of debt. This has two facets in Asian economies – few versus many maturities, and one versus many public sector obligors. With regard to maturity, the choice is between concentrating issuance into benchmarks on the one hand, and supplying a continuous yield curve while lengthening maturities on the other. Industrial countries faced with fiscal surpluses tend to concentrate issuance in a few large benchmark issues to maintain liquidity. There seems to be some room to increase the size of benchmark issues in India, Taiwan and Thailand, as they have relatively low ratios of maximum to minimum or average issue size (at least among the HSBC Asian local currency bond index constituents). At the same time, multiple obligors divide the market into relatively less liquid segments. Consideration might be given to the proposal to unify each government bond market in East Asia, by overfunding government fiscal needs and depositing the proceeds in the central bank, replacing its liabilities to market participants, as suggested in McCauley (2003).

Demand factors: broad investor base ...

A narrow investor base, dominated by banks, hinders the development of a liquid secondary bond market. On average, over half of Asian domestic debt securities are held by banks, a share significantly higher than in other emerging markets as well as in developed economies. We find that more concentrated bond holding is associated with larger bid-ask spreads, suggesting that the concentration of bond holdings in Asia impairs liquidity (Graph 3, lower right-hand panel). The concentration of bond holdings is measured by the standard Herfindahl-Hirschman (HH) index, which is defined as the sum of the squared market shares. The larger the HH index, the more concentrated the market. Increased participation by institutional investors and foreign investors, who are notable by their absence – in sharp contrast to equity markets in the region – could help to reduce market concentration and thereby improve liquidity.

Withholding taxes may limit foreign investors' interest in Asian local currency bonds (Takeuchi (2004)). In most cases other than Hong Kong, such taxes are an issue, though how far either the interest forgone or the time and trouble required for refunding such taxes goes in explaining low levels of foreign investment in local markets is not clear. In Korea, it appears that long positions in three-year government bond futures (rather than the cash market) are the main channel for foreign investor participation, which suggests that withholding taxes may be the binding constraint.

... and hedging markets

Gaps in the existence of hedging markets, such as those for interest rate swaps and government bond futures, and underdeveloped funding markets like repurchase markets may reduce liquidity in Asian local bond markets (Barclays (2003), Hohensee and Lee (2004)). Swap markets are either underdeveloped or inactive in many countries, except Hong Kong and Singapore, mainly reflecting regulatory restrictions and the lack of reliable reference rates. Exchange-traded futures have been tried in Hong Kong, Singapore, Korea, Taiwan, Malaysia and India but have achieved critical mass only in Korean three-year bond futures. Repo market development is uneven, hindered by regulatory and taxation issues. Most of the transactions involve central banks, with limited inter-dealer markets in Korea, Malaysia and Singapore. While forward hedging of most local currencies is restricted, the increasing liquidity of

non-deliverable forward contracts may facilitate foreign investment in local currency bond markets by providing hedging instruments (Ma et al (2004)).

Liquidity under stress

Measures and determinants of liquidity in normal markets may not apply to liquidity under stress, which may be a particular challenge for Asian local markets. Even well developed bond markets can show strains in down markets, as in 1994 or mid-2003 (Borio and McCauley (1996)). East Asian markets, with small size, less liquidity and a less diversified investor base, can encounter even more difficulty in times of stress.

Runs in bond markets

The Korean and Thai markets have provided instances in support of the view that markets, like financial institutions, can be subject to runs (Borio (2000)). While such runs can occur in the centre of a market, as when dealers become concerned about each other's solvency and liquidity (counterparty risks in an over-the-counter market), recent Asian cases show that the runs can start among ultimate investors: in response to adverse price movements arising from either generally higher interest rates or unexpected defaults by bond issuers, investors in non-bank financial institutions that held bonds sought to withdraw their funds. This forced the financial institutions in turn to liquidate their bond holdings, which led to a drying-up of bond market liquidity (see box on page 75).[5]

Yields and returns on Asian local currency bonds

Asian local currency bonds yield both more and less than US Treasury securities

Yields on local currency bonds show considerable dispersion, standing both higher and lower than US Treasury yields. Spreads of local bonds over US Treasuries range from –270 basis points to +1,350 basis points, while yields on Asian US dollar sovereign bonds are uniformly higher than those on equivalent US Treasury notes, with spreads ranging from 50 to 800 basis points (Table 2). Local currency bonds of Singapore, Taiwan and, more recently, Hong Kong SAR trade with yields lower than the comparable US Treasury notes. In Singapore and Taiwan, low policy rates and the expected strengthening of the domestic currencies against the US dollar account for lower interest rates. While Hong Kong bonds have usually offered a premium over their US Treasury counterparts, reflecting the risk of currency unpegging, since September 2003 expectations of renminbi appreciation have carried Hong Kong bond yields below US yields. In China and Malaysia, capital controls allow yields that are lower than US yields, despite the fixed exchange rate against the dollar and the absence, until 2003, of expectations of appreciation. In Thailand, low policy rates and expected currency appreciation accounted for lower interest rates in much of last year, but more rapid growth and a much reduced threat of deflation have put pressure on local yields more recently.

[5] It is not clear whether the clearing and settlement infrastructure in Asia, which is regarded as not sufficiently mitigating risks in the settlement process in all cases (Braeckevelt (2004)), contributes to any loss of liquidity during market stress.

Volatility and liquidity in Asia

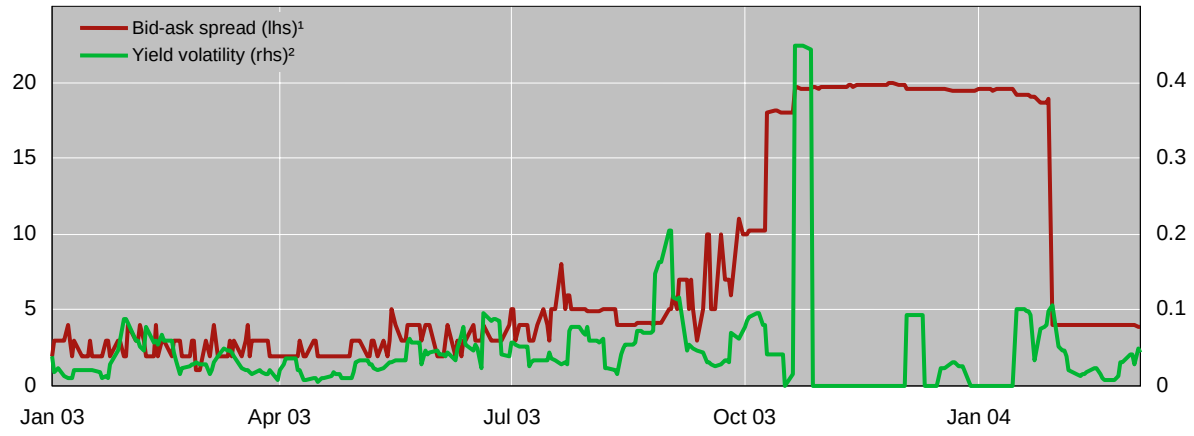
In early 2003, the Korean bond market went through its third crisis since the 1997–98 Asian crisis. Common elements in the three crises were a shock to the assessment of a private firm (Daewoo, Hyundai or SK Group/LG Card), a run on bondholding investment trust companies by households and firms, distress sales of bonds – especially government bonds, illiquidity and eventually government intervention.

More recently, the sell-off in the US Treasury markets during the summer of 2003 as well as domestic developments led to bouts of volatility in Asian local currency bond markets and adversely affected market liquidity. In the latter half of 2003, 10-year bond yields in China, Singapore, Taiwan and Thailand all underperformed the comparable US Treasury notes.

In China, the increase in the reserve requirement in September, the rise in inflation and expectations of a large supply of Treasury bonds led to a major sell-off in a bond market dominated by commercial banks. Ten-year bond yields rose from 2.9% in September to 3.9% in November. This run-up resulted in liquidity vanishing in the primary market, with undersubscription and cancellation of new issues of Treasury bonds.

