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4. Derivatives markets

In the first quarter of 2005 the turnover of exchange-traded derivatives returned to solid growth after two consecutive quarters of contraction. The combined value of trading in interest rate, stock index and currency contracts rose by 19%, to $333 trillion. Activity was buoyant in all market segments, albeit stronger for interest rate products. In the interest rate segment, activity may have been influenced by increased uncertainty over long-term rates, as bond markets sold off in late February and early March. Trading in equity index contracts was probably boosted by a rally in major stock indices in February, after surprisingly strong corporate earnings reports and the announcement of several large mergers.

In the global over-the-counter (OTC) derivatives market, the most recent data show that positions expanded in the second half of 2004. Notional amounts outstanding were up by 12.8%, to $248 trillion at the end of December. Gross market values rose by 43%, to $9.1 trillion as of end-December, and by 40%, to $2.1 trillion, after considering legally enforceable bilateral netting agreements. As a ratio to overall notional amounts, gross market values, after considering such netting agreements, rose only marginally, to 0.8%.

With this issue the BIS is starting to publish statistics on credit default swaps, the most dynamic component of the OTC segment.[1] As of end-December 2004 notional amounts outstanding of these instruments stood at $6.4 trillion. According to data reported in the *Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity* released on 17 March 2005, credit-related derivatives rose by 568% in the three years ending June 2004, nearly five times as rapidly as the overall OTC segment.

Buoyant activity along the yield curve

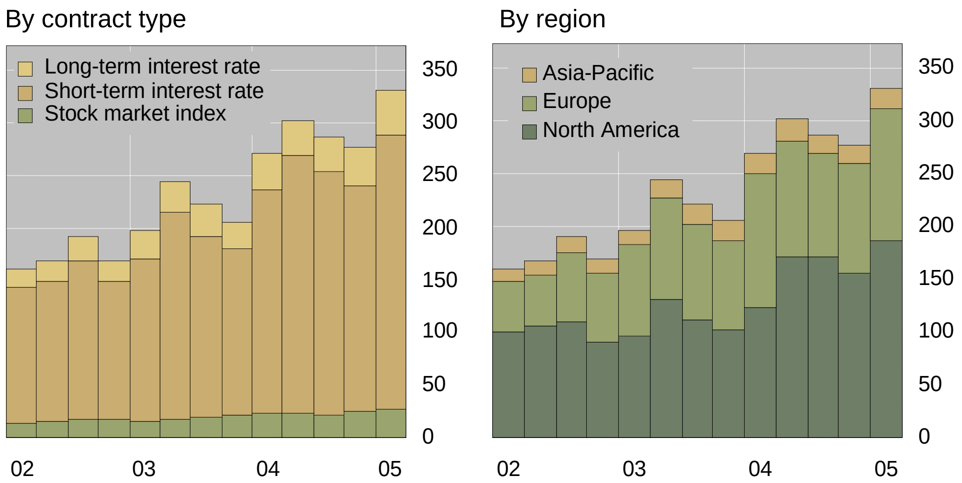
Rise in activity in short rate-related products ...

The aggregate turnover of exchange-traded fixed income contracts rose by 21% in the first quarter of 2005, to $304 trillion. Increased activity derived from contracts on both short and long rates. Trading on money market contracts,

[1] With this issue, the BIS is also starting to publish concentration measures for OTC derivatives markets. These figures are commented on in the BIS press release *OTC derivatives market activity in the second half of 2004* (20 May 2005), available at www.bis.org.

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

including those on eurodollar, Euribor and euroyen rates, rose by 21% to $262 trillion, with strong activity for both futures and options. For bond-related instruments, turnover was up by 20% to $43 trillion (Graph 4.1).

... across maturities and geographical areas

Unlike the previous two quarters, activity in short-term contracts was strong in all regions. Trading increased by 23% in the United States, to $159 trillion, with futures and options up by 17% and 38%, respectively (Graph 4.2). Business rose by 18% in Europe, to $95 trillion, with activity in futures up by 13% and that in options by 41%.

The rise in business in short-term derivatives was not due to increased uncertainty over the course of monetary policy. Most investors expected that Fed tightening would continue in gradual increments over the next few months at least, as evidenced by unanimous federal funds rate target forecasts made by all participants in a Bloomberg survey. Significantly, business in federal funds products, which had fallen noticeably in the last part of 2004, shrank by an additional 1% and 14% in the first quarter of 2005 for futures and options, respectively. However, over the same period, activity in three-month eurodollar futures and options rose by 20% and 60%, respectively.

