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4. Derivatives markets

In the last quarter of 2004 the combined value of trading in interest rate, stock index and currency contracts on organised exchanges fell by 3%, to $279 trillion. The slowdown in global activity was due solely to the stagnant short-term interest rate segment; long-term interest rates, stock market indices and currencies registered solid growth. Notional amounts as of year-end returned close to the values prevailing in March, as a huge expansion in the first half of the year outweighed the declines in the second half.

A greater convergence of views about the likely path of monetary policy in the United States after the first increase in policy rates in June probably explains the weak trading of short-term interest rate contracts. At the other end of the yield curve, as well as for stock indices, greater hedging-related activity in the fourth quarter of 2004 may have been stimulated by softer expected global GDP growth, while the sharp dollar depreciation may have contributed to expanded business in currency-related products.

The pattern of growth in activity was similar across geographical areas, with one major exception. Trading in short-term interest rate contracts, which for 2004 as a whole represented nearly 80% of overall trading on exchanges, was particularly low in Asia and the United States, but high on European exchanges.

Restrained trading on reduced rate uncertainty

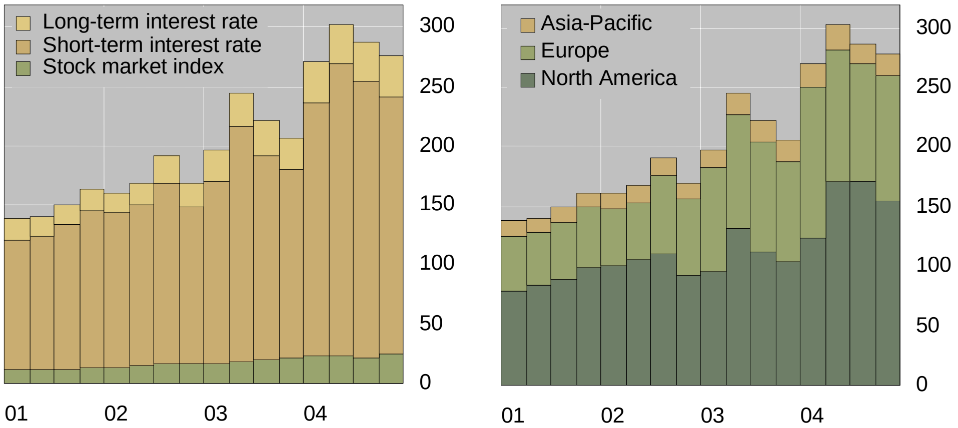
Activity in fixed income contracts drops further ...

The aggregate turnover of exchange-traded fixed income contracts fell by 5% in the last quarter of 2004, as in the previous quarter, to $252 trillion. The decline was due entirely to reduced trading on short rate contracts. Trading on money market contracts, including those on eurodollar, Euribor and euroyen rates, fell by 7% to $217 trillion. This slowdown in activity involved both futures and options, with turnover falling by 5% and 11% respectively (to $164 trillion and $53 trillion). By contrast, activity in bond-related instruments rose by 8% to $36 trillion (Graph 4.1), where business in futures rose by 10%, but that in options fell by 4%.

Turnover of exchange-traded futures and options

Quarterly data, in trillions of US dollars

By contract type | By region



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

... due to reduced trading in short-term contracts ...

Activity in short-term contracts varied significantly across geographical regions. Trading was sharply down in the United States, by 13% to $128 trillion, with both the futures and options segments falling by the same percentage (Graph 4.2). In contrast, business rose by 6% in Europe, to $80 trillion, due to activity in futures, up 10%, while trading in options fell by 8%. Activity in Europe thus reached nearly two thirds that of the United States, up from only half the US size in the third quarter. The pickup in futures business in European marketplaces was apparent in both of the major contracts, with transactions growing by 7% in both the three-month eurosterling and the three-month Euribor contracts. Analogously, the slowdown in options trading in Europe was apparent in both contracts as well.