The sell-off in the Thai baht bond market was triggered by the volatility in the US Treasury markets. However, domestic factors – relaxed restrictions on capital outflows, uncertainty about the timing of government bond issuance and strong performance of the stock market – pushed baht yields up even after the US markets had stabilised. The decline in the net asset value of fixed income mutual funds was sharp owing to the lack of hedging instruments. This led to withdrawals by investors. Mutual funds had to sell bonds to meet redemption requests, further depressing bond prices. As price volatility increased from June, bid-ask spreads widened substantially from about 3 basis points to 10 basis points, and further to almost 20 basis points (see graph below). Though bid-ask spreads also rose in the US Treasury markets amid volatile conditions, the movement in the Thai market was much larger and lasted longer (Kos (2003)). Trading volume fell to less than 1 billion baht a day from about 10 billion baht a day.

Yield volatility and bid-ask spread for Thai government bond maturing in 2012



[1] In basis points. [2] Standard deviations of daily yield changes in the preceding week.

Sources: Bloomberg; HSBC; BIS calculations.

Over the past three years, investing in those instruments with relatively high yields would have tended to produce higher returns in local currency terms (Table 2). The higher-yielding bonds of India and the Philippines performed better both because of capital gains as yields declined and because of the higher yields themselves. Bonds yielding less than comparable US Treasury bonds tended to produce lower local currency returns.

Since exchange rates against the dollar were on average relatively stable during the period, the mix of local currency returns translated into respectable US dollar returns. This conclusion emerges from a juxtaposition of the total returns on Asian local currency bonds in local and US dollar terms (on an unhedged basis), as compiled by HSBC, with those on US Treasuries as compiled by the European Federation of Financial Analysts Societies (EFFAS). Since these sets of returns are available only for indices, we choose the appropriate EFFAS index to match each Asian index's duration.

Outperformance against US Treasury securities ...

Based on these indices, the total returns from Asian local bonds exceeded those on comparable US Treasury bonds from January 2001 to March 2004 (Graph 4). In particular, the total return in US dollars from the HSBC local bond market index during the period is higher than the comparable US Treasury return by about 24 percentage points.[6] Except in China, Malaysia and Singapore (where yields were generally low and currencies stable), Asian local bonds in each economy posted returns in US dollar terms in excess of those on US Treasuries over the 39 months. Exchange rate appreciation did contribute significantly to higher returns in Korea and Thailand, with dollar returns exceeding local currency returns by 10 to 13 percentage points. While exchange rate weakness reduced local currency returns by 17 percentage points in the Philippines, this exchange loss was more than offset by higher yields and capital appreciation. As noted, these factors accounted for higher returns in India, and to a much lesser extent, Hong Kong, over the 39 months.[7]

Yield spreads and returns on Asian local currency bonds

In per cent

	Yield spread[1] 31 Jan 2001	Yield spread[1] 1 Mar 2004	Index return[2]
China 11-year	–1.64[3]	0.44	10.94
Hong Kong SAR 5-year	0.61	–0.33	25.42
India 10-year	5.45	1.29	81.65
Korea 3-year	0.93	2.64[4]	25.99
Malaysia 10-year	–0.01	0.69	14.30
Philippines 3-year	11.94[5]	9.60	54.88
Singapore 10-year	–1.42	–0.71	16.16
Taiwan, China 10-year	–0.04	–1.44	35.65
Thailand 10-year	–0.27	0.42	23.20

[1] Spread over US Treasury of corresponding maturity. [2] Between January 2001 and March 2004; index return in local currency terms, as compiled by HSBC. [3] 11 October 2001. [4] 27 February 2004. [5] 19 October 2001.

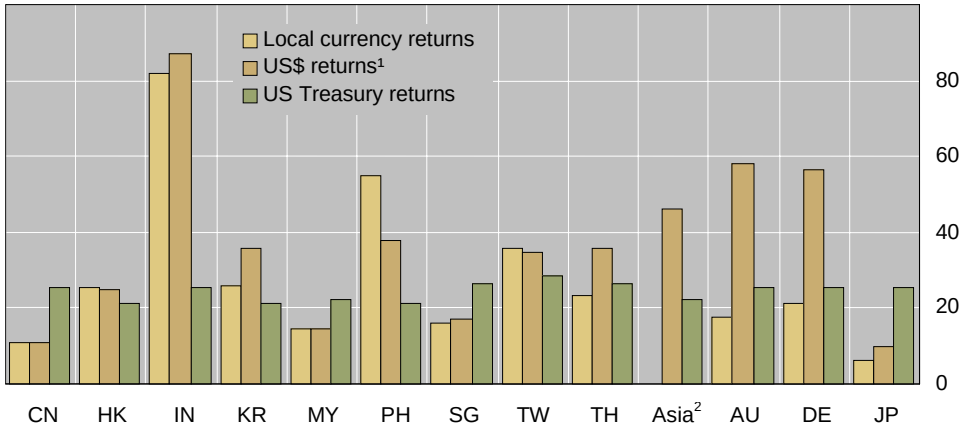
Sources: Bloomberg; HSBC; BIS calculations. Table 2

[6] The HSBC overall Asian local bond total return index covers Hong Kong SAR, India, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand, and is calculated in US dollar terms. The index excludes China since its bond market has not been opened to foreign investment.

[7] See Remolona and Schrijvers (2003) on higher-yielding bonds and returns.

Returns from Asian local currency bonds and US Treasuries

January 2001–March 2004



AU = Australia; CN = China; DE = Germany; HK = Hong Kong SAR; IN = India; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; TW = Taiwan, China.

[1] Unhedged basis. [2] Asian countries shown, except Japan.

Sources: Bloomberg; HSBC; BIS calculations. Graph 4

... but not against euro or Australian dollar bonds

These returns from Asian local currency bonds can be compared to the returns from Australia dollar, euro and Japanese yen bonds. Total US dollar returns from Asian bonds fell short of those from Australian dollar or euro bonds during the 39 months, by about 10 percentage points, owing entirely to the strength of the Australian dollar and the euro against the US dollar.[8] Asian bond dollar returns were higher than those on Japanese bonds.

Lower credit quality

With higher credit risks in Asian bonds, these realised returns alone would not necessarily make such bonds attractive to investors. The credit ratings assigned to Asian local currency sovereign bonds are generally higher than those assigned to their dollar bonds (Kisselev and Packer (2004)). Still, these bonds averaged a credit rating of about A/A2 during the sample period, as compared to the higher ratings assigned to the US Treasury, top-rated European governments and the Australian government. Furthermore, there was a trend towards higher ratings in Asia in the sample period, which would tend to increase realised returns.

Conclusions

Asian local currency bond markets have achieved substantial size since the Asian crisis. Liquidity conditions vary substantially across Asian economies, with market size and larger individual issues working for liquidity and concentration of bond holdings among buy-and-hold investors working against

[8] This discussion of returns is from the perspective of a dollar-based investor, which is appropriate for many portfolios managed in Asia. For a euro-based investor, the ranking would be the same: investing on an unhedged basis in euro or Australian dollar bonds would have led to the highest returns, followed by investing in Asian bonds and then investing in US Treasuries.

it. This implies that measures to consolidate different segments of the markets, such as fewer but larger issues and the unifying of government and central bank debts, would be helpful in improving liquidity. Efforts to develop hedging markets and to build up a broad investor base could help improve liquidity. Such measures might make it less likely that local currency bond markets seize up when hit with a change in liquidity preference or when otherwise stressed.

In most East Asian economies, investing in Asian local currency bonds on an unhedged basis would recently have produced returns in US dollar terms that were higher than similar investments in US Treasury securities, but lower than those in Australian dollar or euro bonds. Higher-yielding local bond markets, which enjoyed capital gains, contributed most to this outcome. To some extent as well, these returns reflect higher credit risk.

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The markets for non-deliverable forwards in Asian currencies[1]

Trading in non-deliverable forwards on Asian currencies has grown in recent years. The offshore interest rates implied by these contracts differ significantly from onshore interest rates and suggest upward pressure on most Asian currencies.