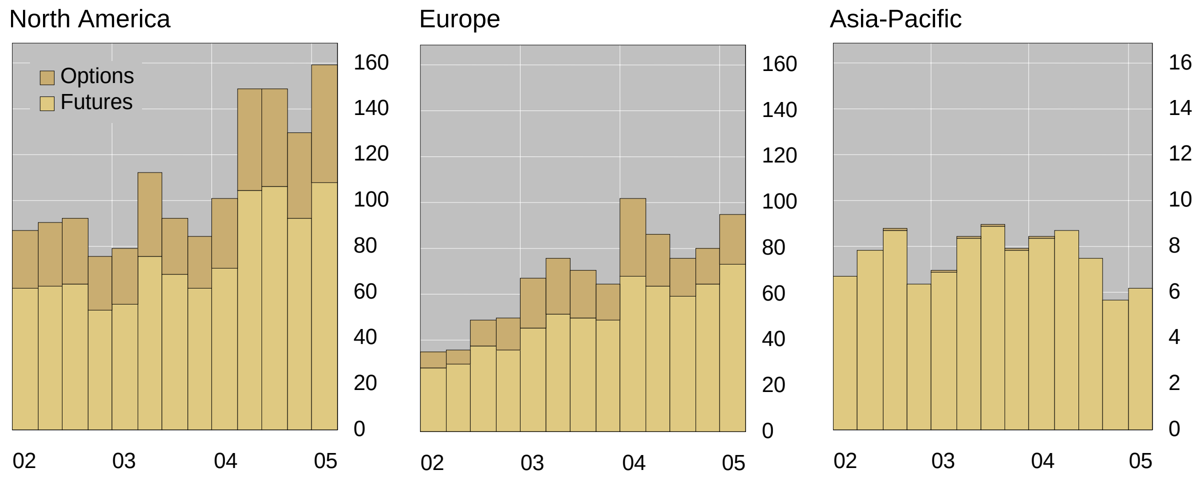
Uncertain growth prospects favour European long-term contracts

In the long-term interest rate segment, contracts expanded by 20% in the first quarter, to $43 trillion. Business was up by 11% in North America to $15 trillion, and by 27% in Europe to $25 trillion (Graph 4.3). In the US market, activity might have been related to hedging needs in connection with an unexpected flattening of the curve in the early part of the period, followed by an abrupt sell-off at the long end in late February and early March. In European marketplaces, higher interest rate uncertainty may also have played a role – implied volatilities on swap rates were up 3 percentage points over the quarter, as macroeconomic news from Europe over the period was quite mixed.

As in the fourth quarter, trading at the long end of the maturity spectrum may also have been favoured by an increasing steepness of the term structure of implied volatilities, which was particularly pronounced in the United States, due to sharply falling volatilities at the short end (Graph 4.4). The higher

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

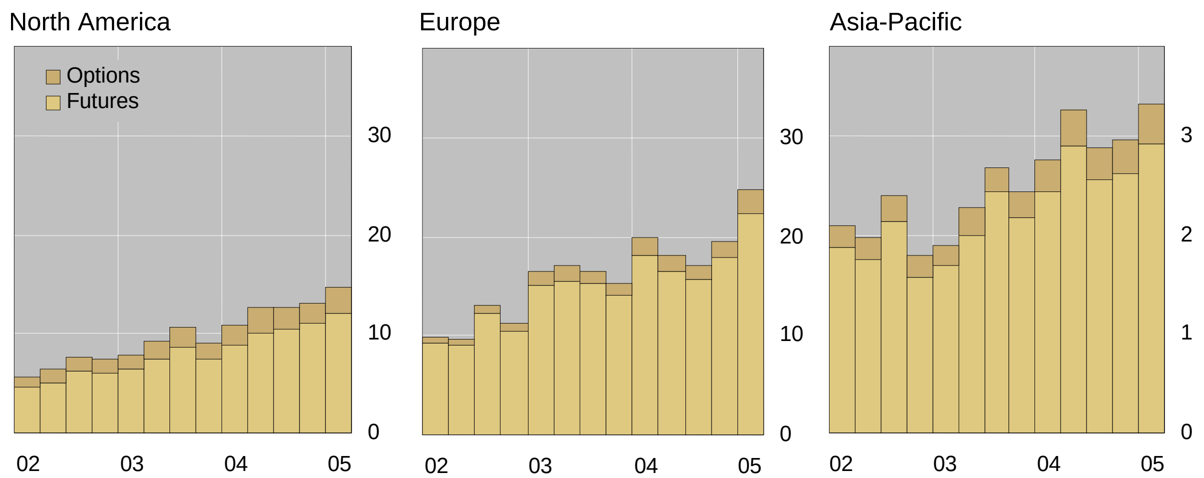
relative expected volatility of long-term rates changed the sensitivity of interest rate portfolios to both maturity changes and interest rate changes, possibly raising the need for hedging activity.