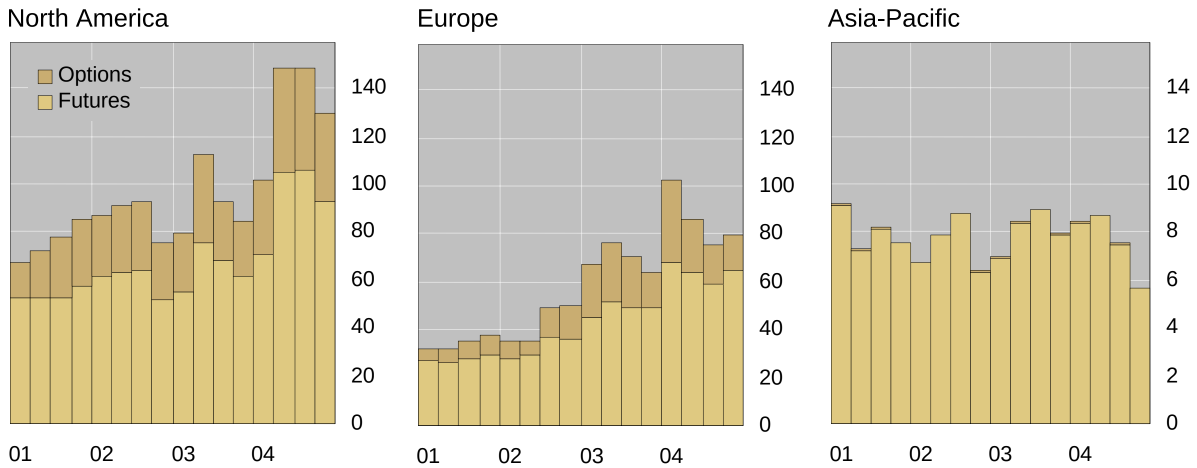
Lower activity in short-term interest rate derivatives, which appeared after the first increase of official rates in the United States in June, is probably due to reduced uncertainty and an increased degree of consensus over the course of monetary policy. In the second half of 2004, the Federal Reserve consistently signalled to the markets that the future path of short-term interest rates would be upwards but implemented gradually at a "measured pace". In the last quarter of the year, implied volatility derived from either options on three-month eurodollar futures or from swaptions on the one-year rate with a short expiration decreased noticeably, from 34% to 24% and from 23% to 18% respectively.

... and less disagreement over the path of monetary policy

A link between trading in short-term interest rate derivatives and the degree of consensus over the course of monetary policy is consistent with the pattern of business in federal funds futures. In the first half of 2004 (see the December 2004 issue of the *BIS Quarterly Review*) trading in federal funds futures had risen noticeably, owing to greater position-taking in an environment characterised by divergent views ahead of the first hike in rates by the Federal Reserve in June. However, transactions then fell sharply in July, and continued to fall through the last quarter. This pattern seems to mirror indications of less divergence of views about monetary policy. According to a Bloomberg survey,

Turnover of short-term interest rate contracts

Quarterly contract turnover, in trillions of US dollars



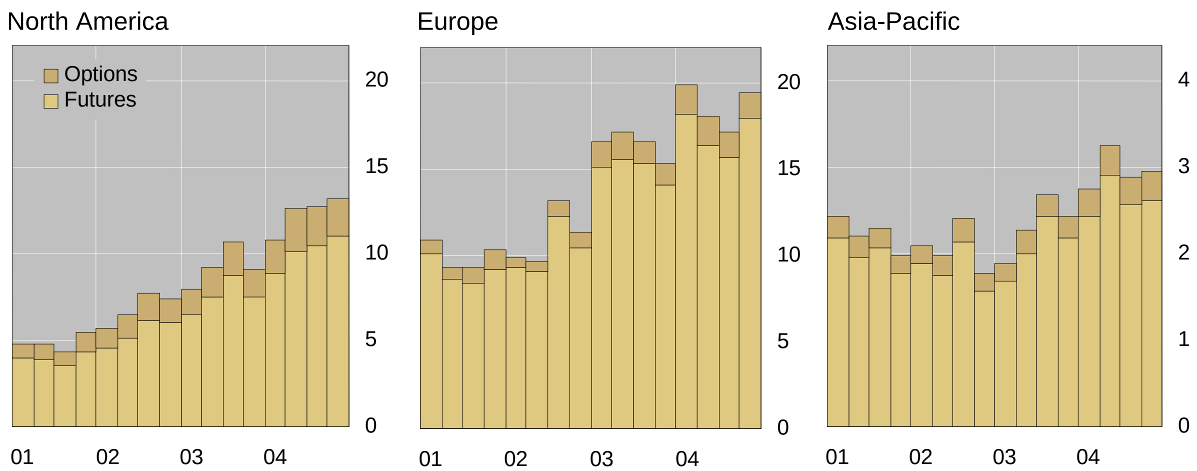
Sources: FOW TRADEdata; Futures Industry Association; BIS calculations. Graph 4.2

the standard deviation of federal funds rate target forecasts hit the year's maximum at the end of May and dropped visibly after the June decision, remaining at extremely low values since then.