JEL classification: F310, G150, G180, N250.

Active, large and growing non-deliverable forward (NDF) markets trade six Asian currencies. These offshore markets form an important part of the global and Asian foreign exchange markets, equilibrating market demand and supply in the presence of capital controls (Ishii et al (2001), Watanabe et al (2002)).

While the NDF markets have at times presented challenges to policymakers, the rise of NDF trading could nevertheless prove beneficial to the development of local currency bond markets in Asia. Monetary authorities naturally regard these offshore speculative trades and their possible cross-border spillovers with suspicion, and the general trend since the 1997–98 crisis has been to further restrict onshore-offshore interactions. However, liquid NDF markets could serve international portfolio investors by affording them an otherwise unavailable means to hedge foreign exchange risk. An ability to hedge currency risk is particularly important for offshore bond investors. Consequently, NDF markets could potentially facilitate foreign investment in Asia's expanding local currency bond markets and thereby add diversity and liquidity to them (Jiang and McCauley (2004)).

This special feature sketches the characteristics of NDF markets in Asia and analyses the market segmentation between onshore interest rates and offshore interest rates implied by NDFs. Characteristics considered include market turnover, liquidity, volatility, market participants and interactions among the Asian NDFs. The analysis focuses on the implications of the changing spread between the onshore interest rate of the home currency and its NDF-implied interest rate offshore.

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

Characteristics of Asian NDFs

What is an NDF …

NDFs are foreign exchange derivative products traded over the counter. The parties of the NDF contract settle the transaction, not by delivering the underlying pair of currencies, but by making a net payment in a convertible currency (typically the US dollar) proportional to the difference between the agreed forward exchange rate and the subsequently realised spot fixing. NDFs are also distinct from deliverable forwards in that NDFs trade outside the direct jurisdiction of the authorities of the corresponding currencies and their pricing need not be constrained by domestic interest rates.

… and what are its uses?

The NDF market offers an alternative hedging tool for foreign investors with local currency exposure or a speculative instrument for them to take positions offshore in the local currency. The use of Asian NDF markets by non-residents in part reflects restrictions on their access to domestic forward markets (Table 1). However, in some cases, such as Korea, onshore players are also important counterparties in the NDF market of the home currency (Hohensee and Lee (2004)). The NDF markets for some Asian currencies have existed at least since the mid-1990s. Tightening of controls after the Asian crisis may have boosted their growth in some cases.

NDFs arise in response to cross-border restrictions

Why these offshore instruments have emerged in the first place can be illustrated by the birth of the Indonesian rupiah NDF in early 2001 (Goeltom (2002), Watanabe et al (2002)). Before January 2001, *deliverable* rupiah forwards were actively traded offshore, mostly in Singapore, and non-residents enjoyed easy access to rupiah funding. To reduce speculative pressure on the rupiah, rupiah loans and transfers by banks to non-residents and related derivative transactions were prohibited or restricted by Bank Indonesia in January 2001. This effectively limited the offshore deliverability of the rupiah and dried up trading in offshore *deliverable* rupiah forwards. To meet the offshore hedging or speculative demand, an offshore market in rupiah NDFs gradually developed over the following months.[2]

Access to onshore forward markets by non-residents

Chinese renminbi	No offshore entities participate in onshore markets
Indian rupee	Allowed but subject to underlying transactions requirement
Indonesian rupiah	Allowed but restricted and limited
Korean won	Allowed but subject to underlying transactions requirement
Philippine peso	Allowed but restricted and limited
New Taiwan dollar	Only onshore entities have access to onshore market

Sources: HSBC (2003); national data. Table 1

[2] A more actively traded Thai baht NDF market could emerge in the future in response to the recent Bank of Thailand measures to limit non-resident holdings of Thai baht bank accounts. There is effectively no Malaysian ringgit NDF market at the moment, despite restrictions on access by foreign investors to the onshore forward market, possibly because of market-makers' concerns over their onshore banking licences. In Asia, there are also non-deliverable options (NDO) markets that trade off the NDFs.

Average daily NDF turnover in Asia

In millions of US dollars

Sources of estimates	HSBC (mid-2003)	Deutsche Bank (2003–04)	EMTA (1st quarter 2003)	Lehman Brothers (June 2001)	*April 2001 forwards and FX swaps*[1]
Chinese renminbi	1,000	50	150	50	55
Indian rupee	100	20–50	38	35	1,628
Indonesian rupiah	100	50	65	50	301
Korean won	500	700–1,000	1,350	500	4,025
Philippine peso	50	20–30	38	35	301
New Taiwan dollar	500	300–500	250	250	922
Asian six total	2,250	1,140–1,680	1,890	920	7,232
As a percentage of April 2001 forwards, FX swaps and NDFs[1]	*25.1*	*13–19*	*20.7*	*11.3*	

[1] Daily turnover of the forwards and FX swaps is based on BIS (2002).

Sources: Leven (2001); HSBC (2003); Emerging Markets Traders Association (2003); Deutsche Bank (2003); Hohensee and Lee (2004); BIS (2002). Table 2

Turnover

Predominance of Asian NDFs globally

Asia's NDF turnover accounts for the overwhelming majority of global NDF turnover. In particular, NDFs in the Korean won, the New Taiwan dollar, the Chinese renminbi, the Indian rupee, the Indonesian rupiah and the Philippine peso amount to some 70% of the emerging market NDF turnover globally, as measured by an Emerging Markets Traders Association survey in early 2003 (EMTA (2003)).[3]

Korean won NDFs most actively traded

Turnover in the Asian NDF markets varies a great deal across currencies. While reliable, comparable and consistent statistics on NDF turnover are hard to come by, the available survey evidence and estimates by market-makers allow a rough ranking (Table 2). The Korean won NDF market has been the deepest NDF market in Asia as well as globally, with average daily trading volume in excess of $500 million and representing nearly half of the global emerging market NDF turnover. Turnover in the New Taiwan dollar NDF market has been the second most active in Asia. Given the relatively small amount of foreign investment in local currency bond markets, the high turnover in won and New Taiwan dollar NDFs may reflect the active participation of international investors in the Korean and Taiwanese stock markets, though currency hedging is more characteristic of international bond investors.

Rapid growth in Asian NDF markets

Market participants report that the shallower NDF markets in Asia have generally deepened over the past few years. As recently as three years ago, daily NDF turnover in the Chinese renminbi, Indian rupee, Indonesian rupiah and Philippine peso, respectively, was thought to be less than $100 million per day on average. The turnover in the renminbi NDF market has been rising

[3] The major remaining NDF markets are those in Latin American currencies (mainly the Brazilian real and Chilean peso) and the Russian rouble, according to the same survey.

Bid-ask spreads for Asian NDFs

In per cent

	Deutsche Bank estimates[1]	Indicated (6 April 2004)[2]	
		One-month contract	One-year contract
Chinese renminbi	–	0.05–0.07	0.12–0.18
Indian rupee	0.11–0.43	0.23	0.46
Indonesian rupiah	1 mth: 0.24; 1 yr: 1.2	0.35	0.82
Korean won	0.25–0.84	0.09–0.12	0.17–0.21
Philippine peso	–	0.18–0.25	0.53–0.60
New Taiwan dollar	0.08–0.14	0.03	0.06

[1] Based on average US dollar spot rates in June 2003. [2] Based on NDF bid-ask spreads and spot rates as indicated on Reuters.

Sources: Deutsche Bank (2003); Reuters; authors' estimates. Table 3

rapidly since, to about $200 million in early 2003. Estimates of renminbi NDF turnover in 2003 vary, and indeed turnover is said to fluctuate a lot from day to day, but it seems to have doubled over the year. Turnover in the rupiah NDF market seems to have increased substantially from the first months of NDF trading in 2001, with increased non-resident investment in local currency bonds, equities and other assets. Indian rupee and Philippine peso NDF trading seems to have gained depth as well.