Business expands in Asia

After two quarters of contraction, business returned to growth in the Asia-Pacific region, with turnover up by 10% to $9.5 trillion. Activity rose by 9% in short-term rate contracts and by 12% in long rate contracts. Business in the short-term segment was stronger in the Pacific region, up by 13%, than in Asia, where it grew by 2% only. Among Asian countries, activity recovered in Japan, up by 19%, after a 27% slide in the previous quarter, while it continued to fall in Singapore, down by 17%. Both short rate and long rate position-taking in Japan increased through the quarter. This development probably reflected greater uncertainty about prices and growth: Bank of Japan forecasts in January suggested a marked decline in anticipated price pressures, though the

Turnover of government bond contracts

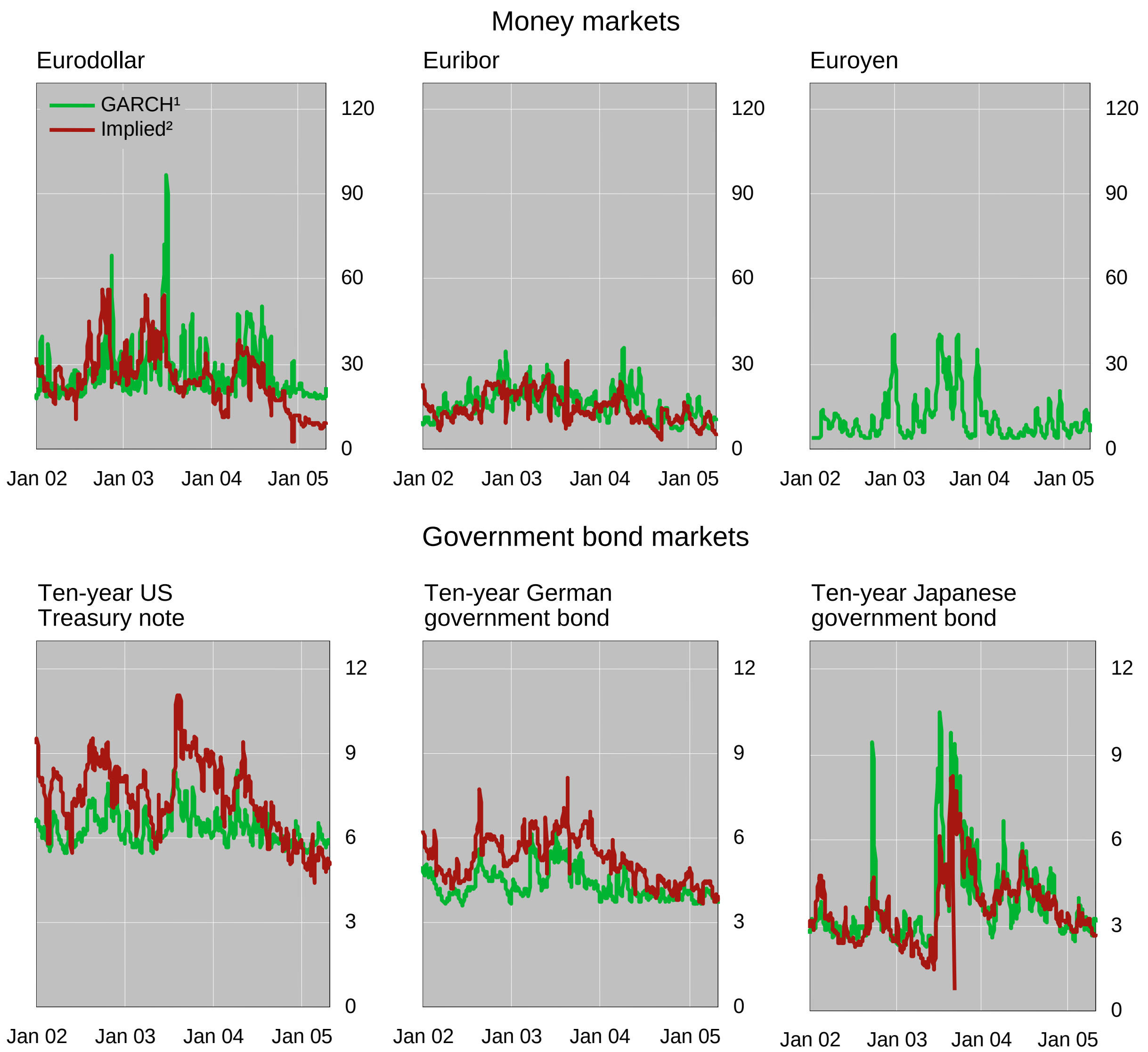
Quarterly contract turnover, in trillions of US dollars



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

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

economic outlook then brightened in February on the back of a positive surprise in machinery orders and a rising equity market.