As mentioned above, European short rate business was more robust during the quarter than that in the United States. This was particularly the case in November, when there was strong trading in European marketplaces (up 23%) while business in the United States was virtually flat. The contrast may be related to the fact that uncertainty about the path of rates did not appear to diminish as in the United States. Volatilities of three-month rates in Europe remained rather stable through the last quarter of 2004, compared to declines in the United States. Neither was there evidence of a decline in the dispersion of forecasts of official European rates.

Turnover of government bond contracts

Quarterly contract turnover, in trillions of US dollars



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

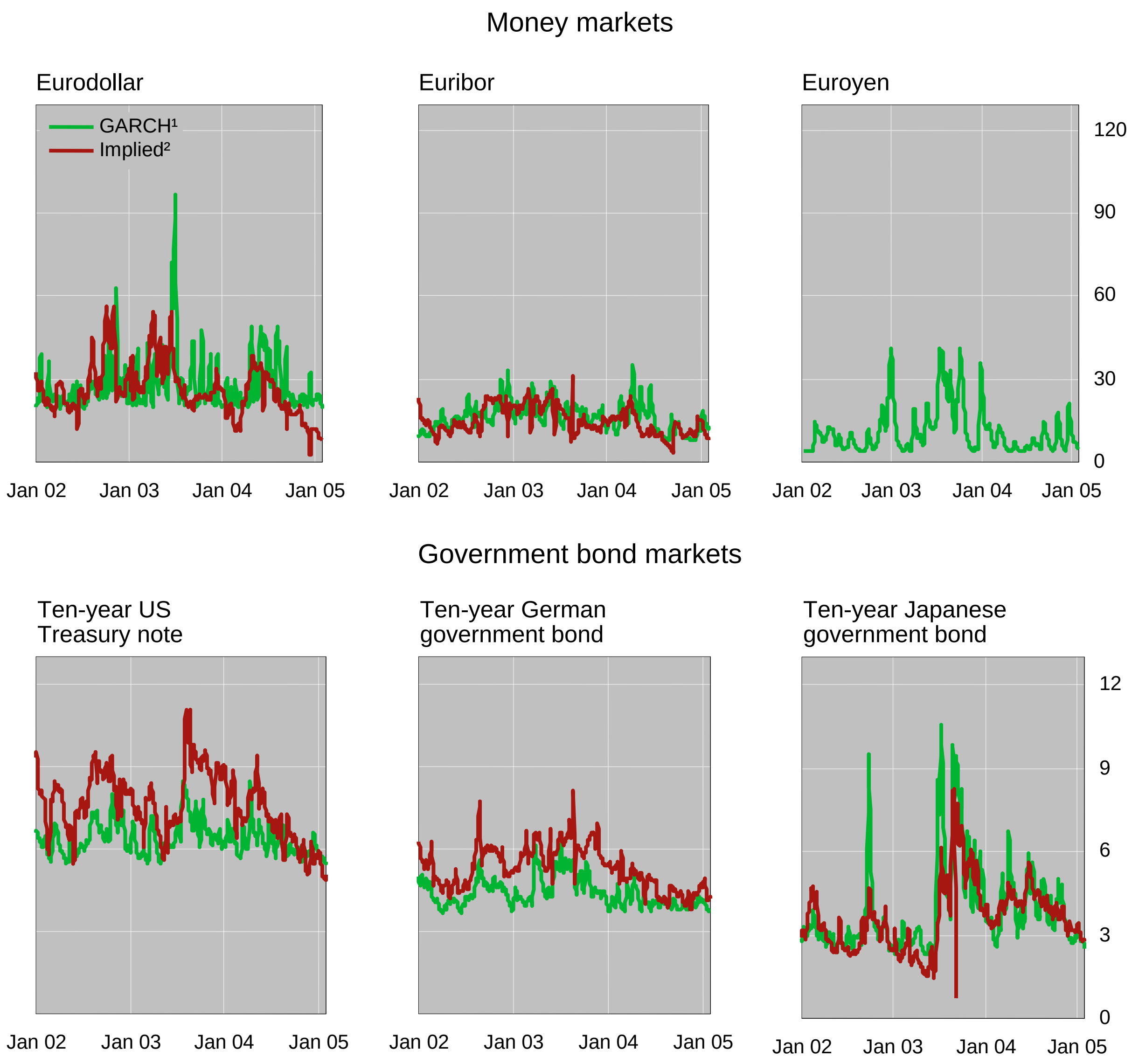
In the long-term interest rate segment, contracts expanded by 8% in the fourth quarter, to $36 trillion. Business was up 3% in North America to $13 trillion, and by 13% in Europe to $19 trillion (Graph 4.3). This activity could have been related to downward revisions of future economic growth, which might have boosted hedging activity at the long end of the yield curve. In the last quarter of 2004, growth forecasts for 2005 as compiled by Consensus Economics were revised downwards in both the United States and Europe.