A substantial part of forward trading in Asia

NDFs form an important part of overall forward trading in regional currencies. For the six Asian currencies being discussed, the reported NDF turnover represents some 10 to 20% of the combined trading volume of the onshore outright forwards, foreign exchange swaps and NDFs.[4] In the case of China, since domestic trading of outright forwards has only recently begun, and

Volatility of spot, NDF and onshore forward markets

In per cent

	Spot	Three-month NDF	12-month NDF
Chinese renminbi	0.04	1.35	2.75
Indian rupee	1.62	3.28	4.07
Indonesian rupiah	13.89	15.10	15.60
Korean won	6.84	6.90	7.06
Philippine peso	5.02	6.87	8.95
New Taiwan dollar	3.11	4.19	4.76
Memo:[1]			
Japanese yen	*9.41*	*9.52*	*9.23*
Euro	*10.55*	*10.54*	*10.50*
Hong Kong dollar	*0.01*	*0.64*	*0.93*

[1] Three- or 12-month deliverable outright forwards. Annualised standard deviation of daily percentage changes. All of the spot rates, forwards and NDFs are those against the US dollar. The data range is from March 2001 to February 2004.

Sources: Bloomberg; CEIC; authors' estimates. Table 4

[4] The turnover data for outright forwards and foreign exchange swaps are from BIS (2002), while NDF trading volumes are estimates by market-makers (Table 2).

an onshore swap market does not yet exist, renminbi NDFs amount to some 90% of the estimated combined turnover of onshore deliverable forwards and offshore NDFs. Therefore, the importance of NDF markets should not be underestimated, for policymakers and market participants alike.

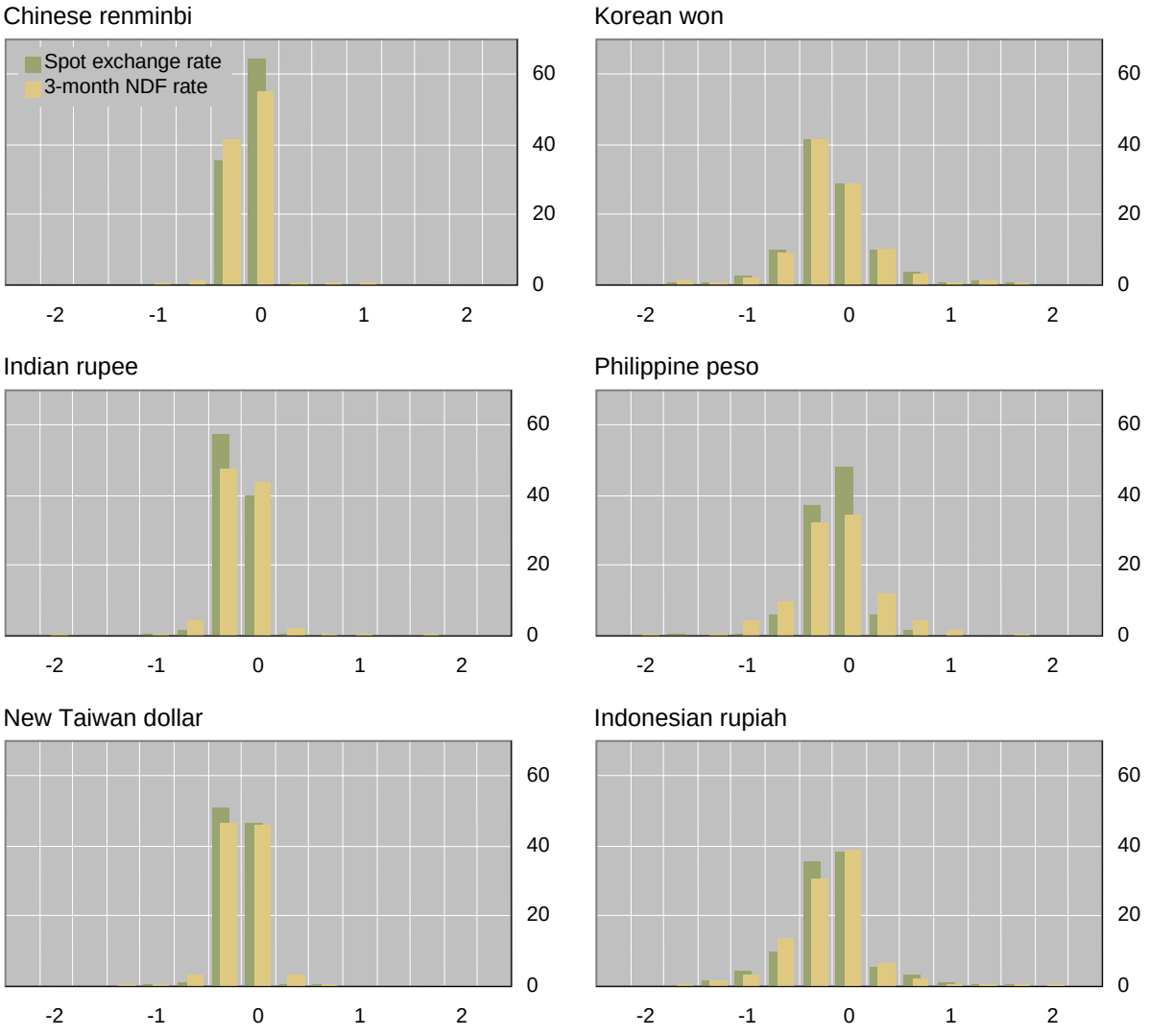
Liquidity

Better liquidity at longer maturities

Liquidity varies with turnover across currencies as well as across maturities (Table 3). Judging by reported bid-ask spreads, the larger and more active NDF markets in Asia – those of the won, the New Taiwan dollar and the renminbi – are comparatively more liquid. The most liquid maturities of the Asian NDFs seem to be much longer than those of the main currency pairs

Frequency distribution of daily percentage changes in spot and three-month NDF-implied US dollar exchange rates

Number of days, January–December 2003



Note: All rates are expressed as domestic currency per US dollar; consequently, positive percentage changes on the horizontal axis denote a depreciation against the dollar.

Sources: Bloomberg; BIS estimates. Graph 1

globally, where the overwhelming majority of forward transactions span three months or less. In Asian NDF markets, most inter-dealer transactions are concentrated in the two- to six-month maturities, while some bank-customer trades even extend out to two to five years, in part due to the importance of foreign direct investment (FDI) in Asia.

Volatility

More volatile than spot rates …

For the period under consideration, NDF volatilities have been consistently higher than their spot counterparts for all six Asian currencies covered (Table 4 and Graph 1). This may be due to official intervention in the respective spot markets. Market participants rank the frequency of official spot market intervention as the highest for China and India, followed by the Philippines and Taiwan (China),[5] and the lowest for Korea and Indonesia. Furthermore, the volatility of the Asian NDFs typically increases with maturity. By contrast, the spot and forward volatilities of the major currency pairs tend to be much more similar.

… and at longer maturities

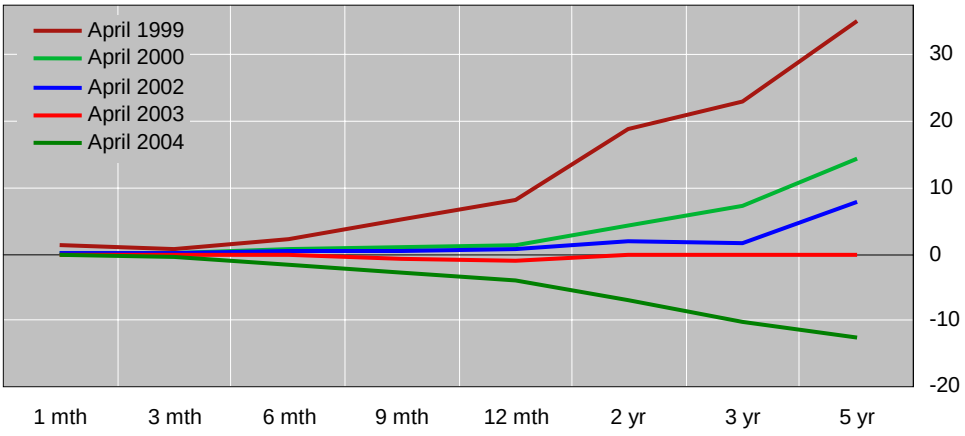
Market participants

A broadening investor base

The investor base for the Asian NDF markets is generally thought to have become broader compared with five years ago. This base mainly comprises multinational corporations, portfolio investors, hedge funds and proprietary foreign exchange accounts of commercial and investment banks.[6] Both hedging demand and speculative demand are present in Asian NDF markets.