Growth in currency contracts continues

Trading in currency products rises ...

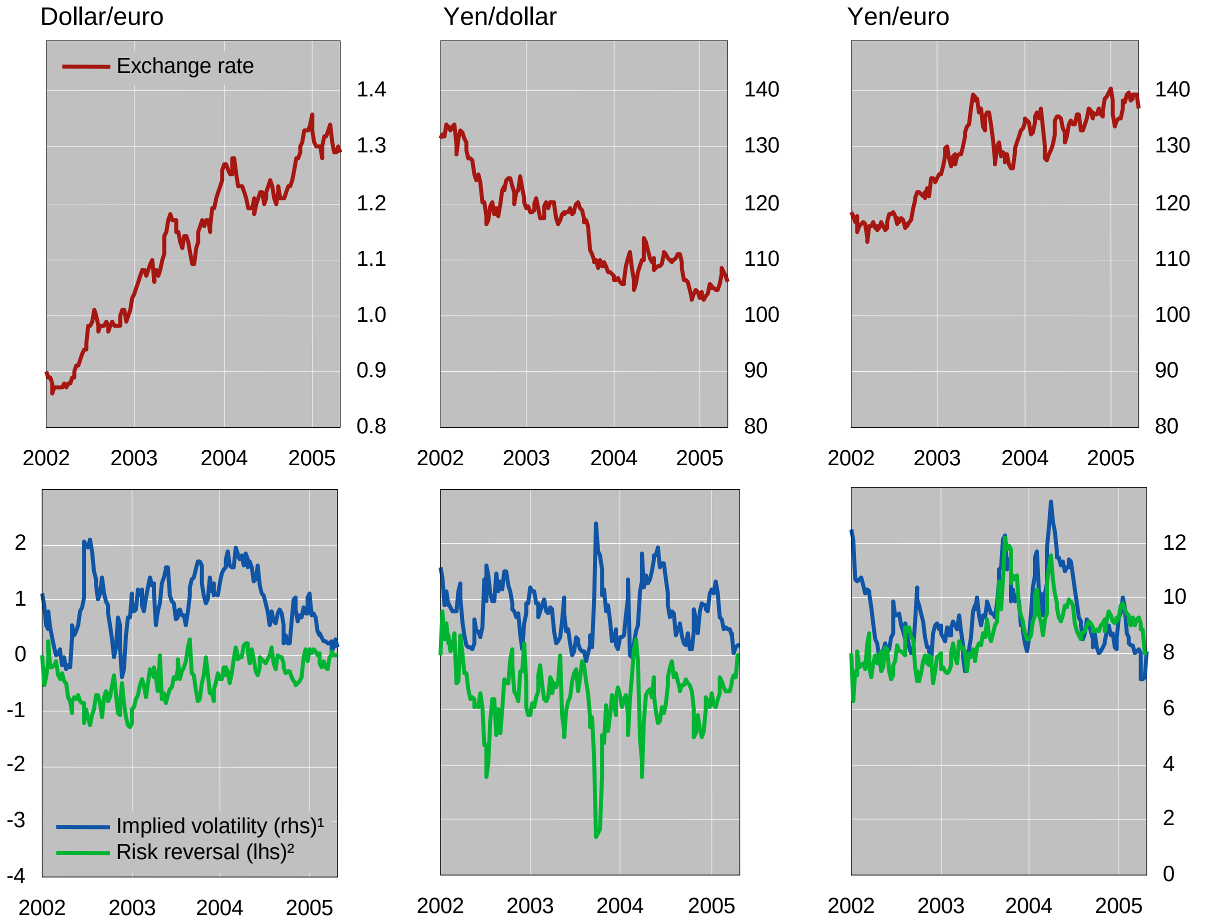
Turnover of exchange-traded currency derivatives rose by 15% from the previous quarter (to $2.7 trillion). Business in futures contracts increased by 14% (to $2.4 trillion), while activity in currency options surged by 25%. Higher turnover derived mainly from activity in the euro vis-à-vis the dollar, up by 19%. Among other currency pairs, turnover grew significantly for the Japanese yen vis-à-vis the dollar, up by 7%.

The increase in turnover differed across regions, although the vast majority of activity remains concentrated in US marketplaces. Business was up by 14% in the United States, to \$2.4 trillion, stagnated in Asia (\$30 billion) and fell by 3% in Europe (\$4 billion). Activity kept expanding at high rates in Brazil, with trading in futures and options on the São Paulo Mercantile and Futures Exchange (BMF) up by 32%, to \$234 billion.