Long-term bond contracts grow, especially in Europe

Trading at the long end of the maturity spectrum in the fourth quarter may also have been favoured by a flatter term structure of implied volatilities – a phenomenon particularly pronounced in the United States, due to sharply

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

falling volatilities at the short end and stable volatilities over longer maturities (Graph 4.4). The higher relative volatility of long-term rates has changed the risk-return characteristics of interest rate portfolios and has possibly increased the need for hedging activity.

Business falls in Asia for the second quarter in a row …

In the Asia-Pacific region, turnover contracted by 17% to $9 trillion. The decline was due to falling activity in short-term rates, down by 24%, while business in long rates rose by 3%. The contraction in the short-term segment was again largest in Asia, where activity, which had already dropped 25% in the third quarter, was down by an additional 46% in the last quarter of the year. Among Asian countries, declines were sharpest in Japan, where turnover of short-term contracts decreased by 27%, and in Singapore, where there was a 74% plunge in futures on three-month eurodollar instruments[1] and a 24% fall in futures on the three-month euroyen. The decline in short rate position-taking in Japan probably reflected less demand to hedge against the likelihood of the Bank of Japan ending its policy of quantitative easing over the near and medium term, since there was a marked reduction in GDP growth forecasts for 2005 from nearly 2% in June to just over 1% last December. In Australia, where interest rate derivatives transactions had soared by 18% in the third quarter, activity remained positive but grew at a much slower rate in the fourth quarter of the year, with short- and long-term contracts up by 5%.

… but keeps growing in Australia

Business in currency contracts expands further

Trading in currency products expands further …

In sharp contrast to the decline in interest rate derivatives trading, turnover of exchange-traded currency derivatives amounted to $2.3 trillion in the fourth quarter of 2004, a 36% rise from the previous quarter. Despite its growth, this segment of the overall exchange-traded derivatives market still represents only 1% of overall trading. Futures form the vast majority of derivatives in this category ($2.1 trillion), with currency options representing just 8% of overall activity. The boom in the fourth quarter stemmed above all from strong business in the euro, yen and Swiss franc vis-à-vis the dollar, up by 44%, 41% and 36% respectively.