Renminbi NDF premium or discount

As a percentage of the spot fixing



Note: First trading day of the months shown. A premium (discount) is shown as a positive (negative) value.

Sources: Bloomberg; authors' estimates. Graph 2

[5] Hereinafter Taiwan.

[6] The net NDF positions of the main market participants in Asia vary over time. Market-makers reported that, as of early 2004, non-resident portfolio investors tended to be most short regional currencies while offshore hedge funds were most long regional currencies. In between, multinationals were somewhat short regional currencies, while offshore market-makers and commercial banks took limited open positions. In the case of the won, where local

Correlation matrix for Asian spots and NDFs

	CNY	INR	IDR	KRW	PHP	TWD
CNY	1	0.061	0.028	0.079	0.016	0.089
INR	*0.006*	1	0.120	0.162	0.103	0.085
IDR	*–0.033*	*0.068*	1	0.216	0.242	0.149
KRW	*–0.001*	*0.131*	*0.160*	1	0.399	0.421
PHP	*0.039*	*0.057*	*0.203*	*0.324*	1	0.254
TWD	*–0.010*	*0.127*	*0.170*	*0.518*	*0.301*	1

Note: CNY = Chinese renminbi; IDR = Indonesian rupiah; INR = Indian rupee; KRW = Korean won; PHP = Philippine peso; TWD = New Taiwan dollar. Correlations for the daily percentage changes of the three-month NDF (upper right-hand side of the matrix) and spot (lower left-hand side of the matrix in italics). March 2001 to February 2004.

Sources: Bloomberg; authors' estimates. Table 5

In the case of the won and the New Taiwan dollar, portfolio investors and hedge funds are probably the most important players. In contrast, in the case of the renminbi, multinationals (given large FDI inflows into China in recent years) and more recently hedge funds (owing to heightened market speculation) probably play a greater role.

Renminbi NDF premia (discounts) larger at longer maturities

Differences in the offshore renminbi forward rates across maturities are said to reflect differences in the preferred maturity habitats of various market participants. The observation is that longer maturities show larger renminbi NDF premia (in the late 1990s) or discounts (recently) (Graph 2). Multinational corporate players probably trade along both short and long maturities, owing to their diverse needs. In contrast, hedge funds' bets reflect market analysts' often refreshed calls for an exchange rate policy change at a horizon of nine months or more. Hence the premia or discounts in the renminbi NDFs have tended to be larger at longer maturities, as speculative players positioned themselves for a possible renminbi devaluation during and after the Asian crisis or a possible revaluation after late 2002.

Correlations between Asian NDFs and major forwards

	Japanese yen		Euro	
	Three-month	12-month	Three-month	12-month
CNY	0.059	0.076	–0.062	–0.032
INR	0.092	0.063	–0.098	–0.097
IDR	0.120	0.128	–0.011	–0.028
KRW	0.495	0.506	–0.182	–0.018
PHP	0.305	0.268	–0.167	–0.150
TWD	0.347	0.312	–0.260	–0.290

Note: See Table 5 for an explanation of the currency codes. The correlation of daily percentage changes of the Asian NDF and bilateral dollar forward of the yen (or euro) against the US dollar of the same tenor. March 2001 to February 2004.

Sources: Bloomberg; authors' estimates. Table 6

banks are important counterparties, onshore banks were found to be overwhelmingly long won in the NDF market, accommodating offshore short positions.

NDF trading hubs

Within the Asia-Pacific region, the principal trading locations for Asian NDFs are in Hong Kong SAR, Singapore, Korea, Taiwan and Japan. Singapore is often thought to be the largest hub, according to the incomplete information available in the central bank 2001 triennial global foreign exchange market survey. Outside the region, New York and London are the principal locations for trading Asian NDFs.

Interactions among Asian NDF markets and with other forward markets

Higher positive correlations among NDFs than among spot rates

The NDFs of the six Asian currencies under consideration have displayed closer co-movements than their spot counterparts (Table 5). In particular, daily percentage changes of the three-month Asian NDFs are all positively correlated with each other and, except for the New Taiwan dollar, exhibit stronger correlations than the respective pairs of spot exchange rates. While the spot correlations between the renminbi and the other five currencies are near zero, their NDF correlations are somewhat higher.

The yen is a possible common influence

A possible common influence underlying the above positive correlations among most Asian NDFs is the yen (Table 6). The euro may also play a role, albeit to a lesser extent, for all but the Indian rupee. All six Asian NDFs have generally strengthened against the US dollar in response to an appreciating yen or euro. The won, Philippine peso and New Taiwan dollar NDFs have shown the greatest co-movement with the yen forwards.

Renminbi NDFs and Hong Kong dollar forwards

Market participants harbour changing notions about the relationship between the renminbi and the Hong Kong dollar, as seen in the time-varying correlations between the respective NDFs and forwards. During and after the 1997-98 Asian crisis, many viewed the liquid Hong Kong dollar as an imperfect proxy for the renminbi, which was still illiquid in NDF trading at the time, on the assumption that a depreciation of the latter would unpeg the former. In 2002 and early 2003, the theme of convergence between a rapidly growing mainland and a mature and deflationary Hong Kong SAR led some to take positions short the Hong Kong dollar forward and long the renminbi NDF, contributing to a negative correlation. All changed in September 2003, however, when the market's interpretation of the call for exchange rate flexibility in the G7 communiqué exerted appreciation pressure on not only the renminbi but also the Hong Kong dollar, resulting in a positive correlation. For the period 2001–04 as a whole, the correlation of the pair is 0.28 for 12-month contracts.

Onshore/offshore interest rate spreads

Large and persistent spreads between the onshore yield on the home currency and its NDF-implied offshore yield are found for five of the six Asian currencies covered. Wide spreads suggest that capital controls effectively segment the onshore and offshore markets.[7] The Korean won stands out as an exception, probably owing to active if not completely unconstrained arbitrage by onshore participants in the offshore won NDF market. Furthermore, the signs of these

[7] For a review of the literature on cross-border mobility and capital controls, see Frankel (1992).

spreads may also reflect the direction of the underlying market pressure on these currencies in the presence of capital controls. Finally, these spreads have narrowed and become less volatile over recent years.

Construction, interpretation and limitation of onshore spreads

Size of spread measures segmentation ...

One way to measure the degree of cross-border market segmentation caused by capital controls is the spread between the onshore interest rate and the NDF-implied offshore interest rate on the home currency (Box 1). Using US dollar Libor, the NDF rate and the bilateral dollar spot rate (of the same maturity and annualised), one may derive the offshore interest rate on the home currency as implied by covered interest parity. This NDF-implied offshore yield on the home currency could be substantially negative, as it is not constrained by the zero lower bound for nominal interest rates. A substantial onshore/offshore yield gap would suggest that capital controls effectively segment onshore and offshore markets.

... and its sign signals market pressure

Further, the sign of the onshore/offshore yield spread can signal underlying market pressure on the currency. An onshore interest rate above its offshore NDF-implied counterpart would indicate underlying appreciation pressure on the home currency but effective capital controls limiting capital inflows into the home currency. An onshore rate below its offshore counterpart would indicate depreciation pressure but effective stemming of capital outflows.[8] Finally, the volatility of the spread may also contain information

Box 1: The spread between onshore yields and NDF-implied offshore yields

In the absence of capital controls, the forward exchange rate of the home currency is linked by arbitrage to its spot rate and the interest rate differential between the home currency and the US dollar through the covered interest parity condition

$$F = S(1+r)/(1+r^{\$})$$

where F is the forward rate, S the spot rate, r the interest rate on the home currency and $r^{\$}$ the US dollar interest rate. When there are no cross-border restrictions, borrowing and lending ensure that the above holds.