… as dollar expectations shift

Increased investment and hedging activity in currency markets was not associated with uncertainty, since implied volatilities for the main currency pairs dropped significantly in the first quarter of 2005. It might instead have reflected realised and expected changes in exchange rate levels, and the need to adjust positions. After a prolonged depreciation, the dollar rose by 4.5% against the euro in the first quarter of 2005. Over the same period, risk reversal indicators derived from currency options (Graph 4.5) started to signal that economic agents had changed their expectations about future exchange rate levels, with the previously expected depreciation of the dollar versus the euro turning towards expectations of stability or slight appreciation. In particular, a large positive change in the risk reversal indicator in March was accompanied by a 34% surge in business in currency derivatives.

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

Activity in stock indices rises, but at a lower rate

Stock index turnover rises …

Global turnover in stock index contracts, which had grown by 17% in the last quarter of 2004, continued to expand in the first quarter of 2005, this time by 7% (to $26 trillion). Business was overall stronger in the United States, up by 9% (to $11 trillion), than in Europe, which was up by a relatively weak 5% (to $6 trillion). Business was particularly stagnant in Germany, where turnover for products related to the DAX index fell sharply. In the Asia-Pacific region, business increased by 5%, to $9 trillion. Trading continued to expand in the Korean stock market, up by 6%, and in Japan, by 10%. Turnover rose by 13% in Australia.

… once again less rapidly in Europe …

Options turnover was up by 8%, to $15 trillion, while business in futures grew by 5%, to $12 trillion. The stronger growth in the options segment came from both the US and the European markets, where activity in such instruments was up by 7% and 10%, respectively.

… as risk aversion increases

The increase in equity index trading in the United States and in Europe contrasts with the stability of the underlying indices, up by 0.1% and 2.4% in the first quarter, respectively. Also, it does not seem to be explained by greater uncertainty, as implied volatilities were stable at around 12% in annual terms. Higher turnover may instead have stemmed from investors turning marginally more risk-averse. Estimates of the coefficient of relative risk aversion derived from equity index options tended to rise in the first quarter of 2005, after declining through the previous year.

Business on individual stocks (data on which are available only in terms of number of contracts) continued to be positively related to activity in equity index-related products. The number of traded futures and options contracts written on individual stocks rose by 11% (17% and 6% in Europe and the United States, respectively).

Trading in commodities remains flat

Overall trading in commodities remains flat

After declining in the third quarter of 2004 and posting a modest recovery in the fourth, activity in commodity markets, which can only be measured in terms of number of contracts, remained flat in the first quarter of 2005. Business varied significantly across regions. It was up by 12% in the United States but declined by 2% in Europe and by 18% in Asia. The large fall in activity in this region derived entirely from energy- and non-precious metals-related products traded in Japan and China. Overall, turnover was negative for all types of commodity-related contracts, with the exception of agricultural derivatives, which were up by 26%.[2]

Strong activity in options on non-precious metals

Activity was down by 1% for futures, which account for 89% of all commodity-related contracts, and up by 9% for options. Business in commodity-related options showed marked differences across types of commodities. Turnover in energy-related options was down by 5% and that in options on precious metals by 31%. In contrast, trading in options on non-

[2] These derivatives represent 35% of all commodity-related contracts.

precious metals rose by 21%, and in those on agricultural commodities by 32%. Persistent expectations that GDP growth would remain solid, at least in the United States, may help to explain the drop in business for options on precious metals (assets typically preferred in periods of business cycle weakness) and the rise in those on non-precious metals (commodities whose prices tend to anticipate business cycle expansions).