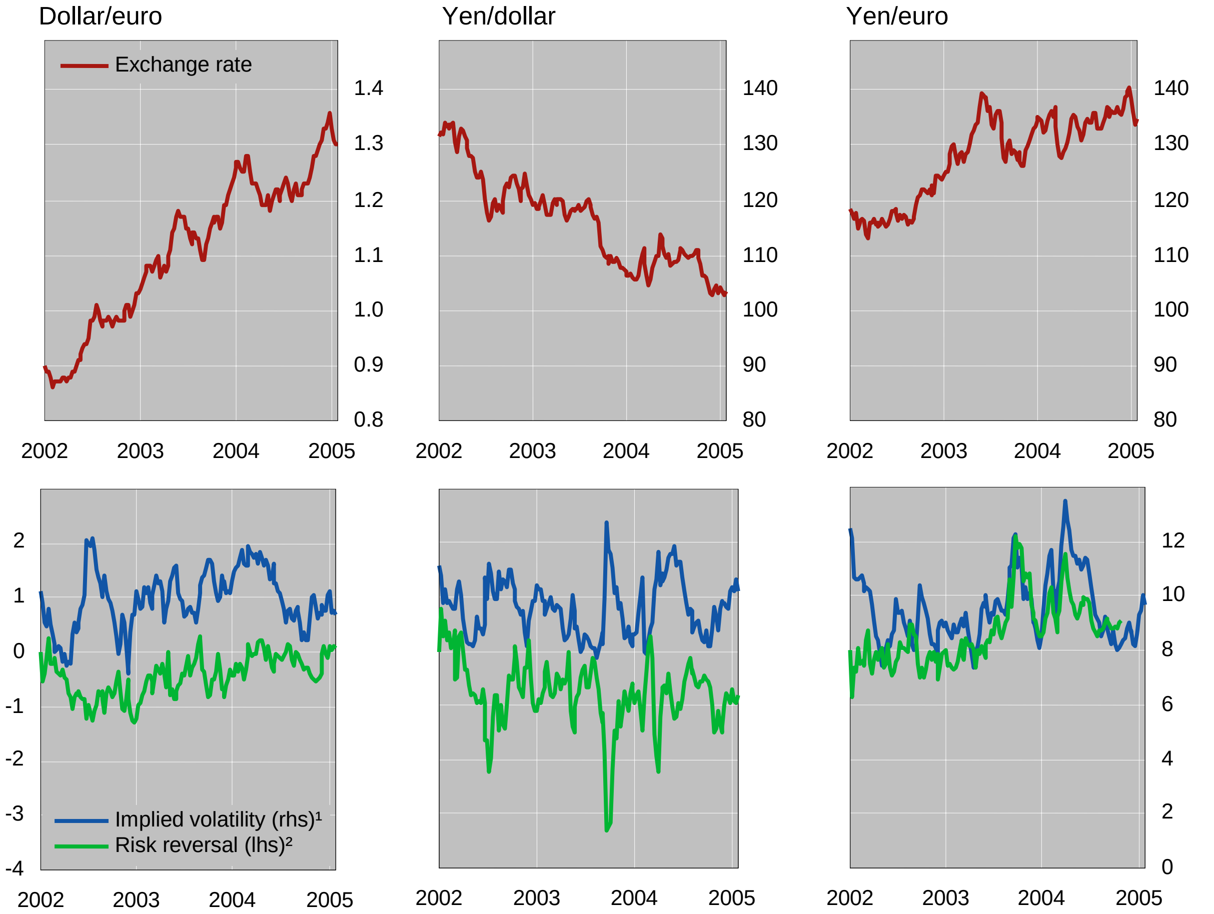
The increase in turnover was global, with business up 39% in the United States to $2.1 trillion, by 43% in Europe to $4 billion, and by 16% in Asia to $30 billion. While activity remains highly concentrated in US marketplaces, where 90% of trading takes place, Brazil is a particularly active exchange especially for options trading. Business in futures and options traded on the São Paulo Mercantile and Futures Exchange (BMF) amounted to $177 billion, six times the overall total in Asian and Australian exchanges ($29 billion). Derivatives trading on the BMF started in 1986, and gained particular strength after 1994, in coincidence with the start of the Real Plan.

… favoured by a sliding dollar …

Clear trends as well as higher volatility in foreign exchange markets are often associated with increased investment and hedging activity in those markets. The strong demand for currency hedging in the fourth quarter is thus

[1] These contracts are traded in Singapore under a Mutual Offset System Agreement with the Chicago Mercantile Exchange.

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

likely to be related to the further slide of the dollar against major currencies (2%, 5% and 4% against the euro in October, November and December respectively) as well as higher implied volatility, which rose from 8.8% per year in September to over 11% per year on average in the last quarter. By contrast, business was not associated with expected changes in the bilateral rates of main currency pairs, which can also stimulate hedging activity. In fact, risk reversals on the dollar/euro and yen/dollar pairs moved slightly towards less negative values and remained overall very close to zero, indicative of a neutral view about the future development of dollar exchange rates (Graph 4.5).

... and higher implied volatilities

Activity in stock indices surges again

After remaining stable in the second quarter and contracting in the third, global turnover in stock index contracts returned to robust growth in the last quarter of the year. Overall trading rose by 17% to $25 trillion. Business was particularly strong in the Asia-Pacific region, rising 23% to $9 trillion, and in the United States, up by 15% to $10 trillion. Turnover grew more slowly in Europe, by 10% to $5 trillion. This relatively lower growth came entirely from weak activity in the

Stock index turnover rises ...