However, when capital controls bind, non-residents may not have full access to onshore credit or placements, giving rise to NDFs.

$$NDF = S(1+i)/(1+r^{\$})$$

where i is the NDF-implied yield on the home currency offshore. To the extent that the arbitrage between the onshore money market and offshore NDF market is effectively constrained by capital controls, the NDF-implied offshore interest rate, i, can differ considerably from the interest rate prevailing in the onshore money market, r. A large and persistent onshore/offshore spread ($r - i$) indicates the presence of effective cross-border restrictions.

Another, in principle equivalent, approach is to estimate the implied onshore yield on the home currency using the onshore deliverable forwards and then to compare it to the NDF-implied offshore yield. Alternatively, one may directly compare the onshore deliverable forwards with their NDF counterparts to derive a forward premium spread. The merits of these different approaches depend in part on data availability and market liquidity.

[8] A zero spread may suggest the absence of effective capital controls, or the absence of market pressure on the home currency, or both.

about the depth of the spot, NDF and onshore money markets, and the ease of transacting across them.

Some qualifications

Interpretations of onshore/offshore interest spreads are qualified, however, by a number of limitations. Ideally, the comparison should be between a liquid onshore bank interest rate and a similarly liquid offshore implied rate. But the fact that the domestic money market is most liquid at short maturities, while NDF markets tend to be more liquid at medium to long maturities, makes it hard to find good liquidity at matching maturities. In the case of India, Indonesia and the Philippines, public sector interest rates rather than bank interest rates are used. Since NDFs involve global banks with a higher credit rating than onshore banks or even sovereigns, and in any case start out with only potential credit risk, onshore yields could exceed offshore implied yields even with full capital mobility. This implies that evolving credit and country risk premia may complicate the interpretation of variations in the onshore/offshore interest spreads.

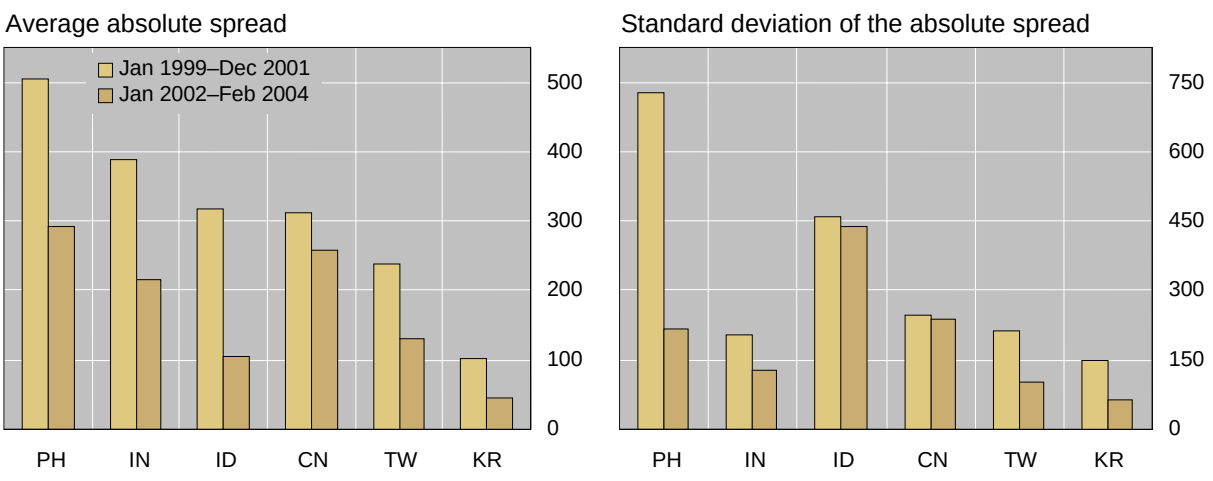
Findings

Capital controls bind to varying degrees

Our estimates of the three-month onshore/offshore interest spread for the six Asian currencies actively traded in NDF markets suggest that capital controls in Asia are binding to varying degrees, weakening or even preventing cross-border arbitrage (Graph 3). The main exception is the case of the Korean won (Box 2). The estimated spreads for the other five Asian currencies appear to be mostly larger than what could be accounted for by other factors (such as transaction costs).

Spreads between onshore and offshore NDF-implied yields

In basis points



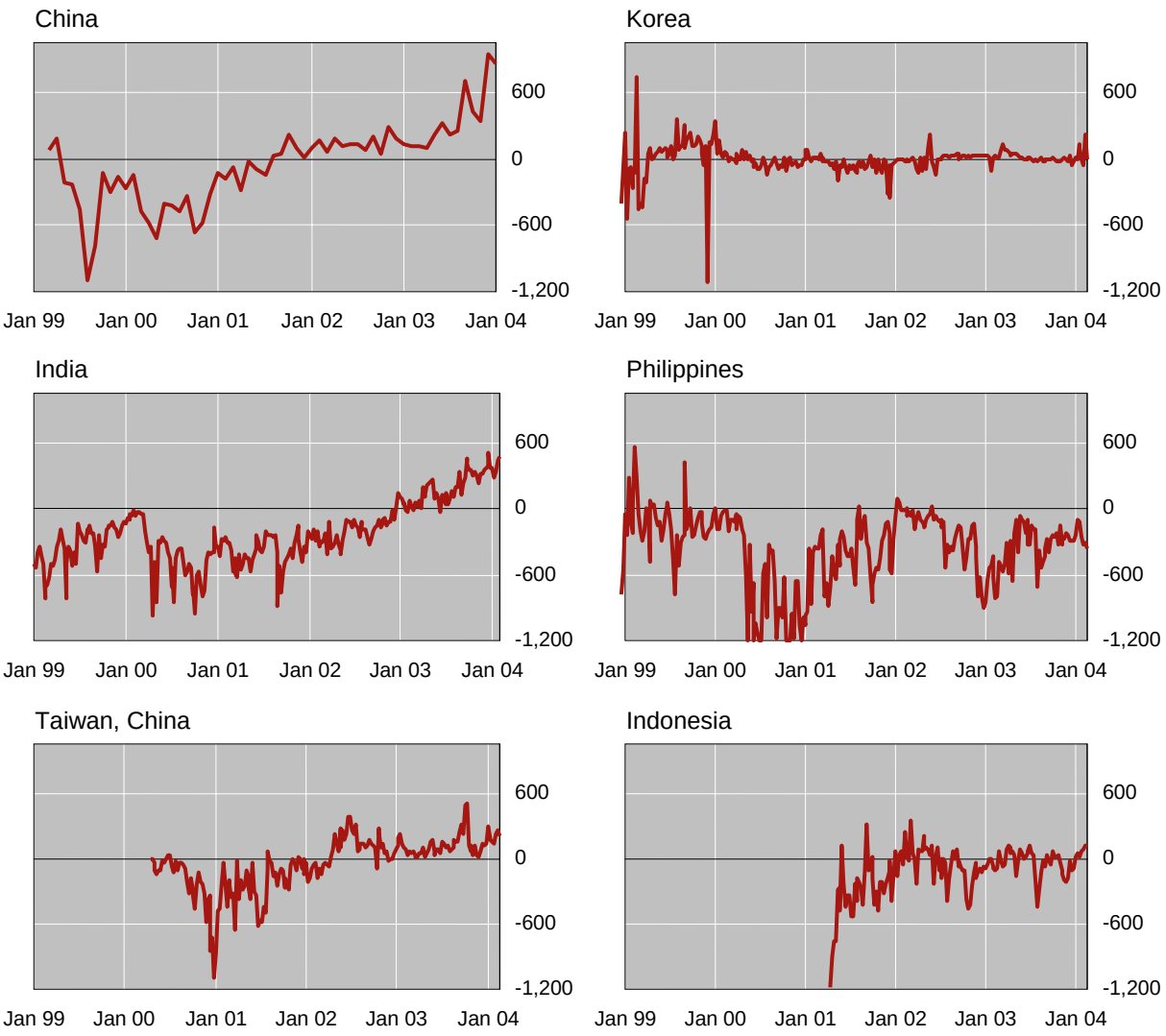
CN = China; KR = Korea; ID = Indonesia; IN = India; PH = Philippines; TW = Taiwan, China.