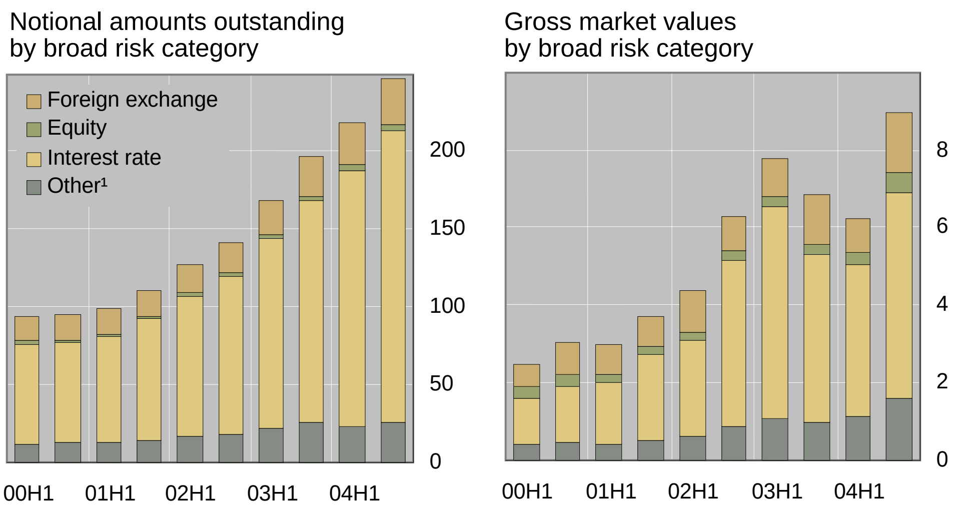
Robust expansion of OTC contracts

OTC activity expands in the second half of 2004

With this issue the BIS is starting to publish statistics on the market for credit default swaps (CDSs).[3] The latest data on OTC derivatives, spanning the second half of 2004, show that at the end of the year notional amounts of CDSs outstanding totalled $6.4 trillion, of which $2.7 trillion represented contracts between reporting dealers. In aggregate, positions in the global OTC derivatives market recorded a robust expansion in the second half of 2004. Overall amounts outstanding were up by 12.8%, to $248 trillion at the end of December (Graph 4.6 and Table 1). The growth in the latter half of the year was slightly higher than in the first six months, when positions had risen by 11.6%. After falling by 20% in the previous two surveys, gross market values increased by 43%, to $9.1 trillion as of end-December. Even after taking account of legally enforceable bilateral netting agreements, the rate of expansion was still 40%, at $2.1 trillion. This figure, however, represents just 0.8% of overall notional amounts.

Global OTC derivatives

In trillions of US dollars



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

Source: BIS. Graph 4.6

[3] The collection of CDS data started in December 2004, hence no information is available on notional amounts outstanding before this date. Also, there is no reference to such data in the Statistical Annex. A single-name CDS contract is an insurance contract covering the risk that a specified credit defaults. Following a defined credit event, the protection buyer receives a payment from the protection seller to compensate for credit losses. In return, the protection buyer pays a premium to the protection seller over the life of the contract.

The global OTC derivatives market[1]

Amounts outstanding, in billions of US dollars

	Notional amounts				Gross market value			
	End-Jun 2003	End-Dec 2003	End-Jun 2004	End-Dec 2004	End-Jun 2003	End-Dec 2003	End-Jun 2004	End-Dec 2004
Grand total	169,658	197,167	220,058	248,288	7,896	6,987	6,395	9,133
A. Foreign exchange contracts	22,071	24,475	26,997	29,575	996	1,301	867	1,562
Outright forwards and forex swaps	12,332	12,387	13,926	15,242	476	607	308	643
Currency swaps	5,159	6,371	7,033	8,217	419	557	442	761
Options	4,580	5,717	6,038	6,115	101	136	116	158
B. Interest rate contracts[2]	121,799	141,991	164,626	187,340	5,459	4,328	3,951	5,306
FRAs	10,270	10,769	13,144	12,805	20	19	29	20
Swaps	94,583	111,209	127,570	147,366	5,004	3,918	3,562	4,793
Options	16,946	20,012	23,912	27,169	434	391	360	492
C. Equity-linked contracts	2,799	3,787	4,521	4,385	260	274	294	501
Forwards and swaps	488	601	691	759	67	57	63	81
Options	2,311	3,186	3,829	3,626	193	217	231	420
D. Commodity contracts[3]	1,040	1,406	1,270	1,439	100	128	166	170
Gold	304	344	318	369	12	39	45	32
Other	736	1,062	952	1,070	88	88	121	138
Forwards and swaps	458	420	503	554	…	…	…	…
Options	279	642	449	516	…	…	…	…
E. Other derivatives[3]	21,949	25,508	22,644	25,549	1,081	957	1,116	1,594
Gross credit exposure[4]	.	.	.	.	1,750	1,969	1,478	2,076
Memo: Exchange-traded contracts[5]	*38,203*	*36,740*	*52,802*	*46,592*	.	.	.	.

[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 absolute value of the gross negative market value of contracts with non-reporting counterparties. [2] Single currency contracts only. [3] Adjustments for double-counting partly estimated. [4] Gross market values after taking into account legally enforceable bilateral netting agreements. [5] Sources: FOW TRADEdata; Futures Industry Association; various futures and options exchanges. Table 1

Growth in notional amounts, especially in the interest rate segment

Growth in notional amounts outstanding derived mainly from increased activity in interest rate products, up by 13.8% to $187 trillion. Owing to the large increases in activity captured in the two most recent semiannual surveys, interest rate swaps accounted for nearly 80% of the overall OTC interest rate segment at the end of December 2004. Business was particularly buoyant for swaps, which grew by 15.5% to $147 trillion. Notional amounts of interest rate options expanded by 13.6% (to $27 trillion), while those of FRAs, activity in which had increased noticeably in the first half of the year, fell by 3% (to $13 trillion).