... but less rapidly in Europe

United Kingdom, where trading in stock index derivatives was up by 1% only, due to the complementary effects of falling turnover on the FTSE 100 index traded on the LIFFE and rising activity on the Swedish and Danish stock indices traded on the EDX exchange. Excluding the United Kingdom, business was up by nearly 20% on average in the other main countries of the area (by 29% in Spain, 23% in Italy, 14% in France and 11% in Germany).

The 17% rise in overall stock index business in terms of notional amounts compares with a 9% increase when activity is measured in terms of number of contracts. This type of discrepancy was evident in all regions but was particularly sizeable in European marketplaces, where the 10% rise in terms of notional amounts corresponded to a 2% fall in terms of number of contracts. This could indicate that the expansion in turnover may derive from an increase in the value of derivatives contracts following a surge in the levels of stock indices rather than from an actual increase in the volume of trading.

Overall, as measured by notional amounts, options turnover was up by 21%, to $14 trillion, while business in futures grew by 11%, to $11 trillion. The stronger growth in the options segment was mainly accounted for by the US market, where activity in such instruments was up by 22%. Turnover on the Chicago Board Options Exchange, which accounts for nearly 90% of trading in options in the United States, increased after declining for two consecutive quarters, with robust activity in the S&P 500, the Nasdaq 100 and the Dow Jones Industrial indices. Trading in options was also more buoyant than that in futures in Asian and Pacific marketplaces. In Europe, options turnover expanded by 12% against 6% for futures. Options business was particularly strong in Spain and Italy, up 64% and 29% respectively, although the two countries account for just slightly over 3% of total trading of equity index options in European marketplaces.

Trading pushed by rising equity indices ...

... in a context of higher volatility

The surge in equity index trading in the United States and Europe may reflect the upward movement of the underlying indices, around 9% between end-September and end-December 2004 in both areas; these indices had been virtually flat in the first eight months of the year. Higher turnover may also be due to the reversal in the downward trend displayed by volatilities since mid-2002. Implied volatilities, which had fallen remarkably from the peaks of September 2002 and touched historical lows last September of 11% and 7% (annualised) in the United States and Europe respectively, started to increase in the fourth quarter and reached on average 13% and 14%.

On Asian exchanges, trading in the Korean stock market, which in the third quarter of 2004 had dropped by 26% due to ongoing investigations regarding derivatives trades, expanded by 26% in the fourth quarter. Business was also strong in Japan, up by 10%.

Individual stock contracts rise

Increased business in equity-related products was also apparent in the increased turnover of contracts on individual stocks (data on which are available only in terms of number of contracts). After falling in the previous two quarters, the number of traded futures and options contracts rebounded by 12% in the fourth quarter. Futures traded in Asian marketplaces were particularly strong, up by 28%. Turnover in Europe and in the United States was nearly flat, with the only exception being for options traded on US exchanges, which rose by 25%.

Trading in commodities remains unchanged

Activity in commodity markets, which can only be measured in terms of number of contracts, was virtually flat in the fourth quarter, with growth of less than 2%. Business edged down by 1% in the United States and was up by 5% in Europe, mainly due to increased trading in UK marketplaces.

Energy trading up in Asia

Overall turnover of energy derivatives grew by 1%, albeit with high dispersion across areas. Contracts rose by 8% on Asian exchanges but fell by 3% in the United States and Europe. Total turnover may have increased more markedly in terms of notional amounts, since the price of energy products, which at the end of last year represented 42% of total commodities trading, rose in the last quarter of 2004. However, open interest, which records the number of contracts not yet closed, also fell, which may indicate that economic agents did indeed reduce hedging activity in the energy sector.

Transactions rise for non-precious metals

Trading in non-precious metals derivatives rose by 8% overall, 9% in Europe and 6% in the United States and Asia. The increased business came almost entirely from the London Metal Exchange, where transactions were particularly strong for aluminium, copper and zinc. Given that trading activity in these commodities tends to lead changes in coincident cyclical indicators, the recent higher activity may anticipate a new upward reassessment of future global growth in 2005 after the downward revisions that took place in the fourth quarter of 2004.