Note: The spread is calculated as the difference between a representative three-month onshore money yield and the NDF-implied offshore yield of the same maturity. The NDF-implied offshore yield is inferred from the spot rate, the NDF rate and US dollar Libor. The onshore yield is: for Korea, the CD rate; for Taiwan (China), the secondary CP rate; for Indonesia, the Bank Indonesia certificate rate; for China, Chibor; for India, the 91-day T-bill auction yield; and for the Philippines, the secondary 91-day T-bill rate. For Taiwan (China), data start in April 2000; for Indonesia, March 2001.

Sources: Bloomberg; CEIC; authors' estimates. Graph 3

Onshore less offshore NDF-implied yields

Three-month rates, in basis points



Note: See Graph 3. For China, monthly data; for all others, weekly.

Sources: Bloomberg; CEIC; BIS estimates.

Graph 4

Wide swings in underlying market pressure

The relationship between the onshore and NDF-implied offshore yields also seems to reflect the swings in the underlying market pressure on the currencies in question (Graph 4). In the wake of the Asian crisis, offshore implied interest rates were higher than onshore rates, reflecting ongoing depreciation pressure in the offshore trading at the time. Since 2001–02, however, offshore positioning on further Asian currency appreciation has driven offshore implied interest rates below onshore rates for some Asian currencies.

This development is most obvious in the case of the Chinese renminbi and the Indian rupee, where the estimated onshore/offshore interest rate spreads swung widely from a negative 400–1,000 basis points in 1999–2001 to a positive 400–1,000 basis points by late 2003. The New Taiwan dollar and the

Box 2: The Korean won NDF market

The Korean won NDF market, the largest and most liquid NDF market globally, continues to thrive offshore alongside a large and active onshore forward market. This is in spite of its effective integration with the onshore money market as measured by the very small spread between onshore and offshore yields (see Box 1). Why? There are three possible explanations.

The first explanation is the residual exchange regulations in Korea, where underlying cross-border transactions (trade or investment) and documentation requirements apply to onshore forward trading. Thus, pure speculative demand for won has to be met offshore. Moreover, in order to reduce pressure for depreciation, the authorities have limited the Korean banking system's ability to provide credit to offshore entities. In particular, won lending by local banks to non-residents required case by case approval before April 1999. Thereafter, the system shifted to a rule-based regime of a won lending quota that was raised from KRW 100 million by one domestic bank to a single non-resident to KRW 1 billion after January 2001. In the face of pressure for appreciation, the authorities introduced new restrictions on the net won NDF positions taken by onshore banks in January 2004, only to partially ease them in February 2004 (Hohensee and Lee (2004)).

These evolving regulations may give rise to an asymmetry of the onshore/offshore spreads (see the table in this box). Before April 1999, the average absolute size of the yield spread when the offshore yield exceeded the onshore yield is larger than when the offshore yield was less than the onshore yield. This was consistent with the policy bias against won outflows at the time. The rule-based won lending quota lessened such a bias, resulting in similar average sizes of the negative and positive spreads for the 1999–2003 period. The latest measure in early 2004 was intended to discourage offshore investors' speculative won demand and to limit onshore banks' arbitraging between the domestic market and NDFs. This has indeed led to larger absolute spreads when onshore yields are below offshore yields.

A second and alternative hypothesis is that the offshore NDF market allows foreign investors to limit taking on credit risk in currency trading. The observation that onshore rates rose relative to offshore rates in early 2003 at a time of heightened concerns over bank credit may be relevant. This observation suggests that the onshore yields embody more credit risk than do their offshore counterparts, both because of the nature of the contract (offshore, only differences are at risk to counterparty failure, not the full amount invested in a domestic certificate of deposit) and because of the credit ratings of market participants (a larger share of foreign banks offshore).

A third view is that a thriving offshore NDF market benefits from the inertia of liquidity, so that trade remains in the offshore Korean won NDF market because it is liquid. This perspective is associated with the notion that liquidity begets liquidity in financial markets, consistent with the tight bid-ask spreads in the won NDF market.

Absolute size of onshore/offshore[1] yield spreads

In basis points

	Onshore yield above offshore yield	Onshore yield below offshore yield
Nov 1998–Mar 1999	106.6	281.6
Apr 1999–Dec 2003	69.4	67.1
Apr 1999–Dec 2000	*109.4*	*81.4*
Jan 2001–Dec 2003	*39.3*	*60.8*
Jan 2004 to date	143.5	75.3

[1] Three-month NDF.

Sources: Bloomberg; authors' estimates.

rupiah also show similar but less pronounced trends. The market's interpretation of the G7 communiqué on exchange rate flexibility in September 2003 looks to have manifested itself as a spike in the onshore/offshore yield spreads for China, India and Taiwan.

A notable exception to the above trend is the Philippine peso. Just as it alone weakened vis-à-vis the US dollar in the spot market, it showed consistently higher offshore NDF-implied interest rates.[9]

Spreads have narrowed over time

Over time, however, the estimated absolute spreads for all six Asian currencies have narrowed considerably, sometimes by as much as two thirds, and the variability of the estimated spreads has also diminished noticeably (Graph 3). In addition to the possibility that pressure for appreciation is weaker or more consistent than the depreciation pressure in previous years, two possible reasons for these observations can be offered. First, liquidity in the NDF markets and the quality of data on them may have improved. For example, the initial large onshore/offshore yield spread for the Indonesian rupiah briefly seen around early 2001 may be due to a lack of liquidity in the nascent rupiah NDF market. Second, controls on capital flows may have diminished or may be consistently less effective against the recent incipient inflows. For instance, until recently, most regulations on cross-border transactions in China and Korea had been biased against capital outflows.

Conclusion

Six Asian currencies trade actively in NDF markets. Their turnover represents the bulk of global trading in NDFs and amounts to a substantial fraction of onshore outright forward and foreign exchange swap turnover in the same currencies. Aggregate turnover in regional NDFs has risen, particularly in the renminbi. The Asian NDF volatility is typically larger than the spot counterpart, owing in part to official intervention in the spot market. Asian NDFs tend to correlate more positively with each other than do their spot counterparts and respond similarly to movements in the forwards of major currencies.

The wide spreads between onshore interest rates and NDF-implied offshore interest rates suggest effective segmentation of onshore and offshore markets in Asia, with the exception of Korea. The recent upward pressure on most Asian currencies is evident in the low and even negative NDF-implied offshore interest rates. One implication of the large negative implied offshore yields is that competing firms with or without offshore operations may face rather different funding costs. However, both the size and volatility of such spreads have diminished in recent years for all six Asian currencies covered.

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[9] The large negative spread briefly observed around late 2000 and early 2001 was consistent with the political instability at the time.

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

Basel Committee on Banking Supervision

The BCBS issues three notes

In January, to clarify various aspects of the new capital adequacy framework, the Basel Committee on Banking Supervision (BCBS) published three technical papers. One deals with the treatment of unexpected losses, one with securitisation and one with cross-border operational risk.