Strong activity for swaps …

... especially for euro- and sterling-denominated contracts

The expansion in the interest rate swap market was due mainly to euro- and sterling-denominated instruments, both up by 20% to $59 trillion and $12 trillion respectively. By contrast, activity in the dollar segment, previously the main source of growth of the swap market, rose by only 7.9%, to $45 trillion, down from 25% in the first half of the year (Graph 4.7).

Growth in the notional amounts outstanding of interest rate derivatives occurred mainly among reporting dealers, up by 13%, and, as in the first half of 2004, between reporting dealers and other financial institutions, up by 23%. Position-taking by non-financial customers, mainly firms, fell by 14%. Looking at maturities, growth in notional amounts was stronger for longer-term instruments (18% for instruments over five years and 16% for those between one and five years) than for shorter-term ones (9%). This stands in contrast to the previous period, when growth in notional amounts had been strongest for short-term instruments, up by 23%.

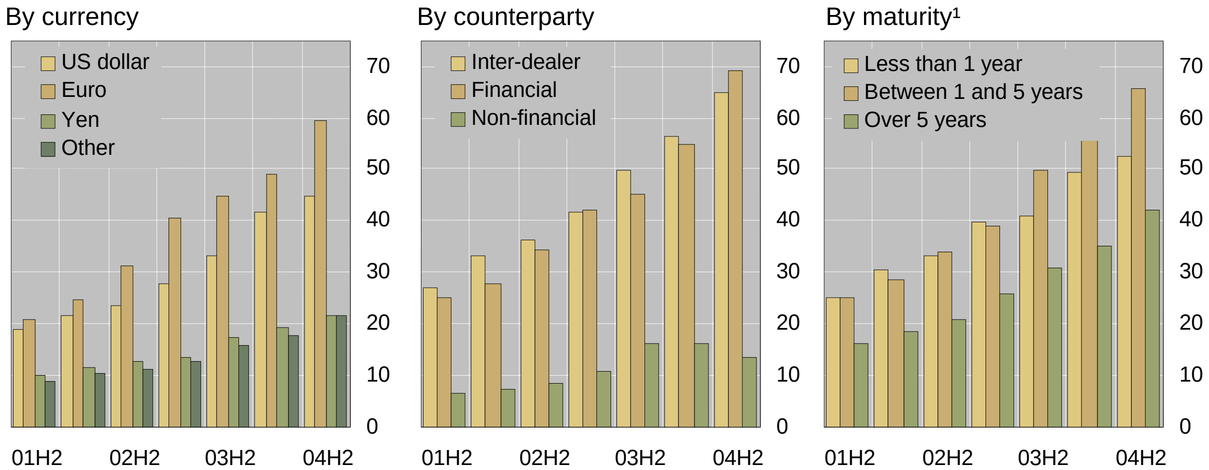
Business in OTC foreign exchange products expanded by 9.5%, to $30 trillion. Over 2004 as a whole, these instruments expanded by 21%, a sharp slowdown from the increase recorded in 2003, despite the persistence of the dollar's fluctuations against major currencies (its 15% fall against the euro in 2003 being followed by a further 8% drop in 2004). Notional amounts outstanding increased particularly for currency swaps, up by 16.8%, while for outright forwards and forex swaps it was equal to the average for the segment (9.5%); business was rather subdued for currency options, up by only 1.3% after posting huge growth during 2003.

Widening expected interest rate gap spurs currency swaps activity

The strong activity in currency swaps may have been boosted by a widening gap between interest rate expectations in the United States and those in the euro area. This development may have led economic agents to seek additional insurance against the larger expected differential. Activity was strongest between dealers and other financial institutions, up by 15%. Business with reporting dealers increased by 8%, down from the 25% rise recorded in

Interest rate swaps

Notional amounts outstanding, in trillions of US dollars



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

Source: BIS. Graph 4.7

the first half of the year. Amounts outstanding with non-financial customers returned to weak growth (3%) after falling by 4% in the previous period.

Credit default swaps

CDSs expand at exceptional rate

At the end of 2004 the notional amounts outstanding of CDSs totalled $6.4 trillion, nearly 50% more than the size of the market for equity index-related products but still significantly less than that of interest rate or exchange rate-related products ($187 trillion and $30 trillion, respectively). Despite its relatively small size, the development of the CDS market has been so far quite exceptional, compared to what has been observed for other risk categories. According to the data presented in the *Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity*, the growth of credit-related derivatives in the three years ending June 2004 amounted to 568%, against 121% for all OTC products.