The first discusses a move to risk weights based on unexpected loss

The first note, *Modifications to the capital treatment for expected and unexpected credit losses*, is a response to comments on a new proposal by the BCBS on risk weights for capital purposes. In October 2003, the BCBS had announced its intention to move to a risk weighting based only on *unexpected* loss, while allowing provisions to deal with *expected* loss. The Committee had asked for comments on this revision, and received 52 comment letters. Respondents generally welcomed the solution and agreed that it would align regulatory capital more closely with the concepts underpinning banks' economic capital modelling processes. Many respondents, however, requested the BCBS to provide more detailed information on the new framework. With this in mind, the note describes the concrete modifications decided upon at a meeting in January 2004. In summary, for the internal ratings-based (IRB) approach, expected losses will be removed from the risk weight functions. However, banks will be required to compare their actual provisions with expected losses. Any shortfall should be deducted equally from Tier 1 and Tier 2 capital and any excess will be eligible for inclusion in Tier 2 capital subject to a cap. The current treatment of general provisions will be withdrawn from the IRB approach. The BCBS does not intend to make any changes to the standardised risk weights. Where banks are partly on the standardised approach and partly on the IRB approach, an element of general provisions may be retained in Tier 2 capital.

The second deals with changes to the securitisation framework ...

The second note, *Changes to the securitisation framework*, deals with plans to revise the IRB approach to securitisation exposures. In response to public comments on the *Third consultative paper (CP3)* on Basel II, the BCBS had announced in October 2003 that it would modify its approach to these exposures. At its January 2004 meeting, it specified changes that address industry concerns over the complexity of the securitisation proposal and the

operational burden related to its implementation. In addition, the BCBS focused on industry comments regarding the need for greater internal consistency among the proposals comprising the securitisation framework. The technical note provides an overview of the Committee's current thinking on how the securitisation framework for banks that adopt the IRB approach to credit risk will be restructured. The BCBS is simplifying the framework and promoting greater consistency among the available approaches in the following manner. First, it is planning to adopt a procedure for certain low-risk unrated positions that more closely reflects leading banks' current risk management practices. Second, it will offer simpler alternatives to the supervisory formula presented in CP3 for the treatment of unrated positions, which some respondents considered to be unnecessarily complex and computationally burdensome. Third, it is considering ways to add flexibility to the top-down approach to calculating capital charges on purchased receivables so as to facilitate the calculation of the capital charge that would have been applied to the underlying exposures had they not been securitised. Fourth, all externally rated positions will be treated under the ratings-based approach (RBA), regardless of whether the bank is an originator or an investor and whether the position falls above or below the capital charge threshold. Finally, the lowest set of risk weights under the RBA will be applied to "senior" positions rather than to those that are "thick" positions as defined in CP3. Some changes to the risk weights are also proposed.

... with a view to simplifying it and making it more consistent

The third note, *Principles for home-host recognition of AMA operational risk capital*, sets out an approach to operational risk capital allocation that addresses concerns expressed by a number of organisations in their *Comments on CP3* about practical impediments to the cross-border implementation of an advanced measurement approach (AMA) for operational risk. This approach shows how a banking organisation calculating a group-wide AMA capital requirement might calculate the operational risk capital requirements of its subsidiaries.

The third examines cross-border operational risk

Committee on Payment and Settlement Systems

In March, the Committee on Payment and Settlement Systems (CPSS) and the Technical Committee of the International Organization of Securities Commissions (IOSCO) released a consultative report entitled *Recommendations for Central Counterparties*. The report, prepared by a joint Task Force on Securities Settlement Systems (SSSs), sets out comprehensive standards for risk management of a central counterparty (CCP).[1] A well designed CCP with appropriate risk management arrangements reduces the risks faced by SSS participants and contributes to the goal of financial stability. CCPs have long been used by derivatives exchanges and a few securities exchanges. In recent years, they have been introduced into many more securities markets, including cash and over-the-counter markets. Although a

The CPSS publishes recommendations for central counterparties

[1] A central counterparty interposes itself between counterparties in financial transactions, becoming the buyer to the seller and the seller to the buyer.

CCP has the potential to reduce risks to market participants significantly, it also concentrates risks and responsibilities for risk management. Therefore, the effectiveness of a CCP's risk control and the adequacy of its financial resources are critical aspects of the infrastructure of the markets it serves. In the light of the growing interest in developing CCPs and expanding the scope of their services, the CPSS and the Technical Committee of IOSCO concluded that international standards for CCP risk management are a critical element in promoting the safety of financial markets.

Financial Stability Forum

The Financial Stability Forum (FSF) met in Rome on 29–30 March. Discussion focused on three key topics: vulnerabilities in the international financial system; offshore financial centres; and market foundations and corporate governance.

Vulnerabilities in the international financial system

FSF members become more optimistic about the global upswing

FSF members were more optimistic about the global upswing than at their previous meeting in September 2003. Recovery was being supported by accommodative policies, favourable financing conditions and rising corporate profits. Balance sheets of financial corporations had generally improved, increasing systemic resilience. However, members felt that there could be risks relating to interest rates, inflation, asset valuations and market liquidity as the global economy strengthened and policies eventually moved to more neutral settings. In addition, substantial international imbalances persisted and it was thought that these could present challenges going forward.

Members focus on household indebtedness and the external financing of EMEs

Members reviewed the risks and policy implications of high levels of household indebtedness in many countries. Most felt that this indebtedness was unlikely to pose a significant direct risk to financial system stability but could increase the sensitivity of consumer spending to interest rate or income shocks. In emerging market economies (EMEs), fundamentals and external financing conditions had improved further, reflected in a marked compression of spreads on EME debt. Some members expressed concern that conditions might tighten in the period ahead, perhaps in response to a shift in policies in major economies or a sudden shock affecting investor confidence.

Turning to other areas, the Forum received a report from the International Association of Insurance Supervisors (IAIS) Task Force on Enhancing Transparency and Disclosure in the Reinsurance Sector. The Task Force had developed a framework for collecting, processing and publishing reinsurance market statistics covering a significant proportion of global activity. The statistics will be published later this year and will enhance transparency in the sector. However, more needs to be done to improve disclosure. In that regard, members welcomed the establishment of the IAIS Steering Group on Transparency in the Reinsurance Sector to carry work forward.

They also discuss a Joint Forum study on credit risk transfer

Members also exchanged views on interim results of a Joint Forum study on credit risk transfer. The study covers recent market developments, market participants' understanding of the risks involved, possible credit risk

concentrations and risk management practices. Members saw great value in this work and looked forward to ongoing efforts in this area.

Offshore financial centres (OFCs)

The Forum discussed progress made by OFCs in strengthening regulatory and information exchange standards. Members judged that progress had been made but that further reform was required in a number of OFCs. The Forum encouraged these OFCs to maintain reform momentum, making use of technical assistance from the IMF and others. It placed particular emphasis on improvements to cross-border cooperation and information exchange. In this respect, members strongly urged all OFCs to publish their IMF assessments.

Market foundations and corporate governance

Members exchange views on corporate governance ...

Members noted that recent corporate incidents, including the Parmalat case, had highlighted the importance of implementing measures to strengthen corporate governance and financial reporting frameworks. But they also illuminated other issues, inter alia the need to review implementation of existing standards on information exchange and cooperation, the role of unregulated entities and complex group structures, the adequacy of risk management in large commercial and investment banks and corresponding regulatory challenges. The FSF welcomed the creation by IOSCO's Technical Committee of a special Chairmen's Task Force to look into several of these issues.

... and greet reforms carried out by IFAC ...

The Forum greeted the adoption by the International Federation of Accountants (IFAC) of reforms on audit-related standard-setting activities, including the proposal to create an independent Public Interest Oversight Board (PIOB) to monitor and review progress in this area. Forum members urged that this important body be set up as soon as possible. Members also looked forward to the results of a survey on national auditor oversight arrangements that is to be led by IOSCO.

... as well as work by the IASB and the FASB

With regard to accounting, members welcomed the completion by the International Accounting Standards Board (IASB) of improvements to existing standards, progress in the convergence project with the Financial Accounting Standards Board (FASB), and the efforts of all parties to finalise IAS 39. The FSF noted the need for further work on outstanding issues, taking into account financial stability considerations.

Finally, members reviewed matters relating to credit rating agencies (CRAs) in the light of the US Securities and Exchange Commission's follow-up to its *Concept Release* on CRAs, which was issued in June 2003. Members also welcomed the establishment by IOSCO's Technical Committee of a task force to develop a code of conduct for CRAs.