Of the $6.4 trillion of notional amounts outstanding, $2.7 trillion concerned contracts between reporting dealers. For both protection bought and protection sold, over 80% of the outstanding contracts between reporting dealers and non-dealers were with non-reporting financial institutions. In terms of maturity of outstanding contracts, more than 70% of the single-name contracts had a maturity between one and five years, close to the corresponding number for multi-name contracts (60%).

Dealers bought net protection from non-dealers amounting to $178 billion, of which $149 billion was with non-reporting financial institutions. Nearly two thirds of these latter contracts were multi-name. The net market value of all outstanding contracts was $4 billion, with $89 billion in contracts with a gross positive market value and $93 billion in contracts with a negative market value.

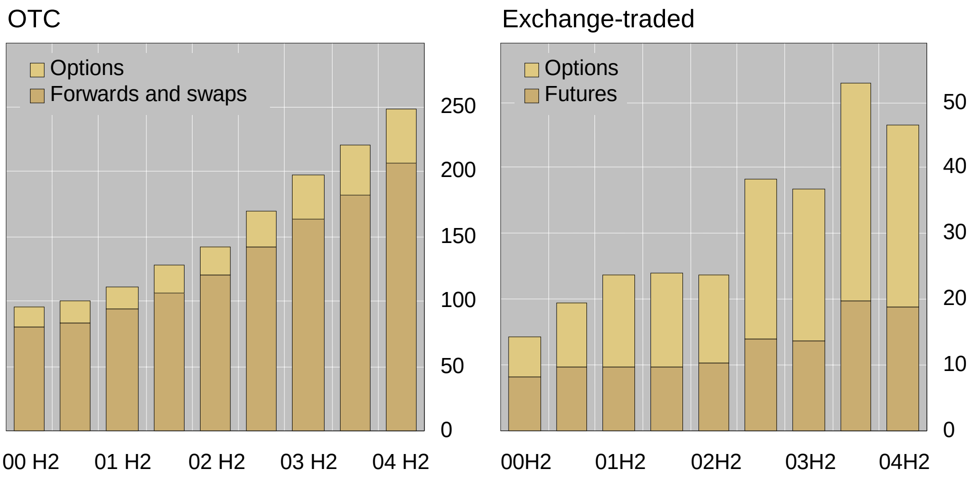
Development of CDS market likely to be boosted by credit derivatives fixing

Looking forward, the growth of credit derivatives could be further boosted by the recent launch of a credit derivatives fixing, relating to the iTraxx family of CDS indices. The availability of a fixing will produce a widely supported reference and settlement tool for the credit derivatives market. It will reassure investors that the prices quoted by individual traders are close to the market-wide consensus prices (much in the same way as Libor rates support the pricing of interest rate swaps), thereby enhancing transparency, and consequently volumes, of CDSs and cash-settled credit-related options.

Sizeable increase in gross market values

Gross market values, which had been declining for two consecutive reporting periods, jumped significantly, by 43%, in the second half of 2004, to $9 trillion (Graph 4.6). Interest rate contracts, which represent the largest OTC segment, were up by 34%, to $5.3 trillion. The increase was quite small for dollar-related products, only 3%, to $1.5 trillion, but amounted to 65% and 26% for euro- and sterling-related products, to $2.9 trillion and $237 billion respectively. The surge in gross market values was particularly strong for foreign exchange products, 80%, to $1.6 trillion, and for equity-related products, 70%, to $0.5 trillion. Compared to interest rate products, both segments are, however, Global derivatives positions

Amounts outstanding, in trillions of US dollars



Sources: FOW TRADEdata; Futures Industry Association; BIS. Graph 4.8

smaller components of the overall derivatives market. Across all risk categories, the ratio of gross market values to notional amounts outstanding went up from 2.9% as of end-June 2004 to 3.7% as of year-end. Taking account of legally enforceable bilateral netting agreements does not bring down the expansion in gross market values. Nevertheless, gross market values – thus calculated – increased only marginally (from 0.7% to 0.8%) as a ratio to overall notional amounts.

Growth in OTC markets was not matched on exchanges

The 12.8% rise in business in OTC markets in the second half of 2004 coincided with a drop in activity, of 11.8%, on the exchanges.[4] The gap in the development of notional amounts outstanding between the two markets has become particularly sizeable since mid-2003 (Graph 4.8). Between end-June 2003 and end-December 2004, amounts outstanding grew by 46% in OTC markets, against 22% in exchanges. By contrast, over the previous 18-month period, both segments had grown by approximately 55%.

[4] When comparing activity in the exchange-traded and OTC segments, it is important to recall that notional amounts outstanding in the OTC market should tend to grow faster, since hedging or trading in this segment generally involves the writing of new contracts, which leads to a natural build-up of notional amounts outstanding.